DESCRIPTION

AROMATIC COMPOUND

TECHNICAL FIELD

The present invention relates to an aromatic compound.

BACKGROUND ART

Currently, it is said that the disease known as fibrosis includes 130 types or more of diseases, if rare diseases are also included therein. Representative examples of such fibrosis include lung fibrosis, hepatic fibrosis, and glomerulosclerosis.

In general, lung fibrosis refers to a group of diseases associated with loss of lung functions due to a lesion regarding the reconstruction of an alveolar region, which is caused by the phenomenon whereby the alveoloar structure is destroyed by an inflammatory reaction, and as a result, growth of fibroblasts and an excessive increase in extracellular matrix mainly composed of collagen take place, so that the lung becomes hardened.

Moreover, hepatic fibrosis refers to a pathologic condition associated with fibrosis of the liver, which is caused by the phenomenon whereby hepatic cells are necrotized by various types of hepatopathy such as chronic viral hepatitis or alcoholic hepatitis, and thereafter, extracellular

matrix increases to replenish the necrotized portion, resulting in such fibrosis of the liver. This pathologic condition finally leads to hepatic cirrhosis, in which the entire hepatic fibers shrink and become hardened.

In order to suppress the aforementioned hepatic fibrosis, drugs such as Penicillamine or Lufironil have been used. Penicillamine has been known as a drug for treating Wilkinson's disease that is developed as a result of accumulation of copper in the liver due to abnormality of copper metabolism. Lufironil has been studied for its use as a proline hydroxylase inhibitor.

However, taking into consideration their side effects and effectiveness, the aforementioned drugs do not sufficiently function as drugs for preventing fibrosis of the liver. Thus, as a matter of fact, neither therapeutic agents nor methods for treating fibrosis, which are effective for fibrosis, including hepatic fibrosis as a representative example, have been established to date. A method of specifically inhibiting a process of developing fibrosis has become a focus of attention in the research field.

As stated above, it has been known that an excessive increase in extracellular matrix mainly composed of collagen takes place during a process of development of fibrosis in the lung tissues or hepatic tissues. Moreover, it has also been known that such an

increase in extracellular matrix in hepatic cells takes place mainly in sinusoidal wall Disse's space, and that Ito cells that are mesenchymal cells in the liver are main sources for production of such extracellular matrix.

Accordingly, in order to suppress fibrosis occurring in the liver, the lung, or other organs, it is important to suppress an excessive increase in extracellular matrix (namely, collagen).

JP-A-2002-507601 and JP-A-2001-89450 disclose that a certain type of pyridine derivative has an effect of suppressing the generation of collagen and thus is effective for fibrosis. JP-A-2001-89412 discloses that a certain type of benzene derivative has an effect of suppressing the production of collagen and thus is effective for fibrosis.

However, the effect of suppressing the generation of collagen of the compounds described in JP-A-2002-507601, JP-A-2001-89450, and JP-A-2001-89412 are insufficient, or these compounds have serious side effects. Accordingly, it has strongly been desired that a compound, which has a superior effect of suppressing the production of collagen, less side effects, and excellent safety, will be developed.

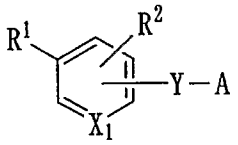
DISCLOSURE OF THE INVENTION

It is an object of the present invention to provide a novel compound, which has a superior effect

of suppressing the generation of collagen, for example, a pharmaceutical composition being useful for preventing and treating fibrosis such as lung fibrosis, hepatic fibrosis, glomerulosclerosis and the like, with less side effects, and excellent safety.

As a result of intensive studies directed towards achieving the aforementioned object, the present inventors have found that an aromatic compound represented by the following general formula (1) and a salt thereof have a superior effect of suppressing the generation of collagen, less side effects, and excellent safety. The present invention has been completed based on these findings.

The present invention provides an aromatic compound represented by the general formula (1) or a salt thereof:

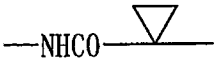


(1)

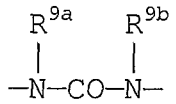
[wherein X_1 represents a nitrogen atom or a group -CH=,

R^1 represents a group $-Z-R^6$,

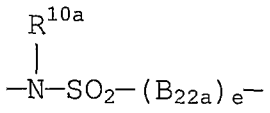
Z represents a group $-N(R^8)-B-$, a group $-B-N(R^8)-$, a group $-B_0-O-$, a group



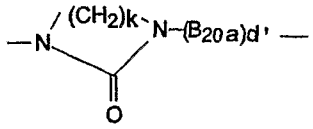
a group -CO-, a group -CH(OH)-, a group



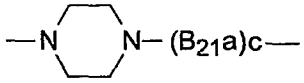
a group -N=CH-, a group



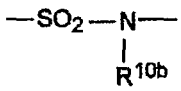
a lower alkenylene group, a group $-NHCO-B_1-$, a group $-NHCO-B_2-(W)u-$, a group $-B_0-O-B_{19a}-$, a group



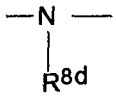
a group



a group



a group -S-, a lower alkynylene group, a lower alkylene group, a group



or a group $-CO-NH-B_{18}a-$,

wherein R^8 represents a hydrogen atom, a lower alkyl group that may have a lower alkoxy group as a substituent, a lower alkanoyl group, a phenyl lower alkyl group, or a lower alkylsulfonyl group,

B represents a group -CO- or a lower alkylene group,

B_0 represents a lower alkylene group,

each of R^{9a} and R^{9b}, which are identical or different, represents a hydrogen atom or a lower alkyl group

R^{10a} represents a hydrogen atom or a lower alkyl group,

B_{22a} represents a lower alkylene group or a lower alkenylene group,

e represents 0 or 1,

B_1 represents a lower alkenylene group that may have a phenyl group as a substituent,

B_2 represents a lower alkylene group that may be substituted by a group selected from the group consisting of a lower alkoxy group and a phenyl group,

W represents an oxygen atom, a group -NH-, or a sulfur atom,

u represents 0 or 1,

B_{18a} represents a lower alkylene group,

B_{19a} represents a lower alkylene group,

B_{20a} represents a lower alkylene group,

B_{21a} represents a lower alkylene group,

R^{8d} represents a hydrogen atom or a lower alkyl group,

k represents 2 or 3,

c represents 0 or 1,

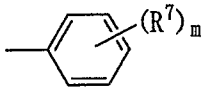
d′ represents 0 or 1,

R^{10b} represents a hydrogen atom or a lower alkyl group,

R^6 represents a 5- to 15-membered monocyclic, dicyclic, or tricyclic saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or

sulfur atoms (wherein, the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of an oxo group; an optionally halogenated lower alkoxy group; an optionally halogenated lower alkyl group; a halogen atom; a lower alkylsulfonyl group; a phenyl group that may be substituted, on the phenyl ring, by an optionally halogenated lower alkyl group; a lower alkylthio group; a pyrrolyl group; a benzoyl group; a lower alkanoyl group; a lower alkoxycarbonyl group; and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an adamantyl group, a naphthyl group (wherein, the naphthalene ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a halogen atom, and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an alkyl group that may have a lower alkoxy group as a substituent, a cycloalkyl group that may be substituted, on the cycloalkyl ring, by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group on the amino group and a lower alkyl group that may have a halogen atom as a substituent, a lower alkenyl group that may have a halogen atom as a substituent, a lower alkanoyl group, a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3

groups selected from the group consisting of a lower alkyl group that may have a halogen atom as a substituent and a halogen atom, a group



, a halogen atom-substituted lower alkyl group, or a cycloalkyl lower alkyl group,

R^7 represents a hydrogen atom, a phenyl group, a carboxy group, a hydroxyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a phenoxy group, a lower alkoxy group that may have a halogen atom as a substituent, a lower alkylenedioxy group, an amino group that may have, as a substituent, a group selected from the group consisting of a lower alkyl group, a lower alkanoyl group, a benzoyl group, and a cycloalkyl group, a cyano group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkylsulfonyl group, an aminosulfonyl group, a lower alkoxycarbonyl group, a lower alkanoyloxy group, a 5- or 6-membered saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein the heterocyclic ring may be substituted, by an oxo group), or a lower alkoxycarbonyl lower alkyl group,

m represents an integer between 1 and 5, wherein when m represents 2 to 5, two to five R^7s may be identical or different,

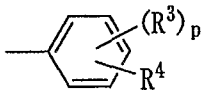
R^2 represents a hydrogen atom, a halogen atom, or a lower alkyl group,

Y represents a group -O-, a group $-N(R^5)-$, a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n-, or a group -C(=N-OH)-,

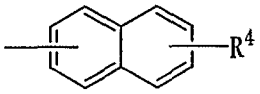
R^5 represents a hydrogen atom, a lower alkyl group, a lower alkanoyl group, a benzoyl group, a phenyl lower alkyl group, or a cycloalkyl group,

n represents 0, 1, or 2,

A represents a group



or a group



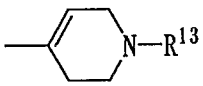
p represents 1 or 2,

R^3 represents a hydrogen atom, a lower alkoxy group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a carboxy group, a group $-CONR^{11}R^{12}$, or a cyano group,

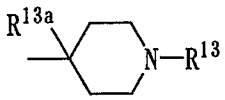
wherein each of R^{11} and R^{12}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, or a phenyl group, or R^{11} and R^{12}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen

atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring,

R^4 represents an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a group



a group



or a group $-(T)_1-N(R^{14})R^{15}$,

R^{13} represents a hydrogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl lower alkyl group, a lower alkoxycarbonyl

lower alkyl group, a carboxy lower alkyl group, a benzoyl group, a morpholino-substituted lower alkanoyl group, a piperazinyl carbonyl lower alkyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a morpholinocarbonyl-substituted lower alkyl group, or an imidazolyl lower alkanoyl group,

R^{13a} represents a hydrogen atom or a hydroxyl group,

T represents a lower alkylene group, a group $-N(R^{17})-B_3-CO-$, a group $-B_{19}-N(R^{18})-CO-$, a group $-B_4-CO-$, a group $-Q-B_5-CO-$, a group $-B_6-N(R^{19})-B_7-CO-$, a group $-CO-B_8-$, a group $-CH(OH)-B_9-$, a group $-CO-B_{10}-CO-$, a group $-CH(OH)-B_{11}-CO-$, a group $-CO-$, a group $-SO_2-$, or a group $-B_{23a}-CO-CO-$,

wherein R^{17} represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, a cycloalkylcarbonyl group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkenyl group, an amino-substituted lower alkanoyl group that may have a lower alkyl group as a substituent, or a lower alkylsulfonyl group,

B_3 represents a lower alkylene group,

B_{19} represents a lower alkylene group,

R^{18} represents a hydrogen atom or a lower alkyl group,

B_4 represents a lower alkenylene group or a lower alkylene group that may have a hydroxyl group as a substituent,

Q represents an oxygen atom or a group -S(O)n- (wherein n has the same meanings as described above),

B_5 represents a lower alkylene group,

B_6 represents a lower alkylene group,

R^{19} represents a hydrogen atom or a lower alkanoyl group,

B_7 represents a lower alkylene group,

B_8 represents a lower alkylene group,

B_9 represents a lower alkylene group,

B_{10} represents a lower alkylene group,

B_{11} represents a lower alkylene group,

B_{23a} represents a lower alkylene group,

l represents 0 or 1,

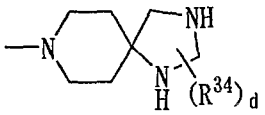
R^{14} represents a hydrogen atom or an alkyl group that may have a hydroxyl group as a substituent,

R^{15} represents (2) a hydroxyl group-substituted alkyl group, (3) a cycloalkyl group that may have a group selected from the group consisting of a hydroxyl group and a lower alkyl group as a substituent, (4) a phenoxy lower alkyl group, (5) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group; a lower alkoxy group that may have a halogen atom as a substituent; a halogen atom; an amino lower

alkoxy group that may have a lower alkyl group as a substituent; a hydroxyl group-substituted lower alkyl group; a phenyl lower alkyl group; a lower alkynyl group; an amino group that may have a lower alkylsulfonyl group as a substituent; a lower alkylthio group; a cycloalkyl group; a phenylthio group; an adamantyl group; an anilino group that may have a halogen atom as a substituent on the phenyl ring; a lower alkoxycarbonyl group; a piperazinyl group that may have a lower alkyl group as a substituent on the piperazine ring; a pyrrolidinyl group that may have an oxo group as a substituent on the pyrrolidine ring; a lower alkanoylamino group; a cyano group; and a phenoxy group, (6) a phenoxy group, (7) a phenyl lower alkyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkyl group, (8) a phenyl lower alkyl group that has a lower alkylenedioxy group as a substituent on the phenyl ring, (10) a lower alkoxycarbonyl-substituted lower alkyl group, (11) a carboxy-substituted lower alkyl group, (12) an amino group that may have a lower alkanoyl group as a substituent, (13) a 1,2,3,4-tetrahydroquinolyl group that may have 1 to 3 groups selected from the group consisting of an oxo group, a lower alkoxy group, and a lower alkylenedioxy group as a substituent(s) on the tetrahydroquinoline ring, (14)

a cycloalkyl lower alkyl group, (15) a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (16) a pyridyl lower alkyl group, (17) an amino group-substituted lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent, (18) a lower alkoxy lower alkyl group, (19) an imidazolyl group, (20) an imidazolyl lower alkyl group, (21) a 1,2,3,4-tetrahydroisoquinolyl-carbonyl-substituted lower alkyl group, (22) a piperidinylcarbonyl group that may have a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, and a furyl lower alkyl group as a substituent on the piperidine ring, (23) a thiazolidinyl lower alkanoyl group that may have an oxo group as a substituent on the thiazolidine ring, (24) a piperidinyl group that may be substituted, on the piperidine ring, by a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, a lower alkyl group, a benzoyl group, and a furyl lower alkyl group, (25) a carbonyl lower alkyl group substituted by a group

, (26) a carbonyl lower alkyl group substituted by a group



, (27) a group $-CO-B_{20}-N(R^{36})R^{37}$, (26a) a pyrrolidinyl lower alkyl group, (27a) a morpholino lower alkyl group, (28a) a phenyl lower alkenyl group, (29a) an anilinocarbonyl lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, (30a) an indolyl group, (31a) a piperazinyl lower alkyl group that may have, as a substituent on the piperazine ring, a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (32a) an amidino lower alkyl group that may have a lower alkyl group as a substituent, (33a) a fluorenyl group, (34a) a carbazolyl group that may have a lower alkyl group as a substituent on the carbazole ring, (35a) an amidino group that may have a lower alkyl group as a substituent, (36a) a piperazinyl-substituted oxalyl group that may have 1 to 3 groups selected from the group consisting of a phenyl lower alkyl group (that may have 1 to 3 groups selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group as a substituent(s) on the phenyl ring) and a pyridyl lower alkyl group as a substituent(s) on the piperazine ring, or (37a) a

cyano-substituted lower alkyl group,

R^{34} represents an oxo group or a phenyl group,

d represents an integer between 0 and 3,

B_{20} represents a lower alkylene group,

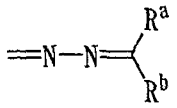
R^{36} and R^{37}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic group may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated or unsaturated heterocyclic ring; or a group

wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of (28) a phenyl-substituted lower alkyl group, which has 1 to 2 phenyl groups and which may have a pyridyl group on the lower alkyl group, wherein the phenyl ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkanoyl group, an amino group that may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro

group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy group, (29) a carbamoyl group, (30) a pyridyl lower alkyl group that may have, as a substituent(s) on the pyridine ring, 1 to 3 groups selected from the group consisting of a hydroxyl group and a lower alkyl group that may have a hydroxyl group as a substituent, (31) a pyrrolyl lower alkyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the pyrrole ring, (32) a benzoxazolyl lower alkyl group, (33) a benzothiazolyl lower alkyl group, (34) a furyl lower alkyl group, (35) a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, an amino group that may have a lower alkylsulfonyl group as a substituent, a halogen atom, a lower alkoxy group, a lower alkyl group that may have a halogen atom as a substituent, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a thiazolidinylidene lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, and a lower alkylenedioxy group, (36) a pyrimidinyl group, (37) a pyrazinyl group, (38) a pyridyl group, (39) a lower alkoxycarbonyl group, (40) a thiazolidinyl lower alkanoyl group that may be substituted, on the

thiazolidine ring, by a group selected from the group consisting of an oxo group and a group



(wherein each of R^a and R^b represents a lower alkyl group), (41) a lower alkyl group that may have a group selected from the group consisting of a hydroxyl group and a halogen atom as a substituent, (42) a lower alkanoyl group that may have a halogen atom as a substituent, (43) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a carbamoyl group that may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group, a lower alkoxycarbonyl group, a carboxy group, a cyano group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a benzoyl group that may have a halogen atom as a substituent on the phenyl ring, a phenyl lower alkyl group that may have a halogen atom as a substituent on the phenyl ring, and a hydroxyl group, (44) a phenyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (45) a naphthyl lower alkyl group, (46) a phenoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group

consisting of a cyano group, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (47) a phenoxy lower alkyl group, (48) a phenyl lower alkoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (49) a group $-(B_{12}CO)t-N(R^{20})R^{21}$, (50) a group $-(CO)o-B_{13}-N(R^{22})R^{23}$, (51) a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may be substituted, on the 1,2,3,4-tetrahydronaphthalene ring, by 1 to 5 lower alkyl groups as a substituent(s), (52) a cycloalkyl group that may have a hydroxyl group as a substituent, (53) a piperidinyl group that may be substituted, on the piperidine ring, by 1 to 3 lower alkyl groups as a substituent(s), (54) a quinolyl lower alkyl group, (55) a 1,2,3,4-tetrazolyl lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent on the tetrazole ring, (56) a thiazolyl lower alkyl group that may have a phenyl group as a substituent on the thiazole ring, (57) a benzoyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkoxy group and a halogen atom as a substituent(s) on the phenyl ring,

(58) a piperidinyl lower alkyl group that may have a lower alkyl group as a substituent on the piperidine ring, (59) an imidazolyl group that may have 1 to 3 phenyl groups as a substituent(s) on the imidazole ring, (60) a benzimidazolyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the benzimidazole ring, (61) a pyridyl lower alkoxy group, (62) a 1,2,3,4-tetrahydroquinolyl lower alkyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (63) a 1,3,4-oxadiazolyl lower alkyl group that may have an oxo group as a substituent on the 1,3,4-oxadizole ring, (64) a cycloalkyl lower alkyl group, (65) a tetrahydropyranyl group, (66) a thienyl lower alkyl group, (67) a pyrimidinylcarbonyl group that may have an oxo group as a substituent on the pyrimidine ring, (68) a hydroxyl group, (69) a carboxy group, (70) a lower alkoxy lower alkyl group, (71) a lower alkoxy lower alkoxy group, (72) a benzoyloxy group, (73) a lower alkoxycarbonyl lower alkoxy group, (74) a carboxy lower alkoxy group, (75) a phenoxy lower alkanoyl group, (76) a 1,2,3,4-tetrahydroquinolylcarbonyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (77) a phenylsulfonyl group, (78) an imidazolyl lower alkanoyl group, (79) an imidazolyl lower alkyl group, (80) a pyridylcarbonyl group, (81) an imidazolylcarbonyl group, (82) a lower alkoxycarbonyl lower alkyl group, (83) a carboxy lower alkyl group,

(84) a group $-(O-B_{15})s-CO-N(R^{26})R^{27}$, (85) a group $-N(R^{28})-CO-B_{16}-N(R^{29})R^{30}$, (86) a group $-N(R^{31})-B_{17}-CO-N(R^{32})R^{33}$, (87) a benzoxazolyl group, (88a) a benzothienyl group, (89a) an oxo group, and (90a) a 1,2,3,4-tetrahydroquinolyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring,

B_{12} represents a lower alkylene group,

t represents 0 or 1,

each of R^{20} and R^{21}, which are identical or different, represents a hydrogen atom; a cycloalkyl group; an amino group that may have a lower alkoxycarbonyl group as a substituent; a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring; a lower alkyl group; a lower alkyl group having 1 to 2 phenyl groups that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkylthio group; a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxy group that may have a halogen atom as a substituent and a lower alkyl group that may have a halogen atom as a substituent; a lower alkoxycarbonyl group; a cycloalkyl lower alkyl group; a pyrrolidinyl lower alkyl group that may have 1 to 3

lower alkyl groups that may have a hydroxyl group as a substituent on the pyrrolidine ring; an amino-substituted lower alkyl group that may have a group selected from the group consisting of a phenyl group and a lower alkyl group as a substituent; a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may have 1 to 5 lower alkyl groups as a substituent(s) on the 1,2,3,4-tetrahydronaphthalene ring; a naphthyl lower alkyl group; a pyridyl lower alkyl group; a quinolyl lower alkyl group; a 1,2,3,4-tetrazolyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent(s) on the tetrazole ring; a 1,2,4-triazolyl lower alkyl group; a tetrahydrofuryl lower alkyl group that may have a hydroxyl group as a substituent on the lower alkyl group; a phenoxy lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a nitro group as a substituent(s) on the phenyl ring; a phenyl lower alkanoyl group; a lower alkanoyl group that may have a halogen atom as a substituent; an imidazolyl lower alkanoyl group; a lower alkoxycarbonyl lower alkyl group; a pyridyl group; or a carboxy lower alkyl group, or R^{20} and R^{21}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic

ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group that may have 1 to 3 groups selected from the group consisting of a halogen atom and a lower alkyl group that may have a halogen atom as a substituent(s) on the phenyl ring, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

o represents 0 or 1,

B_{13} represents a lower alkylene group,

each of R^{22} and R^{23}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring, a phenoxy lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, a phenyl lower alkyl group, or a phenyl group, or R^{22} and R^{23}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

B_{15} represents a lower alkylene group,

s represents 0 or 1,

each of R^{26} and R^{27}, which are identical or different,

represents a hydrogen atom, a lower alkyl group, a phenyl lower alkyl group, or an imidazolyl lower alkyl group, or R^{26} and R^{27}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring, as a substituent(s),

R^{28} represents a hydrogen atom or a lower alkyl group,

B_{16} represents a lower alkylene group,

R^{29} and R^{30}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{31} represents a hydrogen atom or a lower alkyl group,

B_{17} represents a lower alkylene group,

R^{32} and R^{33}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups

selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

provided that the above described aromatic compound or a salt thereof satisfy the following requirements (i) to (v):

(i) when X_1 represents a group -CH=, then R^3 represents a hydrogen atom;

(ii) when X_1 represents a group -CH=, l represents 1, T represents -CO-, and R^{14} represents a hydrogen atom or an alkyl group that may have a hydroxyl group as a substituent, then R^{15} represents the group (24) described above;

(iii) when X_1 represents a group -CH=, l represents 1, and T represents $-N(R^{17})-B_3-CO-$, then R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated or unsaturated heterocyclic ring, wherein the heterocyclic ring is substituted by 1 to 3 groups of (28) described above;

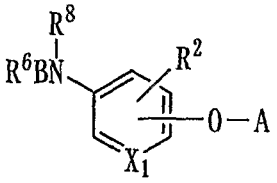
(iv) when X_1 represents a nitrogen atom, and l represents 0, or when X_1 represents a nitrogen atom, l represents 1, and T represents -CO- or $-SO_2$, then R^{15} is not the group being any one of (5), (7), (19), and (20) described above; and

(v) when R^6 represents a cycloalkyl group

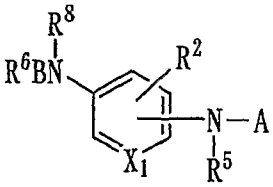
wherein the cycloalkyl ring may be substituted by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group and a lower alkyl group that may have a halogen atom as a substituent, then R^{14} represents a group $-(T)_l-N(R^{14})R^{15}$ (wherein T and l have the same meanings as described above, and R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated heterocyclic ring; or R^{14} and R^{15} form a group

)].

The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-1) to (1-7):



(1-1)



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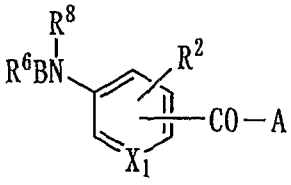

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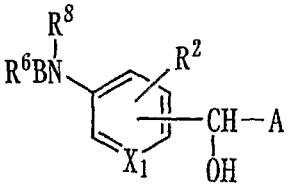

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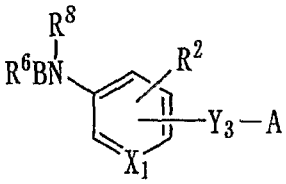

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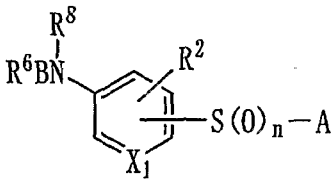
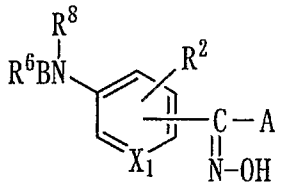


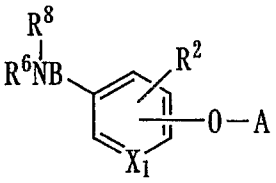
(1-6)



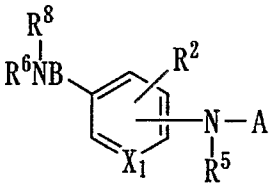
(1-7)

[wherein, in said general formulas (1-1) to (1-7), R^6, B, R^8, R^2, R^5, n, X_1, and A have the same meanings as described above, and Y_3 represents a lower alkylene group].

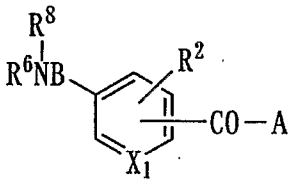
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-8) to (1-14):



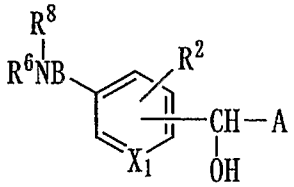
(1-8)



(1-9)



(1-10)



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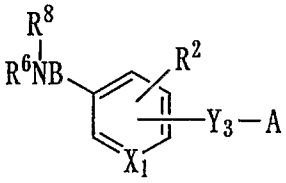

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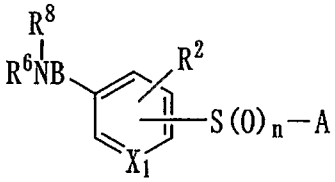

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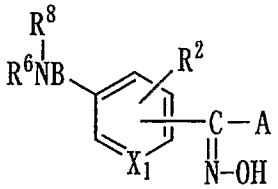
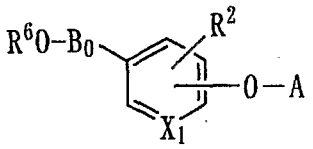


(1-14)

[wherein, in said general formulas (1-8) to (1-14), R^6,

B, R^8, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-15) to (1-21):



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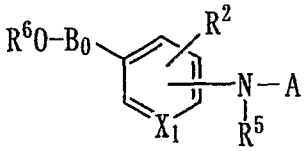
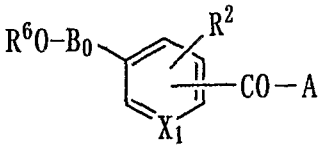


(1-16)



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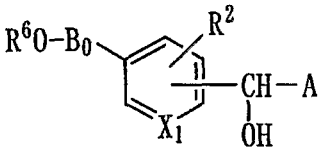
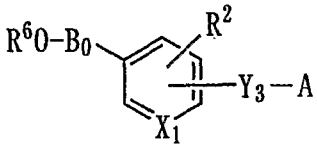


(1-18)



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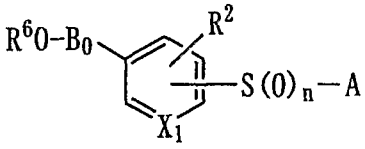
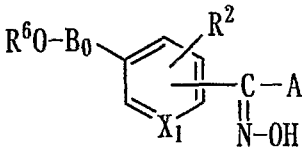


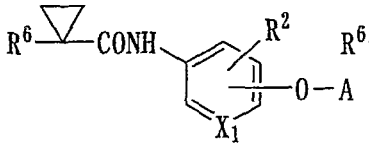
(1-20)



(1-21)

[wherein, in said general formulas (1-15) to (1-21), R^6, B_0, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-22) to (1-28):



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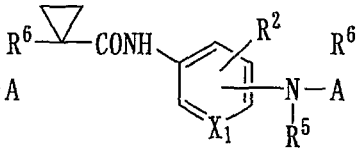

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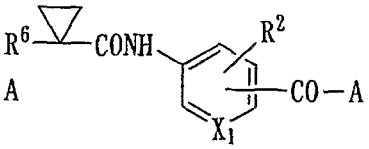

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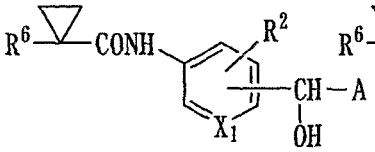

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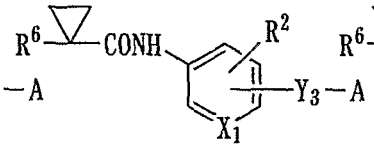
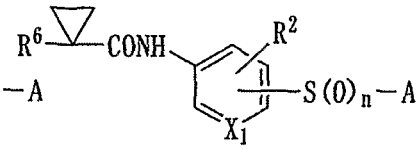
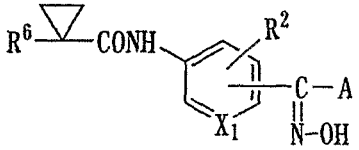


(1-26)



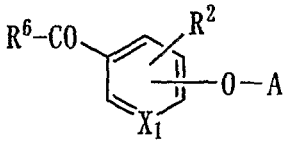
(1-27)



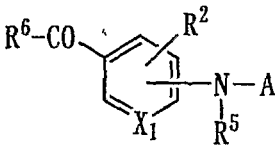
(1-28)

[wherein, in said general formulas (1-22) to (1-28), R^6, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

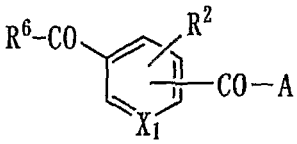
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-29) to (1-35):



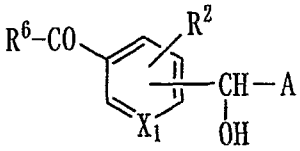
(1-29)



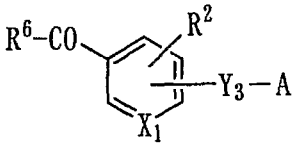
(1-30)



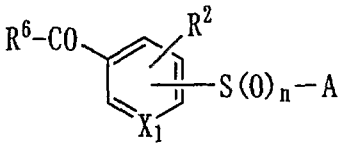
(1-31)



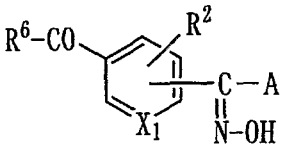
(1-32)



(1-33)



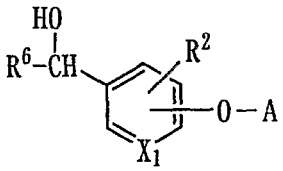
(1-34)



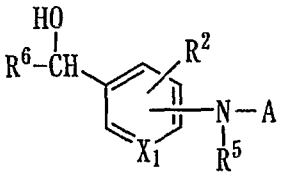
(1-35)

[wherein, in said general formulas (1-29) to (1-35), R^6, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

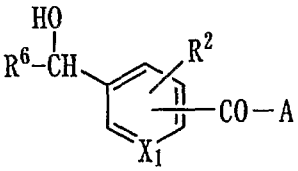
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-36) to (1-42):



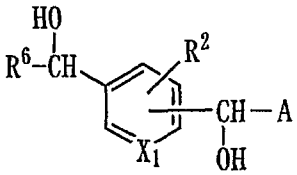
(1-36)



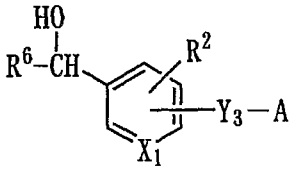
(1-37)



(1-38)



(1-39)



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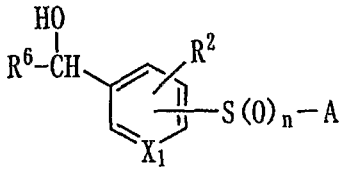
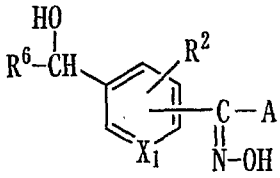


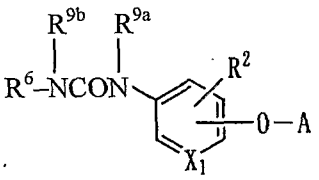
(1-41)



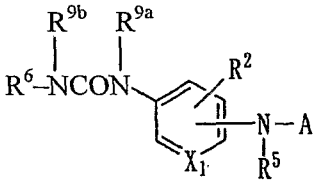
(1-42)

[wherein, in said general formulas (1-36) to (1-42), R^6, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

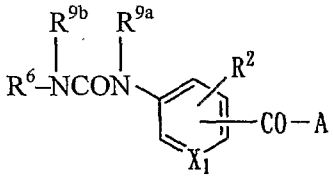
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-43) to (1-49):



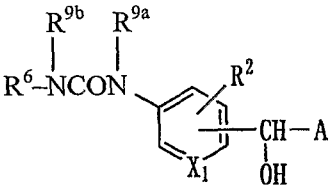
(1-43)



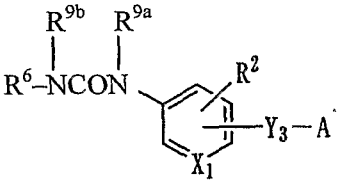
(1-44)



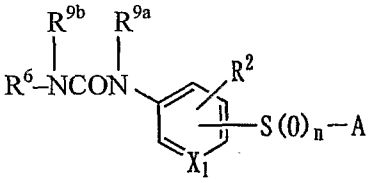
(1-45)



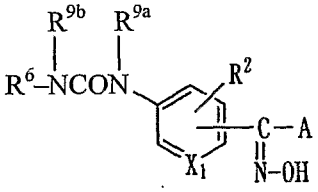
(1-46)



(1-47)



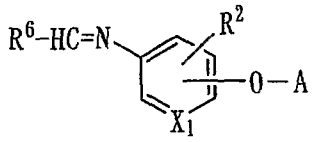
(1-48)



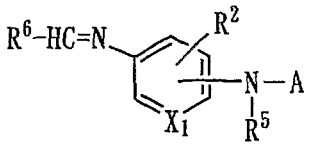
(1-49)

[wherein, in said general formulas (1-43) to (1-49), R^6, R^2, R^5, n, X_1, A, R^{9a}, R^{9b} and Y_3 have the same meanings as described above].

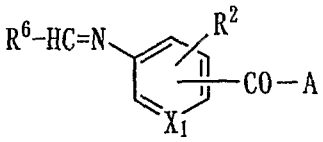
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-50) to (1-56):



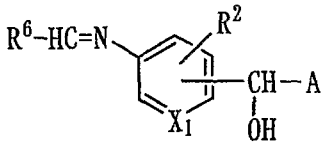
(1-50)



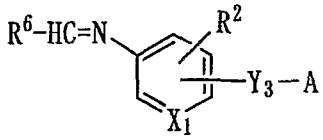
(1-51)



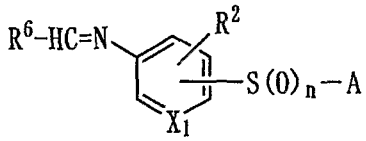
(1-52)



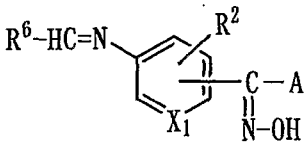
(1-53)



(1-54)



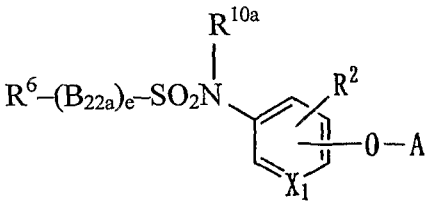
(1-55)



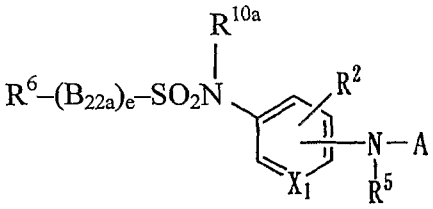
(1-56)

[wherein, in said general formulas (1-50) to (1-56), R^6, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

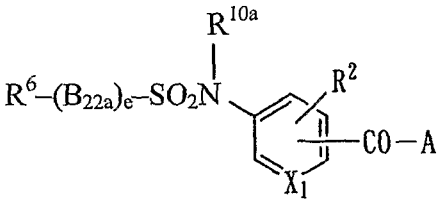
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds or salts thereof represented by the general formulas (1-57) to (1-63):



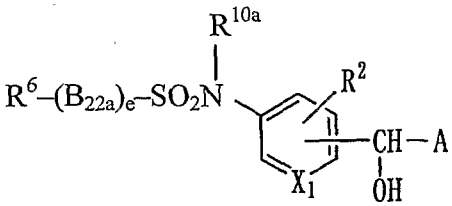
(1-57)



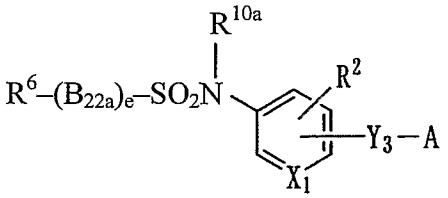
(1-58)



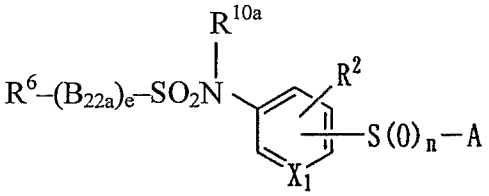
(1-59)



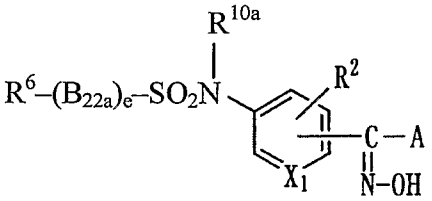
(1-60)



(1-61)



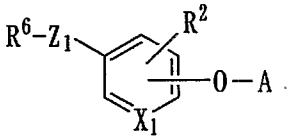
(1-62)



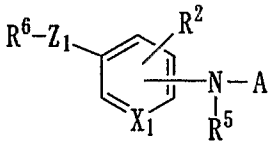
(1-63)

[wherein, in said general formulas (1-57) to (1-63), R^6, R^2, R^5, n, X_1, A, R^{10a}, B_{22a}, e and Y_3 have the same meanings as described above].

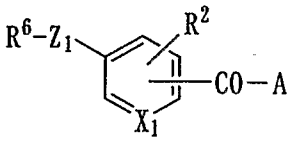
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-64) to (1-70) or salts thereof:



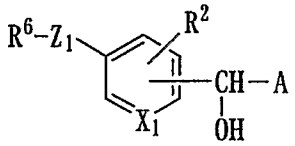
(1-64)



(1-65)



(1-66)



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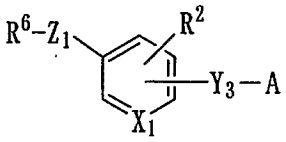
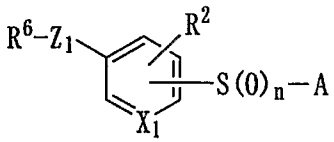
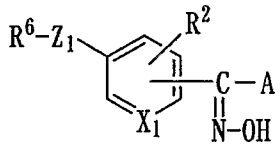


(1-68)



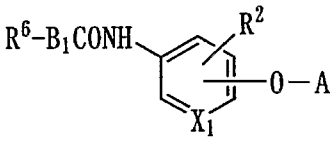
(1-69)



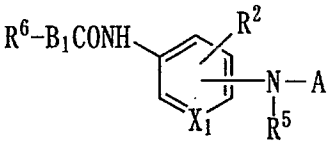
(1-70)

[wherein, in said general formulas (1-64) to (1-70), R^6, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above, and Z_1 represents a lower alkenylene group].

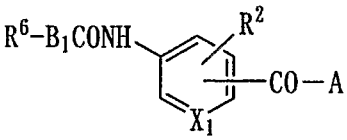
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-71) to (1-77) or salts thereof:



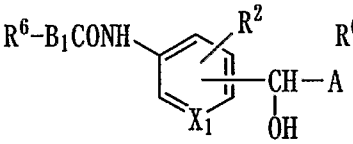
(1-71)



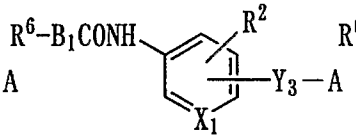
(1-72)



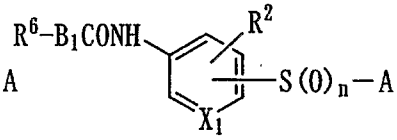
(1-73)



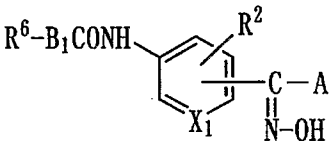
(1-74)



(1-75)



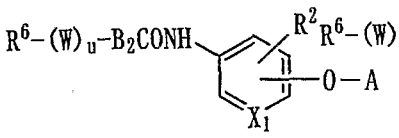
(1-76)



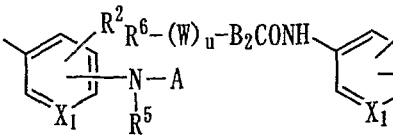
(1-77)

[wherein, in said general formulas (1-71) to (1-77), R^6, R^2, B_1, R^5, n, X_1, A and Y_3 have the same meanings as described above].

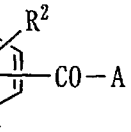
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-78) to (1-84) or salts thereof:



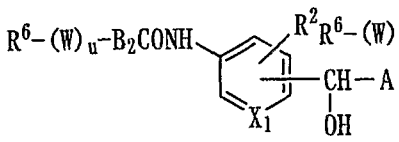
(1-78)



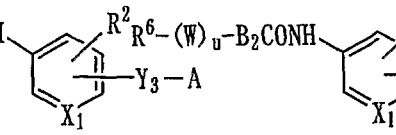
(1-79)



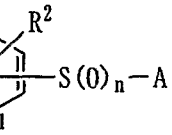
(1-80)



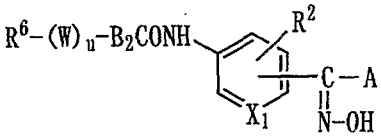
(1-81)



(1-82)



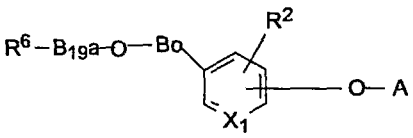
(1-83)



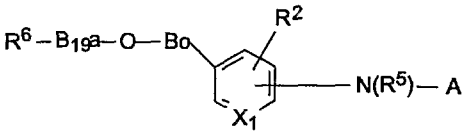
(1-84)

[wherein, in said general formulas (1-78) to (1-84), R^6, W, u, B_2, R^2, R^5, n, X_1, A and Y_3 have the same meanings as described above].

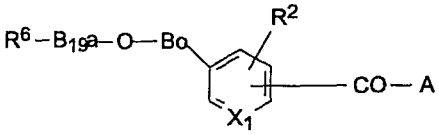
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-85) to (1-91) or salts thereof:



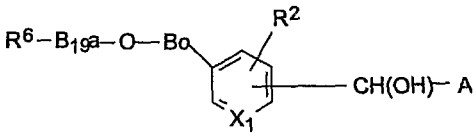
(1-85)



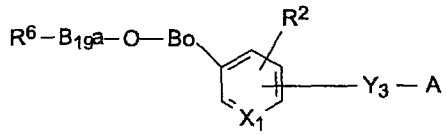
(1-86)



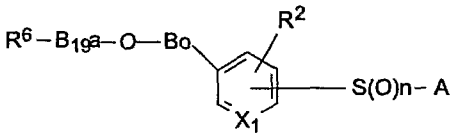
(1-87)



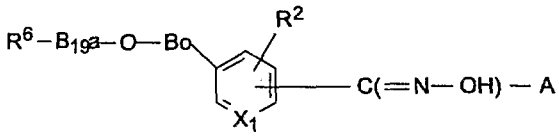
(1-88)



(1-89)



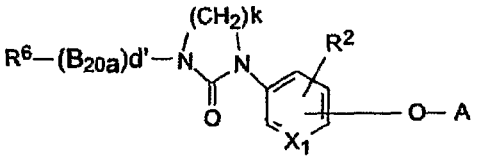
(1-90)



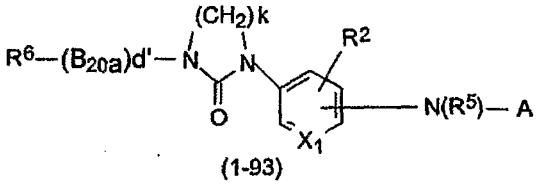
(1-91)

[wherein, in said general formulas (1-85) to (1-91), R^5, R^6, B_{19a}, B_0, R^2, X_1, n, A and Y_3 have the same meanings as described above].

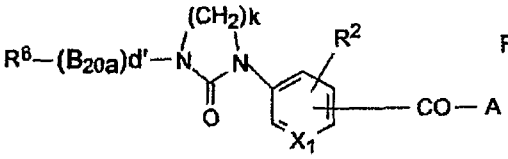
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-92) to (1-98) or salts thereof:



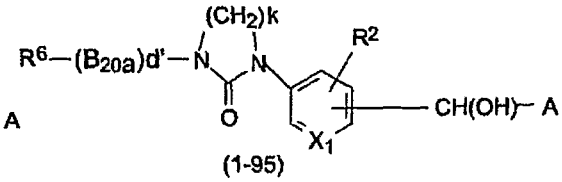
(1-92)



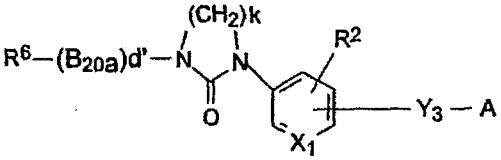
(1-93)



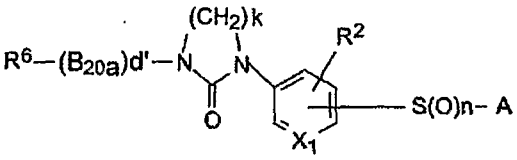
(1-94)



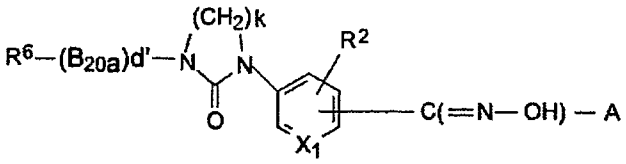
(1-95)



(1-96)



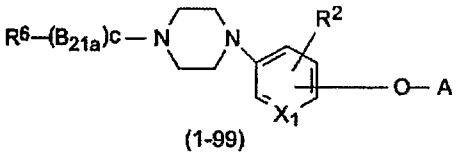
(1-97)



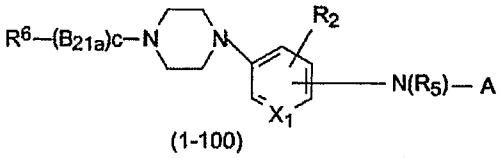
(1-98)

[wherein, in said general formulas (1-92) to (1-98), R^5, R^6, B_{20a}, R^2, X_1, A, n, d′, k and Y_3 have the same meanings as described above].

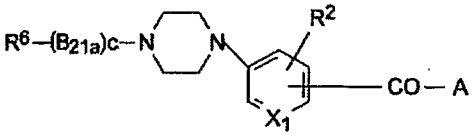
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-99) to (1-105) or salts thereof:



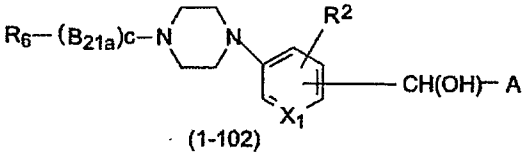
(1-99)



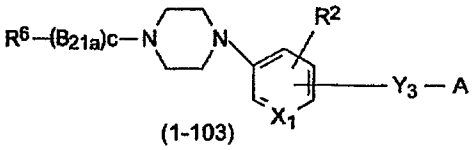
(1-100)



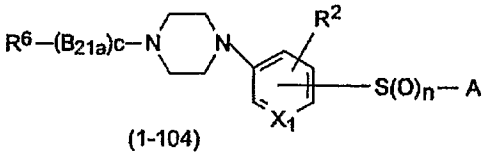
(1-101)



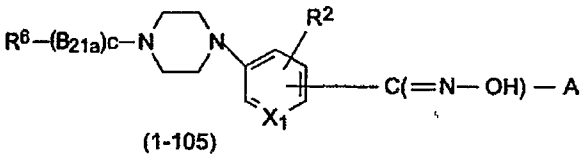
(1-102)



(1-103)



(1-104)

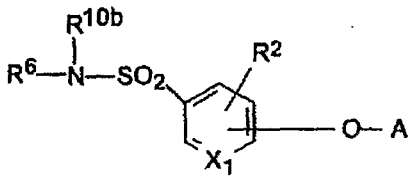


(1-105)

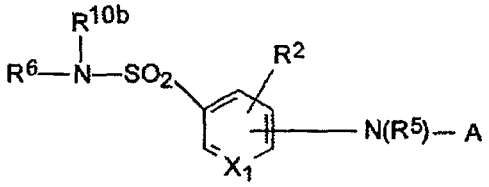
[wherein, in said general formulas (1-99) to (1-105), R^6, R^5, B_{21a}, R^2, X_1, A, n, c and Y_3 have the same meanings as described above].

The above aromatic compound represented by

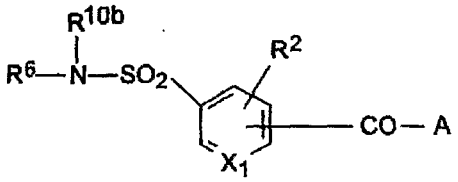
the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-106) to (1-112) or salts thereof:



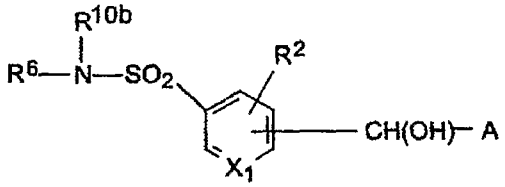
(1-106)



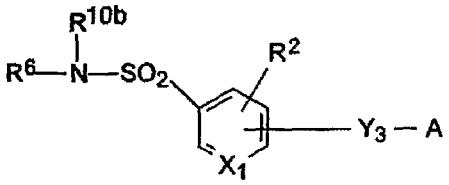
(1-107)



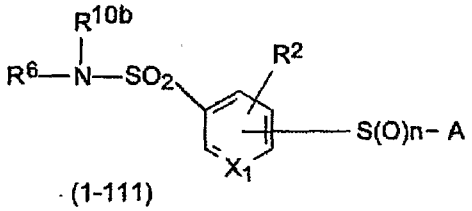
(1-108)



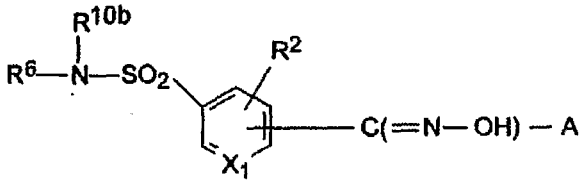
(1-109)



(1-110)



(1-111)

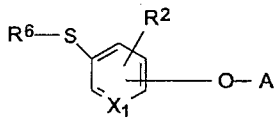


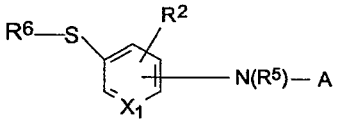
(1-112)

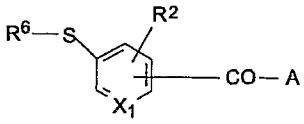
[wherein, in said general formulas (1-106) to (1-112), R^5, n, R^6, R^{10b}, X_1, R^2, A and Y_3 have the same meanings as described above].

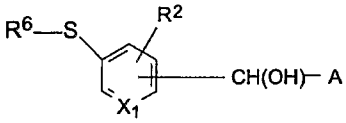
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general

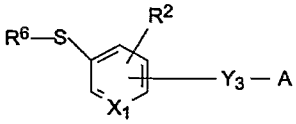
formulas (1-113) to (1-119) or salts thereof:

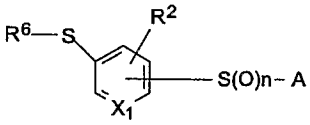

(1-113)

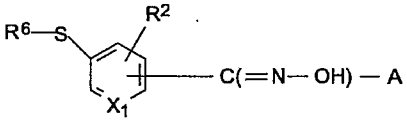

(1-114)


(1-115)


(1-116)

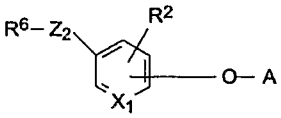

(1-117)

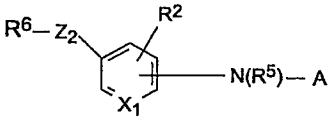

(1-118)


(1-119)

[wherein, in said general formulas (1-113) to (1-119), R^6, R^2, X_1, R^5, n, A and Y_3 have the same meanings as described above].

The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-120) to (1-126) or salts thereof:


(1-120)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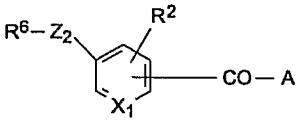
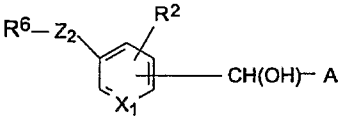
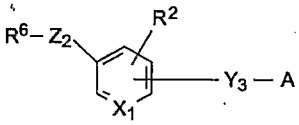
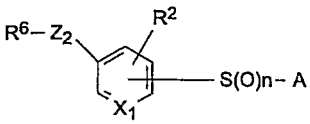
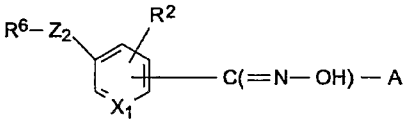

(1-122)


(1-123)

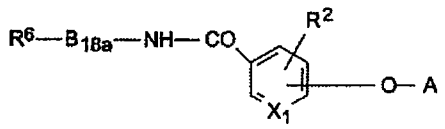

(1-124)


(1-125)

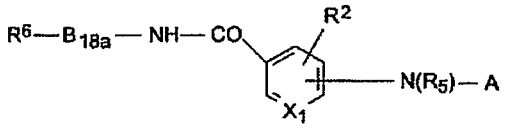

(1-126)

[wherein, in said general formulas (1-120) to (1-126), R^6, R^2, X_1, A, R^5, n and Y_3 have the same meanings as described above, and Z_2 represents a lower alkynylene group].

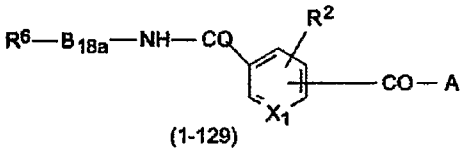
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general formulas (1-127) to (1-133) or salts thereof:



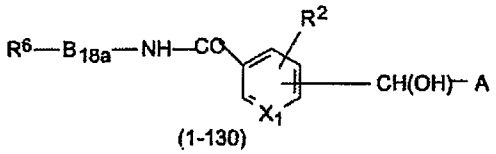
(1-127)



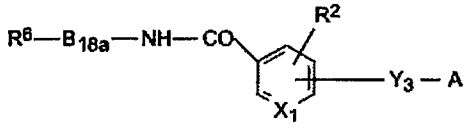
(1-128)



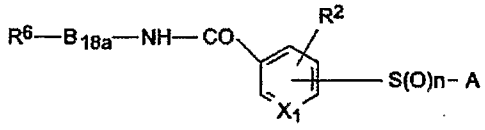
(1-129)



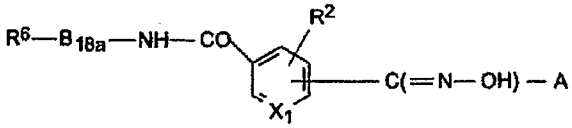
(1-130)



(1-131)



(1-132)

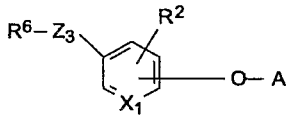


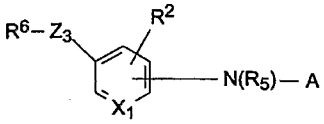
(1-133)

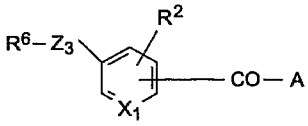
[wherein, in said general formulas (1-127) to (1-133), R^6, B_{18a}, R^2, X_1, A, R^5, n and Y_3 have the same meanings as described above].

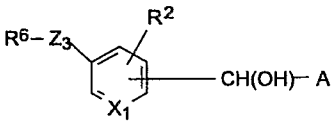
The above aromatic compound represented by the general formula (1) or a salt thereof includes the following aromatic compounds represented by the general

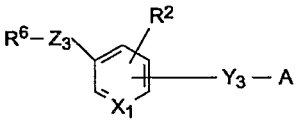
formulas (1-134) to (1-140) or salts thereof:

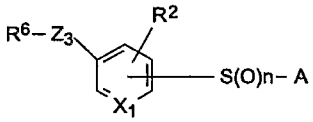

(1-134)

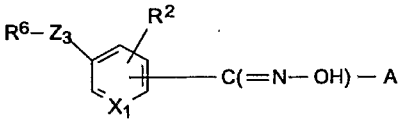

(1-135)


(1-136)


(1-137)


(1-138)


(1-139)


(1-140)

[wherein, in said general formulas (1-134) to (1-140), R^6, R^2, X_1, A, R^5, and n have the same meanings as described in Claim 1, Y_3 has the same meanings as described in Claim 2, and Z_3 represents a lower alkylene group or a group $-\underset{\underset{R^{8d}}{|}}{N}-$ (R^{8d} is the same meanings as described above)].

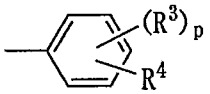
The present invention provides the above-mentioned aromatic compound or salt thereof wherein Y is a group -O-.

The present invention provides the above-mentioned aromatic compound or salt thereof wherein Y is a group $-N(R^5)-$ (R^5 has the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein

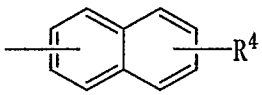
Y is a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n- (n has the same meanings as described above), or a group -C(=N-OH)-.

The present invention provides the above-mentioned aromatic compound or salt thereof wherein A is a group



(R^3, R^4 and p have the same meanings as described above).

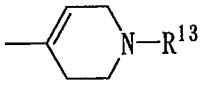
The present invention provides the above-mentioned aromatic compound or salt thereof wherein A is a group



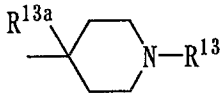
(R^4 has the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that

may have an oxo group as a substituent on the thiazolidine ring, a group



or a group



(R^{13} and R^{13a} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (T, R^{14} and R^{15} have the same meanings as described above), and l is 0.

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (T, R^{14} and R^{15} have the same meanings as described above), and l is 1.

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-N(R^{17})-B_3-CO-$ (R^{14}, R^{15}, R^{17} and B_3 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_{19}-N(R^{18})-CO-$ (R^{14}, R^{15}, B_{19} and R^{18} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_4-CO-$ (R^{14}, R^{15}, and B_4 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-Q-B_5-CO-$ (R^{14}, R^{15}, Q and B_5 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_6-N(R^{19})-B_7-$ (R^{14}, R^{15}, B_6, R^{19} and B_7 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CO-B_8-$ (R^{14}, R^{15}, and B_8 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CH(OH)-B_9-$ (R^{14}, R^{15}, and B_9 have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group

$-CO-B_{10}-CO-$ (R^{14}, R^{15}, and B_{10} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CH(OH)-B_{11}-CO-$ (R^{14}, R^{15}, and B_{11} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CO-$ (R^{14} and R^{15} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-SO_2-$ (R^{14} and R^{15} have the same meanings as described above).

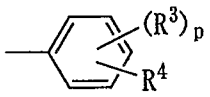
The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_{23a}-CO-CO-$ (R^{14}, R^{15} and B_{23a} have the same meanings as described above).

The present invention provides the above-mentioned aromatic compound or salt thereof wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a lower alkylene group (R^{14} and R^{15} have the same meanings as described above).

In the above-mentioned aromatic compound

represented by the general formula (1) or salt thereof, the aromatic compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-64) and (1-65) or salts thereof are preferable.

Further, those compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64) and (1-65) or salts thereof, wherein Y is a group -O- or a group $-N(R^5)-$, A is a group



, and R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (R^3, R^4, R^5, R^{14}, R^{15}, p and l have the same meanings as described above). are more preferable.

The present invention provides the aromatic compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64) and (1-65) or salts thereof, wherein

l is 1, and T is a group $-N(R^{17})-B_3-CO-$ (R^{17} and B_3 have the same meanings as described above).

The present invention provides the aromatic compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64) and (1-65) or salts thereof, wherein

l is 1, and T is a group $-B_4-CO-$ (B_4 have the same meanings as described above).

The present invention provides the aromatic compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64) and (1-65) or salts thereof, wherein

l is 1, and T is a group -CO-.

The present invention provides the aromatic compounds represented by the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64) and (1-65) or salts thereof, wherein

l is 0.

The present invention particularly provides the aromatic compounds selected from the group consisting of:

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-4-

trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzene-sulfonamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperazin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide,

N-[6-({4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenyl}methylamino)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

1-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3-(3,4-dichlorophenyl)-1-ethylurea,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-(6-{4-[3-(4-piperonylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-(6-{4-[(2-{4-[4-(4-fluorobenzoyl)phenyl]-piperazin-1-yl}-2-oxoethyl)methylamino]-2-methoxy-phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

2-(4-piperonylpiperazin-1-yl)-N-{3-methyl-4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenyl}-2-oxoacetamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-2-fluoro-4-trifluoromethylbenzamide,

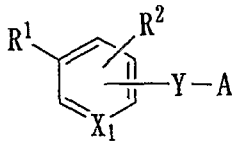
N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-

oxoethyl]piperidin-1-yl}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide, and

4-(3-{3-methyl-4-[5-(4-trifluoromethylbenzoylamino)pyridin-2-yloxy]phenyl}-2-oxohexahydropyrimidin-1-yl)benzoic acid ethyl ester, or salts thereof.

The present invention provides processes for preparing the aromatic compound represented by the general formula (1) or a salt thereof according to any one of the processes described in Reaction formulas-1 to 46, 48, 49, 52, 59, 104, 105, 108 to 132 and 135 mentioned below.

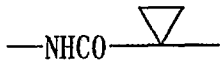
The present invention provides a pharmaceutical composition for the treatment of fibrosis, which comprises an aromatic compound represented by the general formula (1A) or a salt thereof:



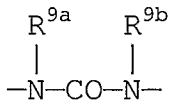
(1A)

[wherein X_1 represents a nitrogen atom or a group -CH=, R^1 represents a group $-Z-R^6$,

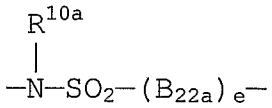
Z represents a group $-N(R^8)-B-$, a group $-B-N(R^8)-$, a group $-B_0-O-$, a group



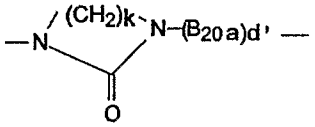
a group -CO-, a group -CH(OH)-, a group



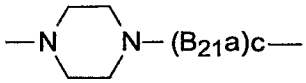
a group -N=CH-, a group



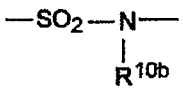
a lower alkenylene group, a group $-NHCO-B_1-$, a group $-NHCO-B_2-(W)u-$, a group $-B_0-O-B_{19a}-$, a group



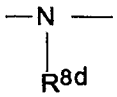
a group



a group



a group -S-, a lower alkynylene group, a lower alkylene group, a group



or a group $-CO-NH-B_{18}a-$,

wherein R^8 represents a hydrogen atom, a lower alkyl group that may have a lower alkoxy group as a substituent, a lower alkanoyl group, a phenyl lower alkyl group, or a lower alkylsulfonyl group,

B represents a group -CO- or a lower alkylene group,

B_0 represents a lower alkylene group,

each of R^{9a} and R^{9b}, which are identical or different, represents a hydrogen atom or a lower alkyl group

R^{10a} represents a hydrogen atom or a lower alkyl group,

B_{22a} represents a lower alkylene group or a lower alkenylene group,

e represents 0 or 1,

B_1 represents a lower alkenylene group that may have a phenyl group as a substituent,

B_2 represents a lower alkylene group that may be substituted by a group selected from the group consisting of a lower alkoxy group and a phenyl group,

W represents an oxygen atom, a group -NH-, or a sulfur atom,

u represents 0 or 1,

B_{18a} represents a lower alkylene group,

B_{19a} represents a lower alkylene group,

B_{20a} represents a lower alkylene group,

B_{21a} represents a lower alkylene group,

R^{8d} represents a hydrogen atom or a lower alkyl group,

k represents 2 or 3,

c represents 0 or 1,

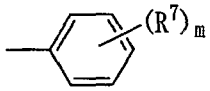
d′ represents 0 or 1,

R^{10b} represents a hydrogen atom or a lower alkyl group,

R^6 represents a 5- to 15-membered monocyclic, dicyclic, or tricyclic saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or

sulfur atoms (wherein, the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of an oxo group; an optionally halogenated lower alkoxy group; an optionally halogenated lower alkyl group; a halogen atom; a lower alkylsulfonyl group; a phenyl group that may be substituted, on the phenyl ring, by an optionally halogenated lower alkyl group; a lower alkylthio group; a pyrrolyl group; a benzoyl group; a lower alkanoyl group; a lower alkoxycarbonyl group; and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an adamantyl group, a naphthyl group (wherein, the naphthalene ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a halogen atom, and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an alkyl group that may have a lower alkoxy group as a substituent, a cycloalkyl group that may be substituted, on the cycloalkyl ring, by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group on the amino group and a lower alkyl group that may have a halogen atom as a substituent, a lower alkenyl group that may have a halogen atom as a substituent, a lower alkanoyl group, a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3

groups selected from the group consisting of a lower alkyl group that may have a halogen atom as a substituent and a halogen atom, a group



, a halogen atom-substituted lower alkyl group, or a cycloalkyl lower alkyl group,

R^7 represents a hydrogen atom, a phenyl group, a carboxy group, a hydroxyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a phenoxy group, a lower alkoxy group that may have a halogen atom as a substituent, a lower alkylenedioxy group, an amino group that may have, as a substituent, a group selected from the group consisting of a lower alkyl group, a lower alkanoyl group, a benzoyl group, and a cycloalkyl group, a cyano group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkylsulfonyl group, an aminosulfonyl group, a lower alkoxycarbonyl group, a lower alkanoyloxy group, a 5- or 6-membered saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein the heterocyclic ring may be substituted, by an oxo group), or a lower alkoxycarbonyl lower alkyl group,

m represents an integer between 1 and 5, wherein when m represents 2 to 5, two to five R^7s may be identical or different,

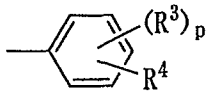
R^2 represents a hydrogen atom, a halogen atom, or a lower alkyl group,

Y represents a group -O-, a group $-N(R^5)-$, a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n-, or a group -C(=N-OH)-,

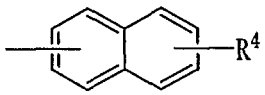
R^5 represents a hydrogen atom, a lower alkyl group, a lower alkanoyl group, a benzoyl group, a phenyl lower alkyl group, or a cycloalkyl group,

n represents 0, 1, or 2,

A represents a group



or a group



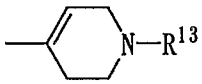
p represents 1 or 2,

R^3 represents a hydrogen atom, a lower alkoxy group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a carboxy group, a group $-CONR^{11}R^{12}$, or a cyano group,

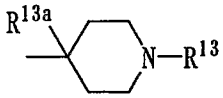
wherein each of R^{11} and R^{12}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, or a phenyl group, or R^{11} and R^{12}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-

membered saturated heterocyclic ring,

R^4 represents an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a group



a group



or a group $-(T)_1-N(R^{14})R^{15}$,

R^{13} represents a hydrogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl lower alkyl group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group, a

benzoyl group, a morpholino-substituted lower alkanoyl group, a piperazinyl carbonyl lower alkyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a morpholinocarbonyl-substituted lower alkyl group, or an imidazolyl lower alkanoyl group,

R^{13a} represents a hydrogen atom or a hydroxyl group,

T represents a lower alkylene group, a group $-N(R^{17})-B_3-CO-$, a group $-(B_{19})_e-N(R^{18})-CO-$, a group $-B_4-CO-$, a group $-Q-B_5-CO-$, a group $-B_6-N(R^{19})-B_7-CO-$, a group $-CO-B_8-$, a group $-CH(OH)-B_9-$, a group $-CO-B_{10}-CO-$, a group $-CH(OH)-B_{11}-CO-$, a group $-CO-$, a group $-SO_2-$, or a group $-B_{23a}-CO-CO-$,

wherein R^{17} represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, a cycloalkylcarbonyl group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkenyl group, an amino-substituted lower alkanoyl group that may have a lower alkyl group as a substituent, or a lower alkylsulfonyl group,

B_3 represents a lower alkylene group,

B_{19} represents a lower alkylene group,

e represents 0 or 1,

R^{18} represents a hydrogen atom or a lower alkyl group,

B_4 represents a lower alkenylene group or a lower alkylene group that may have a hydroxyl group as a substituent,

Q represents an oxygen atom or a group -S(O)n- (wherein n has the same meanings as described above),

B_5 represents a lower alkylene group,

B_6 represents a lower alkylene group,

R^{19} represents a hydrogen atom or a lower alkanoyl group,

B_7 represents a lower alkylene group,

B_8 represents a lower alkylene group,

B_9 represents a lower alkylene group,

B_{10} represents a lower alkylene group,

B_{11} represents a lower alkylene group,

B_{23a} represents a lower alkylene group,

l represents 0 or 1,

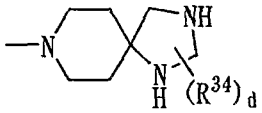
each of R^{14} and R^{15}, which are identical or different represents (1) a hydrogen atom, (2) an alkyl group that may have a hydroxyl group as a substituent, (3) a cycloalkyl group that may have a group selected from the group consisting of a hydroxyl group and a lower alkyl group as a substituent, (4) a phenoxy lower alkyl group, (5) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group; a lower alkoxy group that may have a halogen atom as a substituent; a halogen atom; an amino lower alkoxy group that may have

a lower alkyl group as a substituent; a hydroxyl group-substituted lower alkyl group; a phenyl lower alkyl group; a lower alkynyl group; an amino group that may have a lower alkylsulfonyl group as a substituent; a lower alkylthio group; a cycloalkyl group; a phenylthio group; an adamantyl group; an anilino group that may have a halogen atom as a substituent on the phenyl ring; a lower alkoxycarbonyl group; a piperazinyl group that may have a lower alkyl group as a substituent on the piperazine ring; a pyrrolidinyl group that may have an oxo group as a substituent on the pyrrolidine ring; a lower alkanoylamino group; a cyano group; and a phenoxy group, (6) a phenoxy group, (7) a phenyl lower alkyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkyl group, (8) a phenyl lower alkyl group that has a lower alkylenedioxy group as a substituent on the phenyl ring, (9) a lower alkanoyl group, (10) a lower alkoxycarbonyl-substituted lower alkyl group, (11) a carboxy-substituted lower alkyl group, (12) an amino group that may have a lower alkanoyl group as a substituent, (13) a 1,2,3,4-tetrahydroquinolyl group that may have 1 to 3 groups selected from the group consisting of an oxo group, a lower alkoxy group, and a lower alkylenedioxy group as a substituent(s) on the tetrahydroquinoline ring, (14) a cycloalkyl lower alkyl

group, (15) a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (16) a pyridyl lower alkyl group, (17) an amino group-substituted lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent, (18) a lower alkoxy lower alkyl group, (19) an imidazolyl group, (20) an imidazolyl lower alkyl group, (21) a 1,2,3,4-tetrahydroisoquinolylcarbonyl-substituted lower alkyl group, (22) a piperidinylcarbonyl group that may have a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, and a furyl lower alkyl group as a substituent on the piperidine ring, (23) a thiazolidinyl lower alkanoyl group that may have an oxo group as a substituent on the thiazolidine ring, (24) a piperidinyl group that may be substituted, on the piperidine ring, by a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, a lower alkyl group, a benzoyl group, and a furyl lower alkyl group, (25) a carbonyl lower alkyl group substituted by a group

, (26) a carbonyl lower alkyl group substituted by a

group



, (27) a group $-CO-B_{20}-N(R^{36})R^{37}$, (26a) a pyrrolidinyl lower alkyl group, (27a) a morpholino lower alkyl group, (28a) a phenyl lower alkenyl group, (29a) an anilinocarbonyl lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, (30a) an indolyl group, (31a) a piperazinyl lower alkyl group that may have, as a substituent on the piperazine ring, a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (32a) an amidino lower alkyl group that may have a lower alkyl group as a substituent, (33a) a fluorenyl group, (34a) a carbazolyl group that may have a lower alkyl group as a substituent on the carbazole ring, (35a) an amidino group that may have a lower alkyl group as a substituent, (36a) a piperazinyl-substituted oxalyl group that may have 1 to 3 groups selected from the group consisting of a phenyl lower alkyl group (that may have 1 to 3 groups selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group as a substituent(s) on the phenyl ring) and a pyridyl lower alkyl group as a substituent(s) on the piperazine ring, or (37a) a cyano-substituted lower alkyl group,

R^{34} represents an oxo group or a phenyl group,

d represents an integer between 0 and 3,

B_{20} represents a lower alkylene group,

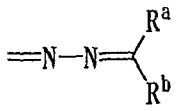
R^{36} and R^{37}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic group may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated or unsaturated heterocyclic ring; or a group

wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of (28) a phenyl-substituted lower alkyl group, which has 1 to 2 phenyl groups and which may have a pyridyl group on the lower alkyl group, wherein the phenyl ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkanoyl group, an amino group that may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl

group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy group, (29) a carbamoyl group, (30) a pyridyl lower alkyl group that may have, as a substituent(s) on the pyridine ring, 1 to 3 groups selected from the group consisting of a hydroxyl group and a lower alkyl group that may have a hydroxyl group as a substituent, (31) a pyrrolyl lower alkyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the pyrrole ring, (32) a benzoxazolyl lower alkyl group, (33) a benzothiazolyl lower alkyl group, (34) a furyl lower alkyl group, (35) a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, an amino group that may have a lower alkylsulfonyl group as a substituent, a halogen atom, a lower alkoxy group, a lower alkyl group that may have a halogen atom as a substituent, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a thiazolidinylidene lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, and a lower alkylenedioxy group, (36) a pyrimidinyl group, (37) a pyrazinyl group, (38) a pyridyl group, (39) a lower alkoxycarbonyl group, (40) a thiazolidinyl lower alkanoyl group that may be substituted, on the thiazolidine ring, by a group selected from the group

consisting of an oxo group and a group



(wherein each of R^a and R^b represents a lower alkyl group), (41) a lower alkyl group that may have a group selected from the group consisting of a hydroxyl group and a halogen atom as a substituent, (42) a lower alkanoyl group that may have a halogen atom as a substituent, (43) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a carbamoyl group that may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group, a lower alkoxycarbonyl group, a carboxy group, a cyano group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a benzoyl group that may have a halogen atom as a substituent on the phenyl ring, a phenyl lower alkyl group that may have a halogen atom as a substituent on the phenyl ring, and a hydroxyl group, (44) a phenyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (45) a naphthyl lower alkyl group, (46) a phenoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, a lower alkyl group that

may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (47) a phenoxy lower alkyl group, (48) a phenyl lower alkoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (49) a group $-(B_{12}CO)t-N(R^{20})R^{21}$, (50) a group $-(CO)o-B_{13}-N(R^{22})R^{23}$, (51) a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may be substituted, on the 1,2,3,4-tetrahydronaphthalene ring, by 1 to 5 lower alkyl groups as a substituent(s), (52) a cycloalkyl group that may have a hydroxyl group as a substituent, (53) a piperidinyl group that may be substituted, on the piperidine ring, by 1 to 3 lower alkyl groups as a substituent(s), (54) a quinolyl lower alkyl group, (55) a 1,2,3,4-tetrazolyl lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent on the tetrazole ring, (56) a thiazolyl lower alkyl group that may have a phenyl group as a substituent on the thiazole ring, (57) a benzoyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkoxy group and a halogen atom as a substituent(s) on the phenyl ring, (58) a piperidinyl lower alkyl group that may have a

lower alkyl group as a substituent on the piperidine ring, (59) an imidazolyl group that may have 1 to 3 phenyl groups as a substituent(s) on the imidazole ring, (60) a benzimidazolyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the benzimidazole ring, (61) a pyridyl lower alkoxy group, (62) a 1,2,3,4-tetrahydroquinolyl lower alkyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (63) a 1,3,4-oxadiazolyl lower alkyl group that may have an oxo group as a substituent on the 1,3,4-oxadizole ring, (64) a cycloalkyl lower alkyl group, (65) a tetrahydropyranyl group, (66) a thienyl lower alkyl group, (67) a pyrimidinylcarbonyl group that may have an oxo group as a substituent on the pyrimidine ring, (68) a hydroxyl group, (69) a carboxy group, (70) a lower alkoxy lower alkyl group, (71) a lower alkoxy lower alkoxy group, (72) a benzoyloxy group, (73) a lower alkoxycarbonyl lower alkoxy group, (74) a carboxy lower alkoxy group, (75) a phenoxy lower alkanoyl group, (76) a 1,2,3,4-tetrahydroquinolylcarbonyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (77) a phenylsulfonyl group, (78) an imidazolyl lower alkanoyl group, (79) an imidazolyl lower alkyl group, (80) a pyridylcarbonyl group, (81) an imidazolylcarbonyl group, (82) a lower alkoxycarbonyl lower alkyl group, (83) a carboxy lower alkyl group, (84) a group $-(O-B_{15})s-CO-N(R^{26})R^{27}$, (85) a group $-N(R^{28})-$

$CO-B_{16}-N(R^{29})R^{30}$, (86) a group $-N(R^{31})-B_{17}-CO-N(R^{32})R^{33}$, (87) a benzoxazolyl group, (88a) a benzothienyl group, (89a) an oxo group, and (90a) a 1,2,3,4-tetrahydroquinolyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring,

B_{12} represents a lower alkylene group,

t represents 0 or 1,

each of R^{20} and R^{21}, which are identical or different, represents a hydrogen atom; a cycloalkyl group; an amino group that may have a lower alkoxycarbonyl group as a substituent; a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring; a lower alkyl group; a lower alkyl group having 1 to 2 phenyl groups that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkylthio group; a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxy group that may have a halogen atom as a substituent and a lower alkyl group that may have a halogen atom as a substituent; a lower alkoxycarbonyl group; a cycloalkyl lower alkyl group; a pyrrolidinyl lower alkyl group that may have 1 to 3 lower alkyl groups that may have a hydroxyl group as a

substituent on the pyrrolidine ring; an amino-substituted lower alkyl group that may have a group selected from the group consisting of a phenyl group and a lower alkyl group as a substituent; a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may have 1 to 5 lower alkyl groups as a substituent(s) on the 1,2,3,4-tetrahydronaphthalene ring; a naphthyl lower alkyl group; a pyridyl lower alkyl group; a quinolyl lower alkyl group; a 1,2,3,4-tetrazolyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent(s) on the tetrazole ring; a 1,2,4-triazolyl lower alkyl group; a tetrahydrofuryl lower alkyl group that may have a hydroxyl group as a substituent on the lower alkyl group; a phenoxy lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a nitro group as a substituent(s) on the phenyl ring; a phenyl lower alkanoyl group; a lower alkanoyl group that may have a halogen atom as a substituent; an imidazolyl lower alkanoyl group; a lower alkoxycarbonyl lower alkyl group; a pyridyl group; or a carboxy lower alkyl group, or R^{20} and R^{21}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from

the group consisting of a lower alkyl group, a phenyl group that may have 1 to 3 groups selected from the group consisting of a halogen atom and a lower alkyl group that may have a halogen atom as a substituent(s) on the phenyl ring, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

o represents 0 or 1,

B_{13} represents a lower alkylene group,

each of R^{22} and R^{23}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring, a phenoxy lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, a phenyl lower alkyl group, or a phenyl group, or R^{22} and R^{23}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

B_{15} represents a lower alkylene group,

s represents 0 or 1,

each of R^{26} and R^{27}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a

phenyl lower alkyl group, or an imidazolyl lower alkyl group, or R^{26} and R^{27}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring, as a substituent(s),

R^{28} represents a hydrogen atom or a lower alkyl group,

B_{16} represents a lower alkylene group,

R^{29} and R^{30}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{31} represents a hydrogen atom or a lower alkyl group,

B_{17} represents a lower alkylene group,

R^{32} and R^{33}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl

group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring].

Further, the present invention provides the pharmaceutical composition for the treatment of fibrosis, comprising the aromatic compound represented by the general formula (1) or a salt thereof mentioned above.

The present invention provides the above-mentioned pharmaceutical composition for the treatment of fibrosis, comprising the aromatic compound or a salt thereof mentioned above, wherein the aromatic compound is selected from the group consisting of

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzene-sulfonamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperazin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-

oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide,

N-[6-({4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenyl}methylamino)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

1-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3-(3,4-dichlorophenyl)-1-ethylurea,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-4-trifluoromethyl-benzamide,

N-[6-(4-{[2-(4-benzylpiperazin-1-yl)-2-

oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-(6-{4-[3-(4-piperonylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-(6-{4-[(2-{4-[4-(4-fluorobenzoyl)phenyl]-piperazin-1-yl}-2-oxoethyl)methylamino]-2-methoxy-phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

2-(4-piperonylpiperazin-1-yl)-N-{3-methyl-4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenyl}-2-oxoacetamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-2-fluoro-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide, and

4-(3-{3-methyl-4-[5-(4-trifluoromethyl-benzoylamino)pyridin-2-yloxy]phenyl}-2-

oxohexahydropyrimidin-1-yl)benzoic acid ethyl ester, or salts thereof.

The present invention provides the above-mentioned pharmaceutical composition for the treatment of fibrosis, wherein the fibrosis is lung fibrosis. The present invention provides the above-mentioned pharmaceutical composition for the treatment of fibrosis, wherein the fibrosis is hepatic fibrosis. The present invention provides the above-mentioned pharmaceutical composition for the treatment of fibrosis, wherein the fibrosis is glomerulosclerosis.

Specific examples of each group represented by the general formula (1) are as follows.

Examples of the lower alkynylene group include linear or branched alkynylene groups having 2 to 6 carbon atoms which have 2 to 6 triple bonds such as ethynylene, 1-propynylene, 1-methyl-1-propynylene, 2-methyl-1-propynylene, 2-propynylene, 2-butynylene, 1-butynylene, 3-butynylene, 2-pentynylene, 1-pentynylene, 3-pentynylene, 4-pentynylene, 2-pentyn-4-ynylene, 2-hexynylene, 1-hexynylene, 5-hexynylene, 3-hexynylene, 4-hexynylene, 3,3-diethyl-1-propynylene, 2-ethyl-1-propynylene groups.

Examples of the amino group which may have a substituent selected from the group consisting of a lower alkyl group and a lower alkanoyl group include amino groups which may have 1 or 2 substituents selected from the group consisting of a linear or

branched alkyl group having 1 to 6 carbon atoms and a linear or branched alkanoyl group having 1 to 6 carbon atoms such as amino, methylamino, ethylamino, propylamino, isopropylamino, butylamino, tert-butylamino, pentylamino, hexylamino, dimethylamino, diethylamino, dipropylamino, dibutylamino, dipentylamino, dihexylamino, N-methyl-N-ethylamino, N-ethyl-N-propylamino, N-methyl-N-butylamino, N-methyl-N-hexylamino, N-acetylamino, N-formylamino, N-propionylamino, N-butyrylamino, N-isobutyrylamino, N-pentanoylamino, N-tert-butylcarbonylamino, N-hexanoylamino, diacetylamino, N-acetyl-N-methylamino, N-acetyl-N-ethylamino groups.

Examples of the benzoyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group which may have a halogen atom as a substituent and a halogen atom) include benzoyl groups (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents and a halogen atom) such as benzoyl, 3,4-difluorobenzoyl, 2-fluorobenzoyl, 3-bromobenzoyl, 4-iodobenzoyl, 4-methylbenzoyl, 2-methylbenzoyl, 3-methylbenzoyl, 2-ethylbenzoyl, 3-ethylbenzoyl, 4-ethylbenzoyl, 4-isopropylbenzoyl, 3-butylbenzoyl, 4-pentylbenzoyl, 4-hexylbenzoyl, 3,4-dimethylbenzoyl, 3,4-diethylbenzoyl, 2,4-

dimethylbenzoyl, 2,5-dimethylbenzoyl, 2,6-dimethylbenzoyl, 3,4,5-trimethylbenzoyl, 2-trifluoromethylbenzoyl, 3-trifluoromethylbenzoyl, 4-trifluoromethylbenzoyl, 2-(bromomethyl)benzoyl, 3-(2-chloroethyl)benzoyl, 4-(2,3-dichloropropyl)benzoyl, 4-(4-fluorobutyl)benzoyl, 3-(5-chloropentyl)benzoyl, 4-(5-bromohexyl)benzoyl, 4-(5,6-dibromohexyl)benzoyl, 3,4-di(trifluoromethyl)benzoyl, 3,4-di(4,4,4-trichlorobutyl)benzoyl, 2,4-di(3-chloro-2-methylpropyl)benzoyl, 2,5-di(3-chloropropyl)benzoyl, 2,6-di(2,2,2-trifluoroethyl)benzoyl, 3,4,5-tri(trifluoromethyl)benzoyl, 4-(2,2,2-trichloroethyl)benzoyl, 2-methyl-4-trifluoromethylbenzoyl, 3-ethyl-4-trichloromethylbenzoyl, 2-chloro-4-trifluoromethylbenzoyl, 3-ethyl-4-fluorobenzoyl, 3-fluoro-4-trichloromethylbenzoyl, 2-methyl-3-trifluoromethyl-4-trifluoromethylbenzoyl, 3-fluorobenzoyl, 4-fluorobenzoyl, 2-bromobenzoyl, 4-bromobenzoyl, 2-iodobenzoyl, 3-iodobenzoyl, 2,3-dibromobenzoyl, 2,4-diiodobenzoyl, 2,5-difluorobenzoyl, 2,6-dichlorobenzoyl, 2,4,6-trichlorobenzoyl, 2,4-difluorobenzoyl, 3,5-difluorobenzoyl, 2,6-difluorobenzoyl, 2-chlorobenzoyl, 3-chlorobenzoyl, 4-chlorobenzoyl, 2,3-dichlorobenzoyl, 2,4-dichlorobenzoyl, 2,5-dichlorobenzoyl, 3,4-dichlorobenzoyl, 2,6-dichlorobenzoyl, 3,5-dichlorobenzoyl, 2,4,6-trifluorobenzoyl, 2,4-

difluorobenzoyl groups.

Examples of the halogen substituted lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms which have 1 to 3 halogen atoms as substituents such as a trifluoromethyl group, trichloromethyl group, chloromethyl group, bromomethyl group, fluoromethyl group, iodomethyl group, difluoromethyl group, dibromomethyl group, dichloromethyl group, 2-chloroethyl group, 2,2,2-trifluoroethyl group, 2,2,2-trichloroethyl group, 3-chloropropyl group, 2,3-dichloropropyl group, 4,4,4-trichlorobutyl group, 4-fluorobutyl group, 5-chloropentyl group, 3-chloro-2-methylpropyl group, 5-bromohexyl group, and 5,6-dibromohexyl group.

Examples of the lower alkanoyl substituted amino group include linear or branched alkanoyl groups having 2 to 6 carbon atoms which have 1 to 3 halogen atoms as substituents such as a acetyl amino group, propionyl amino group, butyryl amino group, pentanoyl amino group, 2-methylpropionyl amino group and hexanoyl amino group.

Examples of the piperazinyl substituted oxalyl group which may have, on the piperazine ring, 1 to 3 substituents selected from the group consisting of a phenyl lower alkyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group) and a pyridyl lower alkyl group

include piperazinyl substituted oxalyl groups which may have, on the piperazine ring, 1 to 3 substituents selected from the group consisting of a phenylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms (and which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkylenedioxy group having 1 to 4 carbon atoms and a linear or branched alkoxy group having 1 to 6 carbon atoms) and a pyridylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as 4-(3,4-methylenedioxybenzyl)-(1-, 2-, or 3-)piperazinyloxalyl, 4-(2-, 3-, or 4-pyridylmethyl)-(1-, 2-, or 3-)piperazinyloxalyl, 4-(3,4-dimethoxybenzyl)-(1-, 2-, or 3-)piperazinyloxalyl, 4-(2,3-methylenedioxybenzyl)-(1-, 2-, or 3-)piperazinyloxalyl, 4-(3,4-ethylenedioxybenzyl)-(1-, 2-, or 3-)piperazinyloxalyl, 4-[2-(2-, 3-, or 4-pyridyl)ethyl]-(1-, 2-, or 3-)piperazinyloxalyl, 4-[3-(2-, 3-, or 4-pyridyl)propyl-(1-, 2-, or 3-)piperazinyloxalyl, 2,4-bis(2-, 3-, or 4-pyridylmethyl)-(1-, 2-, or 3-)piperazinyloxalyl, 2-(3,4-methylenedioxybenzyl)-4-(2-, 3-, or 4-pyridylmethyl)-(1-, 2-, or 3-)piperazinyloxalyl, 2,3,4-tri(2-, 3-, or 4-pyridylmethyl)-(1-, 2-, or 3-)piperazinyloxalyl groups.

Examples of the cyano substituted lower alkyl group include cyanoalkyl groups of which the alkyl

moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a cyanomethyl group, 2-cyanoethyl group, 1-cyanoethyl group, 3-cyanopropyl group, 4-cyanobutyl group, 5-cyanopentyl group, 6-cyanohexyl group, 1,1-dimethyl-2-cyanoethyl group, and 2-methyl-3-cyanopropyl group.

Examples of the carbamoyl group which may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group include carbamoyl groups which may have 1 or 2 groups selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms which has a linear or branched alkoxy group having 1 to 6 carbon atoms and a linear or branched alkyl group having 1 to 6 carbon atoms such as carbamoyl, N-(2-methoxyethyl)carbamoyl, methylcarbamoyl, ethylcarbamoyl, propylcarbamoyl, isopropylcarbamoyl, butylcarbamoyl, tert-butylcarbamoyl, pentylcarbamoyl, hexylcarbamoyl, dimethylcarbamoyl, diethylcarbamoyl, dipropylcarbamoyl, dibutylcarbamoyl, dipentylcarbamoyl, dihexylcarbamoyl, N-methyl-N-ethylcarbamoyl, N-ethyl-N-propylcarbamoyl, N-methyl-N-butylcarbamoyl, N-methyl-N-hexylcarbamoyl, N-(methoxymethyl)carbamoyl, N-(3-propoxypropyl)carbamoyl, N-(4-butoxybutyl)carbamoyl, N-(4-ethoxybutyl)carbamoyl, N-(5-pentyloxypentyl)carbamoyl, N-(5-methoxypentyl)carbamoyl, N-(6-hexyloxyhexyl)carbamoyl, di(2-methoxyethyl)carbamoyl, N-(2-methoxyethyl)-N-

methylcarbamoyl, N-(2-methoxyethyl)-N-ethylcarbamoyl groups.

Examples of the phenyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a halogen atom and a lower alkyl group which may have a halogen atom include phenyl groups which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a halogen atom and a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms such as phenyl, 3,4-difluorophenyl, 2-fluorophenyl, 3-bromophenyl, 4-iodophenyl, 4-methylphenyl, 2-methylphenyl, 3-methylphenyl, 2-ethylphenyl, 3-ethylphenyl, 4-ethylphenyl, 4-isopropylphenyl, 3-butylphenyl, 4-pentylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 3,4-diethylphenyl, 2,4-dimethylphenyl, 2,5-dimethylphenyl, 2,6-dimethylphenyl, 3,4,5-trimethylphenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-(bromomethyl)phenyl, 3-(2-chloroethyl)phenyl, 4-(2,3-dichloropropyl)phenyl, 4-(4-fluorobutyl)phenyl, 3-(5-chloropentyl)phenyl, 4-(5-bromohexyl)phenyl, 4-(5,6-dibromohexyl)phenyl, 3,4-di(trifluoromethyl)phenyl, 3,4-di(4,4,4-trichlorobutyl)phenyl, 2,4-di(3-chloro-2-methylpropyl)phenyl, 2,5-di(3-chloropropyl)phenyl, 2,6-di(2,2,2-trifluoroethyl)phenyl, 3,4,5-tri(trifluoromethyl)phenyl, 4-(2,2,2-

trichloroethyl)phenyl, 2-methyl-4-trifluoromethylphenyl, 3-ethyl-4-trichloromethylphenyl, 2-chloro-4-trifluoromethylphenyl, 3-ethyl-4-fluorophenyl, 3-fluoro-4-trichloromethylphenyl, 2-methyl-3-trifluoromethyl-4-trifluoromethylphenyl, 3-fluorophenyl, 4-fluorophenyl, 2-bromophenyl, 4-bromophenyl, 2-iodophenyl, 3-iodophenyl, 2,3-dibromophenyl, 2,4-diiodophenyl, 2,5-difluorophenyl, 2,6-dichlorophenyl, 2,4,6-trichlorophenyl, 2,4-difluorophenyl, 3,5-difluorophenyl, 2,6-difluorophenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,5-dichlorophenyl, 3,4-dichlorophenyl, 2,6-dichlorophenyl, 3,5-dichlorophenyl, 2,4,6-trifluorophenyl, 2,4-difluorophenyl groups.

Examples of the lower alkenylene group include linear or branched alkenylene groups having 2 to 6 carbon atoms which have 1 to 3 double bonds such as vinylene, 1-propenylene, 1-methyl-1-propenylene, 2-methyl-1-propenylene, 2-propenylene, 2-butenylene, 1-butenylene, 3-butenylene, 3-pentenylene, 1-pentenylene, 2-pentenylene, 4-pentenylene, 1,3-butadienylene, 1,3-pentadienylene, 2-penten-4-ynylene, 2-hexenylene, 1-hexenylene, 5-hexenylene, 3-hexenylene, 4-hexenylene, 3,3-dimethyl-1-propenylene, 2-ethyl-1-propenylene, 1,3,5-hexatrienylene, 1,3-hexadienylene, and 1,4-hexadienylene.

Examples of the lower alkoxy group include

linear or branched alkoxy groups having 1 to 6 carbon atoms such as a methoxy group, ethoxy group, propoxy group, isopropoxy group, butoxy group, tert-butoxyl group, pentyloxy group, and hexyloxy group.

Examples of the lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms such as a methyl group, ethyl group, propyl group, isopropyl group, 2,2-dimethylpropyl group, 1-ethylpropyl group, butyl group, isobutyl group, tert-butyl group, isopentyl group, pentyl group, and hexyl group.

Examples of the lower alkyl group which may have a lower alkoxy group as a substituent include, in addition to the above described lower alkyl groups, linear or branched alkyl groups having 1 to 6 carbon atoms which may have a linear or branched alkoxy group having 1 to 6 carbon atoms as a substituent such as a methoxymethyl group, 1-ethoxyethyl group, 2-methoxyethyl group, 2-propoxyethyl group, 3-isopropoxypropyl group, 4-butoxybutyl group, 5-pentyloxypentyl group, 6-hexyloxyhexyl, 1,1-dimethyl-2-methoxyethyl group, 2-methyl-3-ethoxypropyl, and 3-methoxypropyl group.

Examples of the lower alkanoyl group include alkanoyl groups having 1 to 6 carbon atoms such as a formyl group, acetyl group, propionyl group, butyryl group, isobutyryl group, pentanoyl group, tert-butylcarbonyl, and hexanoyl group.

Examples of the phenyl lower alkyl group include phenylaklyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a benzyl group, 2-phenylethyl group, 1-phenylethyl group, 3-phenylpropyl group, 4-phenylbutyl group, 5-phenylpentyl group, 6-phenylhexyl group, 1,1-dimethyl-2-phenylethyl group, and 2-methyl-3-phenylpropyl group.

Examples of the phenyl lower alkyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group), include, in addition to the above described phenyl lower alkyl groups, phenylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms (and which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkylenedioxy group having 1 to 4 carbon atoms and a linear or branched alkoxy group having 1 to 6 carbon atoms) such as 3,4-methylenedioxybenzyl, 3,4-trimethylenedioxybenzyl, 2-(2,3-ethylenedioxyphenyl)ethyl, 1-(3,4-trimethylenedioxyphenyl)ethyl, 3-(2,3-tetramethylenedioxyphenyl)propyl, 4-(3,4-methylenedioxyphenyl)butyl, 5-(2,3-ethylenedioxyphenyl)pentyl, 6-(3,4-trimethylenedioxyphenyl)hexyl, 1,1-dimethyl-2-(2,3-methylenedioxyphenyl)ethyl, 2-methyl-3-(3,4-

ethylenedioxyphenyl)propyl, 2-methoxybenzyl, 2-(2-methoxyphenyl)ethyl, 2-(3-methoxyphenyl)ethyl, 2-(4-methoxyphenyl)ethyl, 4-methoxybenzyl, 1-(2-ethoxyphenyl)ethyl, 3-(3-ethoxyphenyl)propyl, 4-(4-ethoxyphenyl)butyl, 5-(4-isopropoxyphenyl)pentyl, 6-(3-butoxyphenyl)hexyl, 1,1-dimethyl-2-(4-pentyloxyphenyl)ethyl, 2-methyl-3-(4-hexyloxyphenyl)propyl, 3,4-dimethoxybenzyl, 3,4-diethoxybenzyl, 2,4-dimethoxybenzyl, 2,5-dimethoxybenzyl, 2,6-dimethoxybenzyl, 3,4,5-trimethoxybenzyl groups.

Examples of the lower alkylene group include linear or branched alkylene groups having 1 to 6 carbon atoms such as a methylene group, ethylene group, trimethylene group, 2-methyltrimethylene group, 2,2-dimethylethylene group, 2,2-dimethyltrimethylene group, 1-methyltrimethylene group, methylmethylene group, ethylmethylene group, tetramethylene group, pentamethylene group, and hexamethylene group.

Examples of the lower alkenylene group which may have a phenyl group as a substituent include linear or branched alkenylene groups having 2 to 6 carbon atoms which have 1 to 3 double bonds and may have a phenyl group as a substituent such as vinylene, 1-propenylene, 1-methyl-1-propenylene, 2-methyl-1-propenylene, 2-propenylene, 2-butenylene, 1-butenylene, 3-butenylene, 2-pentenylene, 1-pentenylene, 3-pentenylene, 4-pentenylene, 1,3-butadienylene, 1,3-

pentadienylene, 2-penten-4-ynylene, 2-hexenylene, 1-hexenylene, 5-hexenylene, 3-hexenylene, 4-hexenylene, 3,3-dimethyl-1-propenylene, 2-ethyl-1-propenylene, 1,3,5-hexatrienylene, 1,3-hexadienylene, 1,4-hexadienylene, 1-phenylvinylene, 3-phenyl-1-propenylene, 3-phenyl-1-methyl-1-propenylene, 3-phenyl-2-methyl-1-propenylene, 1-phenyl-2-propenylene, 1-phenyl-2-butenylene, 3-phenyl-1-butenylene, 1-phenyl-3-butenylene, 5-phenyl-2-pentenylene, 4-phenyl-1-pentenylene, 2-phenyl-3-pentenylene, 1-phenyl-4-pentenylene, 1-phenyl-1,3-butadienylene, 1-phenyl-1,3-pentadienylene, 1-phenyl-2-penten-4-ynylene, 1-phenyl-2-hexenylene, 3-phenyl-1-hexenylene, 4-phenyl-5-hexenylene, 6-phenyl-3-hexenylene, 5-phenyl-4-hexenylene, 1-phenyl-3,3-dimethyl-1-propenylene, 1-phenyl-2-ethyl-1-propenylene, 6-phenyl-1,3,5-hexatrienylene, 1-phenyl-1,3-hexadienylene, 2-phenyl-1,4-hexadienylene groups.

Examples of the lower alkylene group which may be substituted with a group selected from the group consisting of a lower alkoxy group and a phenyl group include, in addition to the above described lower alkylene groups, linear or branched alkylene groups having 1 to 6 carbon atoms which may be substituted with 1 or 2 groups selected from the group consisting of a linear or branched alkoxy group having 1 to 6 carbon atoms and a phenyl group such as methoxymethylene, 2-phenylethylene, 3-

ethoxytrimethylene, 1-propoxy-2-methyltrimethylene, 1-phenyl-2,2-dimethylethylene, 3-phenyl-2,2-dimethyltrimethylene, 2-butoxy-1-methyltrimethylene, phenylmethylmethylene, 2-pentyloxyethylmethylene, 4-phenyl-2-hexyloxytetramethylene, 3-phenylpentamethylene, 5-phenylhexamethylene, ethoxymethylene, 1-phenylethylene, 3-phenyltrimethylene, 2-phenyl-1-methoxyethylene groups.

Examples of the 5- to 15- membered monocyclic, bicyclic or tricyclic saturated or unsaturated heterocyclic group which has 1 to 4 nitrogen atoms, oxygen atoms or sulfur atoms include pyrrolidinyl, piperidinyl, piperazinyl, morpholino, pyridyl, 1,2,5,6-tetrahydropyridyl, 1,2,4-triazolyl, 1,2,3-triazolyl, 1,2,5-triazolyl, thiazolidinyl, 1,2,3,4-tetrazolyl, thienyl, quinolyl, 1,4-dihydroquinolyl, benzothiazolyl, pyrazyl, pyrimidyl, pyridazyl, 2H-pyrrolyl, pyrrolyl, 1,3,4-oxadiazolyl, tetrahydropyranyl, tetrahydrofuryl, furazanyl, carbostyryl, 3,4-dihydrocarbostyryl, 1,2,3,4-tetrahydroquinolyl, 1,2,3,4-tetrahydroisoquinolyl, indolyl, isoindolyl, indolinyl, benzoimidazolyl, benzoxazolyl, imidazolidinyl, isoquinolyl, quinazolidinyl, quinoxalinyl, cinnolinyl, phthalazinyl, carbazoyl, acridinyl, chromanyl, isoindolinyl, isochromanyl, pyrazolyl, imidazolyl, pyrazolidinyl, phenothiazinyl, benzofuryl, 2,3-dihydrobenzo[b]furyl, benzothienyl, phenoxatiynyl, phenoxadinyl, 4H-

chromenyl, 1H-indazolyl, phenazinyl, xanthenyl, thianthrenyl, 2-imidazolinyl, 2-pyrrolinyl, furyl, oxazolyl, isoxazolyl, isoxazolidinyl, thiazolyl, isothiazolyl, pyranyl, 2-thiazolinyl, 2-pyrazolinyl, quinuclidinyl, 1,4-benzoxadinyl, 3,4,-dihydro-2H-1,4-benzoxadinyl, 3,4-dihydro-2H-1,4-benthiazinyl, 1,4-benzothiazinyl, 1,2,3,4-tetrahydroquinoxalinyl, 1,3-dithia-2,4-dihydronaphthalenyl, phenanthridinyl, 1,4-dithianaphthalenyl, dibenz[b,e]azepine, 6,11-dihydro-5H-dibenz[b,e]azepine groups.

Examples of the halogen atom include a fluorine atom, chlorine atom, bromine atom and iodine atom.

Examples of the lower alkoxy group which may have a halogen atom as a substituent include linear or branched alkoxy groups having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as methoxy, ethoxy, propoxy, isopropoxy, butoxy, tert-butoxy, pentyloxy, hexyloxy, trifluoromethoxy, trichloromethoxy, chloromethoxy, bromomethoxy, fluoromethoxy, iodomethoxy, difluoromethoxy, dibromomethoxy, 2-chloroethoxy, 2,2,2-trifluoroethoxy, 2,2,2-trichloroethoxy, 3-chloropropoxy, 2,3-dichloropropoxy, 4,4,4-trichlorobutoxy, 4-fluorobutoxy, 5-chloropentyloxy, 3-chloro-2-methylpropoxy, 6-bromohexyloxy, 5,6-dichlorohexyloxy groups.

Examples of the lower alkyl group which may have a halogen atom as a substituent include, in

addition to the above described lower alkyl groups, linear or branched alkyl groups having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as a trifluoromethyl group, trichloromethyl group, chloromethyl group, dichloromethyl group, bromomethyl group, fluoromethyl group, iodomethyl group, difluoromethyl group, dibromomethyl group, dichloromethyl group, 2-chloroethyl group, 2,2,2-trifluoroethyl group, 2,2,2-trichloroethyl group, 3-chloropropyl group, 2,3-dichloropropyl group, 4,4,4-trichlobutyl group, 4-fluorobutyl group, 5-chloropentyl group, 3-chloro-2-methylpropyl group, 5-bromohexyl group, and 5,6-dibromohexyl group.

Examples of the lower alkylsulfonyl group include linear or branched alkylsulfonyl groups having 1 to 6 carbon atoms such as a methylsulfonyl group, ethylsulfonyl group, propylsulfonyl group, isopropylsulfonyl group, butylsulfonyl group, tert-butylsulfonyl group, pentylsulfonyl group, and hexylsulfonyl group.

Examples of the phenyl group which may be substituted on the phenyl ring with a lower alkyl group which may have a halogen atom include phenyl groups which may be substituted with 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms such as phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 2-ethylphenyl, 3-

ethylphenyl, 4-ethylphenyl, 4-isopropylphenyl, 3-butylphenyl, 4-pentylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 3,4-diethylphenyl, 2,4-dimethylphenyl, 2,5-dimethylphenyl, 2,6-dimethylphenyl, 3,4,5-trimethylphenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-(bromomethyl)phenyl, 3-(2-chloroethyl)phenyl, 4-(2,3-dichloropropyl)phenyl, 4-(4-fluorobutyl)phenyl, 3-(5-chloropentyl)phenyl, 4-(5-bromohexyl)phenyl, 4-(5,6-dibromohexyl)phenyl, 3,4-di(trifluoromethyl)phenyl, 3,4-di(4,4,4-trichlorobutyl)phenyl, 2,4-di(3-chloro-2-methylpropyl)phenyl, 2,5-di(3-chloropropyl)phenyl, 2,6-di(2,2,2-trifluoroethyl)phenyl, 3,4,5-tri(trifluoromethyl)phenyl, 4-(2,2,2-trichloroethyl)phenyl, 2-methyl-4-trifluoromethylphenyl, 3-ethyl-4-trichloromethyl groups.

Examples of the lower alkylthio group include linear or branched alkylthio groups having 1 to 6 carbon atoms such as a methylthio group, ethylthio group, propylthio group, isopropylthio group, butylthio group, tert-butylthio group, pentylthio group, and hexylthio group.

Examples of the naphthyl group which may be substituted on the naphthalene ring with 1 to 3 substituents selected from the group consisting of a lower alkyl group, a halogen atom, and an amino group which may have a substituent selected from the group

consisting of a lower alkyl group and a lower alkanoyl group include naphthyl groups which may have, on the naphthalene ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms, a halogen atom, and an amino group which may have 1 or 2 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms and a linear or branched alkanoyl group having 1 to 6 carbon atoms such as (1- or 2-)naphthyl, 1-methyl-(2-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 2-ethyl-(1-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 3-n-propyl-(1-, 2-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 4-n-butyl-(1-, 2-, 3-, 5-, 6-, 7-, or 8-)naphthyl, 4-methyl-(1-, 2-, 3-, 5-, 6-, 7-, or 8-)naphthyl, 5-n-pentyl-(1-, 2-, 3-, 4-, 6-, 7-, or 8-)naphthyl, 6-n-hexyl-(1-, 2-, 3-, 4-, 5-, 7-, or 8-)naphthyl, 1,7-dimethyl-(2-, 3-, 4-, 5-, 6-, or 8-)naphthyl, 1,2,8-trimethyl-(3-, 4-, 5-, 6-, or 7-)naphthyl, 1-dimethylamino-(2-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 2-dimethylamino-(1-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 3-methylamino-(1-, 2-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 5-amino-(1-, 2-, 3-, 4-, 6-, 7-, or 8-)naphthyl, 5-dimethylamino-(1-, 2-, 3-, 4-, 6-, 7-, or 8-)naphthyl, 4-(N-methyl-N-ethylamino)-(1-, 2-, 3-, 5-, 6-, 7-, or 8-)naphthyl, 1-methyl-2-dimethylamino-(3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 1-chloro-(2-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl, 1-acetylamino-(2-, 3-, 4-, 5-, 6-, 7-, or 8-)naphthyl groups.

Examples of the alkyl group which may have a lower alkoxy group as a substituent include, in addition to the above described alkyl groups which may have a lower alkoxy group as a substituent, linear or branched alkyl groups having 1 to 8 carbon atoms which may have a linear or branched alkoxy group having 1 to 6 carbon atoms as a substituent such as a heptyl group, 1-ethylpentyl group, octyl group, 7-methoxyheptyl group, 1-ethoxyheptyl group, 2-propoxyl-1-ethylpentyl group, 3-isopropoxyoctyl group, 7-butoxyheptyl group, 8-pentyloxyoctyl group, and 5-hexyloxy-1-ethylpentyl group.

Examples of the amino substituted lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms substituted with an amino group which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms such as aminomethyl, 2-aminoethyl, 1-aminoethyl, 3-aminopropyl, 4-aminobutyl, 5-aminopentyl, 6-aminohexyl, 1,1-dimethyl-2-aminoethyl, 2-methyl-3-aminopropyl, methylaminomethyl, 1-ethylaminoethyl, 2-propylaminoethyl, 3-isopropylaminopropyl, 4-butylaminobutyl, 5-pentylaminopentyl, 6-hexylaminohexyl, dimethylaminomethyl, 2-diethylaminoethyl, 2-diisopropylaminoethyl, (N-ethyl-N-propylamino)methyl, 2-(N-methyl-N-hexylamino)ethyl groups.

Examples of the cycloalkyl group include cycloalkyl groups having 3 to 16 carbon atoms such as a

cyclopropyl group, cyclobutyl group, cyclopentyl group, cyclohexyl group, cycloheptyl group, cyclooctyl group, cyclononyl group, cyclodecyl group, cycloundecyl group, cyclododecyl group, cyclotridecyl group, cycloteradecyl group, cyclopentadecyl group, and cyclohexadecyl group.

Examples of the cycloalkyl group which may be substituted with a group selected from the group consisting of an amino substituted lower alkyl group which may have a lower alkyl group and a lower alkyl group which may have a halogen as a substituent include cycloalkyl groups having 3 to 16 carbon atoms which may be substituted on the cycloalkyl ring with 1 to 3 groups selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms substituted with an amino group which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms and a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as 4-dimethylaminomethylcyclohexyl, 2-(aminomethyl)cyclopropyl, 3-(2-aminomethyl)cyclobutyl, 2-(1-aminoethyl)cyclopentyl, 3-(3-aminopropyl)cyclohexyl, 3-(4-aminobutyl)cycloheptyl, 4-(5-aminopentyl)cyclooctyl, 4-(6-aminohexyl)cyclohexyl, 2-(1,1-dimethyl-2-aminoethyl)cycloheptyl, 3-(2-methyl-3-aminopropyl)cyclopentyl, 3-(methylaminomethyl)cyclohexyl, 2-(1-ethylaminoethyl)cyclooctyl, 2-(2-

propylaminoethyl)cyclohexyl, 3-(3-isopropylaminopropyl)cyclopentyl, 4-(4-butylaminobutyl)cycloheptyl, 2-(5-pentylaminopentyl)cyclohexyl, 2-(6-hexylaminohexyl)cyclopentyl, 3-(dimethylaminomethyl)cyclohexyl, 3-[(N-ethyl-N-propylamino)methyl]cycloheptyl, 4-[2-(N-methyl-N-hexylamino)ethyl]cyclooctyl, 4-dimethylaminomethylcyclononyl, 2-(aminomethyl)cyclodecyl, 3-(2-aminomethyl)cycloundecyl, 2-(1-aminoethyl)cyclododecyl, 3-(3-aminopropyl)cyclotridecyl, 3-(4-aminobutyl)cyclotetradecyl, 4-(5-aminopentyl)cyclopentadecyl, 4-(6-aminohexyl)cyclohexadecyl, 2-(1,1-dimethyl-2-aminoethyl)cyclononyl, 3-(2-methyl-3-aminopropyl)cyclodecyl, 3-(methylaminomethyl)cycloundecyl, 2-(1-ethylaminoethyl)cyclododecyl, 2-(2-propylaminoethyl)cyclotridecyl, 3-(3-isopropylaminopropyl)cyclotetradecyl, 4-(4-butylaminobutyl)cyclopentadecyl, 2-(5-pentylaminopentyl)cyclohexadecyl, 2-(6-hexylaminohexyl)cyclononyl, 3-(dimethylaminomethyl)cyclododecyl, 3-[(N-ethyl-N-propylamino)methyl]cyclodecyl, 4-[2-(N-methyl-N-hexylamino)ethyl]cyclohexadecyl, 2,2-dimethylcyclopropyl, 2-trifluoromethylcyclopropyl

groups.

Examples of the lower alkenyl group include linear or branched alkenyl groups having 2 to 6 carbon atoms which have 1 to 3 double bonds such as a vinyl group, 1-propenyl group, 1-methyl-1-propenyl group, 2-methyl-1-propenyl group, 2-propenyl group, 2-butenyl group, 1-butenyl group, 3-butenyl group, 2-pentenyl group, 1-pentenyl group, 3-pentenyl group, 4-pentenyl group, 1,3-butadienyl group, 1,3-pentadienyl group, 2-penten-4-ynyl group, 2-hexenyl group, 1-hexenyl group, 5-hexenyl group, 3-hexenyl group, 4-hexenyl group, 3,3-dimethyl-1-propenyl group, 2-ethyl-1-propenyl group, 1,3,5-hexatrienyl group, 1,3-hexadienyl group, and 1,4-hexadienyl group.

Examples of the lower alkenyl group which may have a halogen atom as a substituent include, in addition to the above described lower alkenyl groups, linear or branched alkenyl groups having 2 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents and 1 to 3 double bonds such as 3,3,3-trifluoro-1-propenyl, 2-bromovinyl, 3-chloro-1-propenyl, 3-iodo-1-methyl-1-propenyl, 3-fluoro-2-methyl-1-propenyl, 2-butenyl, 4,4,3-trichloro-1-butenyl, 4,4-difluoro-3-butenyl, 5-fluoro-2-pentenyl, 5,5,3-tribromo-1-pentenyl, 5-chloro-3-pentenyl, 5,5,5-trifluoro-4-pentenyl, 4-chloro-1,3-butadienyl, 5-fluoro-1,3-pentadienyl, 5-bromo-2-penten-4-ynyl, 6-fluoro-2-hexenyl, 6,6,5-trifluoro-1-hexenyl, 6-chloro-

5-hexenyl, 5-bromo-3-hexenyl, 6-chloro-4-hexenyl, 3,3-dimethyl-2-chloro-1-propenyl, 3-fluoro-2-ethyl-1-propenyl, 6-chloro-1,3,5-hexatrienyl, 6-bromo-1,3-hexadienyl, 6-fluoro-1,4-hexadienyl groups.

Examples of the lower alkylenedioxy group include linear or branched alkylene groups having 1 to 4 carbon atoms such as a methylenedioxy group, ethylenedioxy group, trimethylenedioxy group, and tetramethylenedioxy group.

Examples of the amino group which may have a substituent selected from the group consisting of a lower alkyl group, a lower alkanoyl group, a benzoyl group and a cycloalkyl group include amino groups which may have 1 or 2 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms, a linear or branched alkanoyl group having 1 to 6 carbon atoms, a benzoyl group, and a cycloalkyl group having 3 to 16 carbon atoms such as amino, methylamino, ethylamino, propylamino, isopropylamino, butylamino, tert-butylamino, pentylamino, hexylamino, dimethylamino, diethylamino, dipropylamino, dibutylamino, dipentylamino, dihexylamino, N-methyl-N-ethylamino, N-ethyl-N-propylamino, N-methyl-N-butylamino, N-methyl-N-hexylamino, N-methyl-N-acetylamino, N-acetylamino, N-formylamino, N-propionylamino, N-butyrylamino, N-isobutyrylamino, N-pentanoylamino, N-tert-butylcarbonylamino, N-hexanoylamino, N-ethyl-N-

acetylamino, N-benzoylamino, N-ethyl-N-benzoylamino, N-methyl-N-benzoylamino, N-acetyl-N-benzoylamino, cyclopropylamino, cyclobutylamino, cyclopentylamino, cyclohexylamino, cycloheptylamino, cyclooctylamino, N-methyl-N-cyclohexylamino, N-methyl-N-cyclopentylamino, N-methyl-N-cycloheptylamino, N-cyclohexyl-N-acetylamino, N-cyclopentyl-N-benzoylamino, cyclononylamino, cyclodecylamino, cyclododecylamino, cyclotridecylamino, cyclotetradecylamino, cyclopentadecylamino, N-methyl-N-cyclohexadecylamino, N-methyl-N-cyclononylamino, N-methyl-N-cyclodecylamino, N-cycloundecyl-N-acetylamino, N-cyclohexadecyl-N-benzoylamino groups.

Examples of the lower alkanoyl group which may have a halogen atom as a substituent include, in addition to the above described lower alkanoyl groups, linear or branched alkanoyl groups having 2-6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as a 2,2,2-trifluoroacetyl group, 2,2,2-trichloroacetyl group, 2-chloroacetyl group, 2-bromoacetyl group, 2-fluoroacetyl group, 2-iodoacetyl group, 2,2-difluoroacetyl group, 2,2-dibromoacetyl group, 3,3,3-trifluoropropionyl group, 3,3,3-trichloropropionyl group, 3-chloropropionyl group, 2,3-dichloropropionyl group, 4,4,4-trichlorobutyryl group, 4-fluorobutyryl group, 5-chloropentanoyl group, 3-chloro-2-methylpropionyl group, 6-bromohexanoyl group, and 5,6-dibromohexanoyl group.

Examples of the lower alkoxycarbonyl group include linear or branched alkoxycarbonyl groups having 1 to 6 carbon atoms such as a methoxycarbonyl group, ethoxycarbonyl group, propoxycarbonyl group, isopropoxycarbonyl group, butoxycarbonyl group, tert-butoxycarbonyl group, pentyloxycarbonyl group, and hexyloxycarbonyl group.

Examples of the lower alkanoyloxy group include linear or branched alkanoyloxy groups having 2 to 6 carbon atoms such as an acetyloxy group, propionyloxy group, butyryloxy group, isobutyryloxy group, pentanoyloxy group, tert-butylcarbonyloxy group, and hexanoyloxy group.

Examples of the 5- or 6-membered saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms or sulfur atoms include pyrrolidinyl, piperidinyl, piperazinyl, morpholino, thiomorpholino, pyridyl, 1,2,5,6-tetrahydropyridyl, thienyl, pyrazyl, pyrimidyl, pyridazyl, pyrrolyl, 2H-pyrrolyl, imidazolidinyl, pyrazolyl, imidazolyl, pyrazolidinyl, furazanyl, 2-imidazolinyl, imidazolidinyl, 2-pyrrolinyl, furyl, oxazolyl, isoxazilidinyl, isoxazolyl, thiazolyl, isothiazolyl, pyranyl, 2-pyrazolidinyl, 1,2,4-triazolyl, 1,2,3-triazolyl, 1,2,5-triazolyl, thiazolidinyl, 2-thiazolinyl, 1,2,3,4-tetrazolyl, 1,3,4-oxadiazolyl, tetrahydropyranyl, tetrahydrofuryl groups.

Examples of the 5- to 7-membered saturated

heterocyclic ring formed by binding R^{11} and R^{12} each other, together with nitrogen atoms bound to them, through or not through a nitrogen atom, a sulfur atom or an oxygen atom, include a pyrrolidinyl group, piperidinyl group, piperazinyl group, morpholino group, thiomorpholino group, and homopiperazinyl group.

Examples of the imidazolyl lower alkyl group include imidazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (1,2,4 or 5-)imidazolylmethyl group, 2-[(1,2,4 or 5-)imidazolyl]ethyl group, 1-[(1,2,4 or 5-)imidazolyl]ethyl group, 3-[(1,2,4 or 5-)imidazolyl]propyl group, 4-[(1,2,4 or 5-)imidazolyl]butyl group, 5-[(1,2,4 or 5-)imidazolyl]pentyl group, 6-[(1,2,4 or 5-)imidazolyl]hexyl group, 1,1-dimethyl-2-[(1,2,4 or 5-)imidazolyl]ethyl group, and 2-methyl-3-[(1,2,4 or 5-)imidazolyl]propyl group.

Examples of the 1,2,4-triazolyl lower alkyl group include 1,2,4-triazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 3, or 5-)1,2,4-triazolylmethyl, 2-[(1, 3, or 5-)1,2,4-triazolyl]ethyl, 1-[(1, 3, or 5-)1,2,4-triazolyl]ethyl, 3-[(1, 3, or 5-)1,2,4-triazolyl]propyl, 4-[(1, 3, or 5-)1,2,4-triazolyl]butyl, 5-[(1, 3, or 5-)1,2,4-triazolyl]pentyl, 6-[(1, 3, or 5-)1,2,4-triazolyl]hexyl, 1,1-dimethyl-2-[(1, 3, or 5-)1,2,4-

triazolyl]ethyl, 2-methyl-3-[(1, 3, or 5-)1,2,4-triazolyl]propyl groups.

Examples of the 1,2,3-triazolyl lower alkyl group include 1,2,3-triazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 4, or 5-)1,2,3-triazolylmethyl, 2-[(1, 4, or 5-)1,2,3-triazolyl]ethyl, 1-[(1, 4, or 5-)1,2,3-triazolyl]ethyl, 3-[(1, 4, or 5-)1,2,3-triazolyl]propyl, 4-[(1, 4, or 5-)1,2,3-triazolyl]butyl, 5-[(1, 4, or 5-)1,2,3-triazolyl]pentyl, 6-[(1, 4, or 5-)1,2,3-triazolyl]hexyl, 1,1-dimethyl-2-[(1, 4, or 5-)1,2,3-triazolyl]ethyl, 2-methyl-3-[(1, 4, or 5-)1,2,3-triazolyl]propyl groups.

Examples of the 1,2,5-triazolyl lower alkyl group include 1,2,5-triazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 3, or 4-)1,2,5-triazolylmethyl, 2-[(1, 3, or 4-)1,2,5-triazolyl]ethyl, 1-[(1, 3, or 4-)1,2,5-triazolyl]ethyl, 3-[(1, 3, or 4-)1,2,5-triazolyl]propyl, 4-[(1, 3, or 4-)1,2,5-triazolyl]butyl, 5-[(1, 3, or 4-)1,2,5-triazolyl]pentyl, 6-[(1, 3, or 4-)1,2,5-triazolyl]hexyl, 1,1-dimethyl-2-[(1, 3, or 4-)1,2,5-triazolyl]ethyl, 2-methyl-3-[(1, 3, or 4-)1,2,5-triazolyl]propyl groups.

Examples of the pyrazolyl lower alkyl group include pyrazolylalkyl groups of which the alkyl moiety

is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (1,3,4 or 5-)pyrazolylmethyl group, 2-[(1,3,4 or 5-)1,2,5-pyrazolyl]ethyl group, 1-[(1,3,4 or 5-)pyrazolyl]ethyl group, 3-[(1,3,4 or 5-)pyrazolyl]propyl group, 4-[(1,3,4 or 5-)pyrazolyl]butyl group, 5-[(1,3,4 or 5-)pyrazolyl]pentyl group, 6-[(1,3,4 or 5-)pyrazolyl]hexyl group, 1,1-dimethyl-2-[(1,3,4 or 5-)pyrazolyl]ethyl group, and 2-methyl-3-[(1,3,4 or 5-)pyrazolyl]propyl group.

Examples of the pyrimidinyl lower alkyl group include pyrimidinylalkyl groups which may have 1 to 3 oxo groups as substituents on the pyrimidine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (2, 4, 5, or 6-)pyrimidinylmethyl, 2-[(2, 4, 5, or 6-)pyrimidinyl]ethyl, 1-[(2, 4, 5, or 6-)pyrimidinyl]ethyl, 3-[(2, 4, 5, or 6-)pyrimidinyl]propyl, 4-[(2, 4, 5, or 6-)pyrimidinyl]butyl, 5-[(2, 4, 5, or 6-)pyrimidinyl]pentyl, 6-[(2, 4, 5, or 6-)pyrimidinyl]hexyl, 1,1-dimethyl-2-[(2, 4, 5, or 6-)pyrimidinyl]ethyl, 2-methyl-3-[(2, 4, 5, or 6-)pyrimidinyl]propyl, [(1, 3, 4, or 5-)2,6-dioxopyrimidinyl]methyl, [(1, 3, 4, 5, or 6-)2-oxopyrimidinyl]methyl, [(1, 2, 4, or 5-)6-oxopyrimidinyl]methyl, [(1, 2, 5, or 6-)4-oxopyrimidinyl]methyl, [(1, 3, 5, or 6-)2,4-

dioxopyrimidinyl]methyl, 2-[(4 or 6-)2,5-dioxopyrimidinyl]ethyl, 1-[(1, 3, 4, or 5-)2,6-dioxopyrimidinyl]ethyl, 3-[(1, 3, or 5-)2,4,6-trioxopyrimidinyl]propyl, 4-[(1, 3, 4, or 5-)2,6-dioxopyrimidinyl]butyl, 5-[(4 or 6-)2,5-dioxopyrimidinyl]pentyl, 6-[(1, 3, 5, or 6-)2,4-dioxopyrimidinyl]hexyl, 1,1-dimethyl-2-[(1, 3, 4, or 5-)2,6-dioxopyrimidinyl]ethyl, 2-methyl-3-[(1, 3, 4, or 5-)2,6-dioxopyrimidinyl]propyl groups.

Examples of the 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group include 3,5-dioxoisoxazolidin-4-ylidenealkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a 3,5-dioxoisoxazolidin-4-ylidenemethyl group, 3,5-dioxoisoxazolidin-4-ylideneethyl group, 3,5-dioxoisoxazolidin-4-ylidenepropyl group, 3,5-dioxoisoxazolidin-4-ylideneisopropyl group, 3,5-dioxoisoxazolidin-4-ylidenebutyl group, 3,5-dioxoisoxazolidin-4-ylidenepentyl group, and 3,5-dioxoisoxazolidin-4-ylidenehexyl group.

Examples of the 1,2,4-oxadiazolyl lower alkyl group which may have a lower alkyl group as a substituent on the 1,2,4-oxadiazol ring include 1,2,4-oxadiazolylalkyl groups which may have a linear or branched alkyl group having 1 to 6 carbon atoms as a substituent on the 1,2,4-oxadiazol ring and of which the alkyl moiety is a linear or branched alkyl group

having 1 to 6 carbon atoms such as (3 or 5-)1,2,4-oxadiazolylmethyl, 2-[(3 or 5-)1,2,4-oxadiazolyl]ethyl, 1-[(3 or 5-)1,2,4-oxadiazolyl]ethyl, 3-[(3 or 5-)1,2,4-oxadiazolyl]propyl, 4-[(3 or 5-)1,2,4-oxadiazolyl]butyl, 5-[(3 or 5-)1,2,4-oxadiazolyl]pentyl, 6-[(3 or 5-)1,2,4-oxadiazolyl]hexyl, 1,1-dimethyl-2-[(3 or 5-)1,2,4-oxadiazolyl]ethyl, 2-methyl-3-[(3 or 5-)1,2,4-oxadiazolyl]propyl, 5-methyl-3-(1,2,4-oxadiazolyl)methyl, 3-ethyl-2-[5-(1,2,4-oxadiazolyl)]ethyl, 1-[3-propyl-5-(1,2,4-oxadiazolyl)]ethyl, 3-[5-butyl-3-(1,2,4-oxadiazolyl)]propyl, 4-[3-pentyl-5-(1,2,4-oxadiazolyl)]butyl, 5-[5-hexyl-3-(1,2,4-oxadiazolyl)]pentyl, 6-[3-methyl-5-(1,2,4-oxadiazolyl)]hexyl, 1,1-dimethyl-2-[5-isopropyl-3-(1,2,4-oxadiazolyl)]ethyl, 2-methyl-3-[3-isobutyl-5-(1,2,4-oxadiazolyl)]propyl groups.

Examples of the thiazolydinyl lower alkyl group which may have an oxo group as a substituent on the thiazolydine ring include thiazolydinylalkyl groups which may have 1 to 3 oxo groups as substituents on the thiazolydine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (2, 3, 4, or 5-)thiazolidinylmethyl, 2-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 1-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 3-[(2, 3, 4, or 5-)thiazolidinyl]propyl, 4-[(2, 3, 4, or

5-)thiazolidinyl]butyl, 5-[(2, 3, 4, or 5-)thiazolidinyl]pentyl, 6-[(2, 3, 4, or 5-)thiazolidinyl]hexyl, 1,1-dimethyl-2-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 2-methyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propyl, 2,4-dioxo-5-thiazolidinylmethyl, 2-[2-oxo-(3, 4, or 5-)thiazolidinyl]ethyl, 1-[4-oxo-(2, 3, or 5-)thiazolidinyl]ethyl, 3-[5-oxo-(2, 3, or 4-)thiazolidinyl]propyl, 4-[2,5-dioxo-(3 or 4-)thiazolidinyl]butyl, 5-[2,4,5-trioxo-3-thiazolidinyl]pentyl, 6-[4,5-dioxo-(2 or 3-)thiazolidinyl]hexyl, 1,1-dimethyl-2-[2,4-dioxo-(3 or 5-)thiazolidinyl]ethyl, 2-methyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propyl, 3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propyl groups.

Examples of the phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring include, in addition to the above described phenyl lower alkyl groups, phenylalkyl groups which may have a linear or branched alkylenedioxy group as a substituent on the phenyl ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as 3,4-methylenedioxybenzyl, 3,4-trimethylenedioxybenzyl, 2-(2,3-ethylenedioxyphenyl)ethyl, 1-(3,4-trimethylenedioxyphenyl)ethyl, 3-(2,3-tetramethylenedioxyphenyl)propyl, 4-(3,4-methylenedioxyphenyl)butyl, 5-(2,3-

ethylenedioxyphenyl)pentyl, 6-(3,4-trimethylenedioxyphenyl)hexyl, 1,1-dimethyl-2-(2,3-methylenedioxyphenyl)ethyl, 2-methyl-3-(3,4-ethylenedioxyphenyl)propyl groups.

Examples of the lower alkoxycarbonyl lower alkyl group include alkoxycarbonylalkyl groups of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms and the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a methoxycarbonylmethyl group, ethoxycarbonylmethyl group, 2-methoxycarbonylethyl group, 2-ethoxycarbonylmethyl group, 1-ethoxycarbonylethyl group, 3-methoxycarbonylpropyl group, 3-ethoxycarbonylpropyl group, 4-ethoxycarbonylbutyl group, 5-isopropoxycarbonylpentyl group, 6-propoxycarbonylhexyl group, 1,1-dimethyl-2-butoxycarbonylethyl group, 2-methyl-3-tert-butoxycarbonylpropyl group, 2-pentyloxycarbonylethyl group, and hexyloxycarbonylmethyl group.

Examples of the carboxy lower alkyl group include carboxyalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a carboxymethyl group, 2-carboxyethyl group, 1-carboxyethyl group, 3-carboxypropyl group, 4-carboxybutyl group, 5-carboxypentyl group, 6-carboxyhexyl group, 1,1-dimethyl-2-carboxyethyl group, and 2-methyl-3-carboxypropyl group.

Examples of the morpholino substituted lower alkanoyl group include morpholino substituted alkanoyl groups of which the alkanoyl moiety is a linear or branched alkanoyl group having 2 to 6 carbon atoms such as a 2-[(2,3 or 4-)morpholino]acetyl group, 3-[(2,3 or 4-)morpholino]propionyl group, 2-[(2,3 or 4-)morpholino]propionyl group, 4-[(2,3 or 4-)morpholino]butyryl group, 5-[(2,3 or 4-)morpholino]pentanoyl group, 6-[(2,3 or 4-)morpholino]hexanoyl group, 2,2-dimethyl-2-[(2,3 or 4-)morpholino]propionyl group, and 2-methyl-3-[(2,3 or 4-)morpholino]propionyl group.

Examples of the piperazinylcarbonyl lower alkyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring include piperazinylcarbonylalkyl groups which may be substituted on the piperazine ring with 1 to 3 phenylalkyl groups which may have a linear or branched alkylenedioxy group having 1 to 4 carbon atoms and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, the piperazinylcarbonylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, such as [(1, 2, or 3-)piperazinyl]carbonylmethyl, 2-[(1, 2, or 3-)piperazinyl] carbonylethyl, 1-[(1, 2, or 3-)piperazinyl]carbonylethyl, 3-[(1, 2, or

3-)piperazinyl]carbonylpropyl, 4-[(1, 2, or 3-)piperazinyl]carbonylbutyl, 5-[(1, 2, or 3-)piperazinyl]carbonylpentyl, 6-[(1, 2, or 3-)piperazinyl]carbonylhexyl, 1,1-dimethyl-2-[(1, 2, or 3-)piperazinyl]carbonylethyl, 2-methyl-3-[(1, 2, or 3-)piperazinyl]carbonylpropyl, (4-benzyl-1-piperazinylcarbonyl)methyl, 2-[4-(2-phenylethyl)-1-piperazinylcarbonyl]ethyl, 1-[4-(3-phenylpropyl)-1-piperazinylcarbonyl]ethyl, 3-[4-(4-phenylbutyl)-1-piperazinylcarbonyl]propyl, 4-[4-(5-phenylpentyl)-1-piperazinylcarbonyl]butyl, 5-[4-(6-phenylpropyl)-1-piperazinylcarbonyl]pentyl, 6-(4-benzyl-1-piperazinylcarbonyl)hexyl, 1,1-dimethyl-2-(4-benzyl-1-piperazinylcarbonyl)ethyl, 2-methyl-3-(4-benzyl-1-piperazinylcarbonyl)propyl, [4-(3,4-methylenedioxybenzyl)-1-piperazinylcarbonyl]methyl, 2-{4-[2-(2,3-ethylenedioxyphenyl)ethyl]-1-piperazinylcarbonyl}ethyl, 1-{4-[3-(3,4-trimethylenedioxyphenyl)propyl]-1-piperazinylcarbonyl}ethyl, 3-{4-[4-(2,3-tetramethylenedioxyphenyl)butyl]-1-piperazinylcarbonyl}propyl, 4-{4-[5-(3,4-methylenedioxyphenyl)pentyl]-1-piperazinylcarbonyl}butyl, 5-{4-[3-(2,3-ethylenedioxyphenyl)propyl]-1-piperazinylcarbonyl}pentyl, 6-[4-(3,4-trimethylenedioxybenzyl)-1-piperazinylcarbonyl]hexyl, 1,1-dimethyl-2-[4-(2,3-tetramethylenedioxybenzyl)-1-

piperazinylcarbonyl]ethyl, 2-methyl-3-[4-(3,4-methylenedioxybenzyl)-1-piperazinylcarbonyl]propyl, (3,4-dibenzyl-1-piperazinylcarbonyl)methyl, (3,4,5-tribenzyl-1-piperazinylcarbonyl)methyl, [2,4-di(3,4-methylenedioxybenzyl)-1-piperazinylcarbonyl])methyl, [2,4,6-tri(3,4-methylenedioxybenzyl)-1-piperazinylcarbonyl]methyl, [3-benzyl-4-(3,4-methylenedioxybenzyl)-1-piperazinylcarbonyl]methyl groups.

Examples of the piperazinyl lower alkanoyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring include piperazinylalkanoyl groups which may be substituted on the piperazine ring with 1 to 3 phenylalkyl groups which may have a linear or branched alkylenedioxy group having 1 to 4 carbon atoms as a substituent on the phenyl ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, the piperazinylalkanoyl groups of which the alkanoyl moiety is a linear or branched alkanoyl group having 2 to 6 carbon atoms, such as 2-[(1, 2, or 3-)piperazinyl]acetyl, 3-[(1, 2, or 3-)piperazinyl]propionyl, 2-[(1, 2, or 3-)piperazinyl]propionyl, 4-[(1, 2, or 3-)piperazinyl]butyryl, 5-[(1, 2, or 3-)piperazinyl]pentanoyl, 6-[(1, 2, or 3-)piperazinyl]hexanoyl, 2,2-dimethyl-3-[(1, 2, or

3-)piperazinyl]propionyl, 2-methyl-3-[(1, 2, or 3-)piperazinyl]propionyl, 2-(4-benzyl-1-piperazinyl)acetyl, 3-[4-(2-phenylethyl)-1-piperazinyl]propionyl, 2-[4-(3-phenylpropyl)-1-piperazinyl]propionyl, 4-[4-(4-phenylbutyl)-1-piperazinyl]butyryl, 5-[4-(5-phenylpentyl)-1-piperazinyl]pentanoyl, 6-[4-(6-phenylpropyl)-1-piperazinyl]hexanoyl, 6-(4-benzyl-1-piperazinyl)hexanoyl, 2,2-dimethyl-3-(4-benzyl-1-piperazinyl)propionyl, 2-methyl-3-(4-benzyl-1-piperazinyl)propionyl, 2-[4-(3,4-methylenedioxybenzyl)-1-piperazinyl])acetyl, 3-{4-[2-(2,3-ethylenedioxyphenyl)ethyl]-1-piperazinyl}propionyl, 2-{4-[3-(3,4-trimethylenedioxyphenyl)propyl]-1-piperazinyl}propionyl, 4-{4-[4-(2,3-tetramethylenedioxyphenyl)butyl]-1-piperazinyl}butyryl, 5-{4-[5-(3,4-methylenedioxyphenyl)pentyl]-1-piperazinyl}pentanoyl, 5-{4-[3-(2,3-ethylenedioxyphenyl)propyl]-1-piperazinyl}pentanoyl, 6-[4-(3,4-trimethylenedioxybenzyl)-1-piperazinyl])hexanoyl, 2,2-dimethyl-3-[4-(2,3-tetramethylenedioxybenzyl)-1-piperazinyl]propionyl, 2-methyl-3-[4-(3,4-methylenedioxybenzyl)-1-piperazinyl]propionyl, 2-(3,4-dibenzyl-1-piperazinyl)acetyl, 2-(3,4,5-tribenzyl-1-piperazinyl)acetyl, 2-[2,4-di(3,4-methylenedioxybenzyl)-1-piperazinyl])acetyl, 2-[2,4,6-tri(3,4-methylenedioxybenzyl)-1-piperazinyl])acetyl, 2-

[3-benzyl-4-(3,4-methylenedioxybenzyl)-1-piperazinyl])acetyl groups.

Examples of the morpholinocarbonyl substituted lower alkyl group include morpholinocarbonylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(2, 3, or 4-)morpholino]carbonylmethyl, 2-[(2, 3, or 4-)morpholino]carbonylethyl, 1-[(2, 3, or 4-)morpholino]carbonylethyl, 3-[(2, 3, or 4-)morpholino]carbonylpropyl, 4-[(2, 3, or 4-)morpholino]carbonylbutyl, 5-[(2, 3, or 4-)morpholino]carbonylpentyl, 6-[(2, 3, or 4-)morpholino]carbonylhexyl, 1,1-dimethyl-2-[(2, 3, or 4-)morpholino]carbonylethyl, 2-methyl-3-[(2, 3, or 4-)morpholino]carbonylpropyl groups.

Examples of the imidazolyl lower alkanoyl group include imidazolylalkanoyl groups of which the alkanoyl moiety is a linear or branched alkanoyl group having 2 to 6 carbon atoms such as a 2-[(1,2,4 or 5-)imidazolyl]acetyl group, 3-[(1,2,4 or 5-)imidazolyl]propionyl group, 2-[(1,2,4 or 5-)imidazolyl]propionyl group, 4-[(1,2,4 or 5-)imidazolyl]butyryl group, 5-[(1,2,4 or 5-)imidazolyl]pentanoyl group, 6-[(1,2,4 or 5-)imidazolyl]hexanoyl group, 2,2-dimethyl-3-[(1,2,4 or 5-)imidazolyl]propionyl group, and 2-methyl-3-[(1,2,4 or 5-)imidazolyl]propionyl group.

Examples of the cycloalkylcarbonyl group include cycloalkylcarbonyl groups of which the cycloalkyl moiety is a cycloalkyl group having 3 to 16 carbon atoms such as a cyclopropylcarbonyl group, cyclobutylcarbonyl group, cyclopentylcarbonyl group, cyclohexylcarbonyl group, cycloheptylcarbonyl group, cyclooctylcarbonyl group, cyclononylcarbonyl group, cyclodecylcarbonyl group, cycloundecylcarbonyl group, cyclododecylcarbonyl group, cyclotridecylcarbonyl group, cyclotetradecylcarbonyl group, cyclopentadecylcarbonylgroup, and cyclohexadecylcarbonyl group.

Examples of the amino substituted lower alkanoyl group which may have a lower alkyl group as a substituent include linear or branched alkanoyl groups having 2 to 6 carbon atoms substituted with an amino group which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents such as aminoacetyl, 2-aminopropionyl, 3-aminopropionyl, 4-aminobutyryl, 5-aminopentanoyl, 6-aminohexanoyl, 2,2-dimethyl-3-aminopropionyl, 2-methyl-3-aminopropionyl, methylaminoacetyl, 2-ethylaminopropionyl, 3-propylaminopropionyl, 3-isopropylaminopropionyl, 4-butylaminobutyryl, 5-pentylaminopentanoyl, 6-hexylaminohexanoyl, dimethylaminoacetyl, 3-diisopropylaminopropionyl, (N-ethyl-N-propylamino)acetyl, 2-(N-methyl-N-hexylamino)acetyl groups.

Examples of the lower alkylene group which may have a hydroxyl group as a substituent include, in addition to the above described lower alkylene groups, linear or branched alkylene groups having 1 to 6 carbon atoms which may have 1 to 3 hydroxyl groups as substituents such as 1-hydroxymethylene, 2-hydroxyethylene, 1-hydroxyethylene, 2-hydroxytrimethylene, 3-hydroxytrimethylene, 1-hydroxytrimethylene, 3-hydroxy-2-methyltrimethylene, 1-hydroxy-2-methyltrimethylene, 3-hydroxy-2,2-dimethyltrimethylene, 1-hydroxy-2,2-dimethyltrimethylene, 3-hydroxy-1-methyltrimethylene, 2-hydroxy-1-methyltrimethylene, 1-hydroxymethylmethylene, hydroxymethylmethylene, 2-hydroxymethyltrimethylene, 2-hydroxymethyl-2-methyltrimethylene, (2-hydroxyethyl)methylene, (1-hydroxyethyl)methylene, 4-hydroxytetramethylene, 2-hydroxytetramethylene, 3-hydroxytetramethylene, 1-hydroxytetramethylene, 5-hydroxypentamethylene, 4-hydroxypentamethylene, 3-hydroxypentamethylene, 2-hydroxypentamethylene, 1-hydroxypentamethylene, 6-hydroxyhexamethylene, 5-hydroxyhexamethylene, 4-hydroxyhexamethylene, 3-hydroxyhexamethylene, 2-hydroxyhexamethylene, 1-hydroxyhexamethylene, 1,2-dihydroxytrimethylene, 2,2,4-trihydroxytetramethylene, 1,2,6-trihydroxyhexamethylene, 3,4,5-trihydroxypentamethylene groups.

Examples of the alkyl group which may have a

hydroxyl group as a substituent include, in addition to the above described lower alkyl groups, linear or branched alkyl groups having 1 to 16 carbon atoms which have 1 to 3 hydroxyl groups as substituents such as a heptyl group, octyl group, nonyl group, decyl group, undecyl group, dodecyl group, tridecyl group, tetradecyl group, pentadecyl group, 1-methylhexyl group, hexadecyl group, hydroxymethyl group, 2-hydroxyethyl group, 1-hydroxyethyl group, 3-hydroxypropyl group, 2,3-dihydroxypropyl group, 4-hydroxybutyl group, 1,1-dimethyl-2-hydroxyethyl group, 5,5,4-trihydroxypentyl group, 5-hydroxypentyl group, 6-hydroxyhexyl group, 1-hydroxyisopropyl group, and 2-methyl-3-hydroxypropyl group.

Examples of the hydroxyl group substituted alkyl group include linear or branched alkyl groups having 1 to 16 carbon atoms having 1 to 3 hydroxyl groups as substituents such as a hydroxymethyl group, 2-hydroxyethyl group, 1-hydroxyethyl group, 3-hydroxypropyl group, 2,3-dihydroxypropyl group, 4-hydroxybutyl group, 1,1-dimethyl-2-hydroxyethyl group, 5,5,4-trihydroxypentyl group, 5-hydroxypentyl group, 6-hydroxyhexyl group, 1-hydroxyisopropyl group, and 2-methyl-3-hydroxypropyl group.

Examples of the cycloalkyl group which may have a substituent selected from the group consisting of a hydroxyl group and a lower alkyl group include, in addition to the above described cycloalkyl groups,

cycloalkyl groups having 3 to 16 carbon atoms which may have 1 to 3 substituents selected from the group consisting of a hydroxyl group and a linear or branched alkyl group having 1 to 6 carbon atoms such as 2-hydroxycyclopropyl, 3-hydroxycyclobutyl, 3-hydroxycyclopentyl, 2-hydroxycyclohexyl, 4-hydroxycyclohexyl, 3-hydroxycycloheptyl, 4-hydroxycyclooctyl, 5-hydroxycyclononyl, 3-hydroxycyclodecyl, 4-hydroxycycloundecyl, 5-hydroxycyclododecyl, 6-hydroxycyclotridecyl, 7-hydroxycyclotetradecyl, 6-hydroxycyclopentadecyl, 8-hydroxycyclohexadecyl, 2,4-dihydroxycyclohexyl, 2,4,6-trihydroxycyclohexyl, 1-methylcyclopentyl, 2-ethylcyclopropyl, 3-n-propylcyclobutyl, 2-n-butylcyclohexyl, 4-n-pentylcycloheptyl, 4-n-hexylcyclooctyl, 2,3-dimethylcyclohexyl, 2,3,4-trimethylcyclohexyl, 2-methyl-4-hydroxycyclohexyl groups.

Examples of the phenoxy lower alkyl group include phenoxyalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a phenoxymethyl group, 2-phenoxyethyl group, 1-phenoxyethyl group, 3-phenoxypropyl group, 4-phenoxybutyl group, 1,1-dimethyl-2-phenoxyethyl group, 5-phenoxypentyl group, 6-phenoxyhexyl group, 1-phenoxyisopropyl group, and 2-methyl-3-phenoxypropyl group.

Examples of the amino lower alkoxy group

which may have a lower alkyl group as a substituent include linear or branched alkoxy groups having 1 to 6 carbon atoms substituted with an amino group which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms such as aminomethoxy, 2-aminoethoxy, 1-aminoethoxy, 3-aminopropoxy, 4-aminobutoxy, 5-aminopentyloxy, 6-aminohexyloxy, 1,1-dimethyl-2-aminoethoxy, 2-methyl-3-aminopropoxy, methylaminomethoxy, 1-ethylaminoethoxy, 2-propylaminoethoxy, 3-isopropylaminopropoxy, 4-butylaminobutoxy, 5-pentylaminopentyloxy, 6-hexylaminohexyloxy, dimethylaminomethoxy, 2-diethylaminoethoxy, 2-diisopropylaminoethoxy, (N-ethyl-N-propylamino)methoxy, 2-(N-methyl-N-hexylamino)ethoxy groups.

Examples of the hydroxyl group substituted lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms which have 1 to 3 hydroxyl groups as substituents such as a hydroxymethyl group, 1-hydroxyethyl group, 2-hydroxyethyl group, 3-hydroxypropyl group, 2,3-dihydroxypropyl group, 4-hydroxybutyl group, 1,1-dimethyl-2-hydroxyethyl group, 5,5,4-trihydroxypentyl group, 5-hydroxypentyl group, 6-hydroxyhexyl group, 1-hydroxyisopropyl group, and 2-methyl-3-hydroxypropyl group.

Examples of the amino group which may have a lower alkylsulfonyl as a substituent include amino groups which may have 1 or 2 linear or branched

alkylsulfonyl groups having 1 to 6 carbon atoms as substituents such as amino, methylsulfonylamino, ethylsulfonylamino, propylsulfonylamino, isopropylsulfonylamino, butylsulfonylamino, tert-butylsulfonylamino, pentylsulfonylamino, hexylsulfonylamino, dimethylsulfonylamino, diethylsulfonylamino, dipropylsulfonylamino, dibutylsulfonylamino, dipentylsulfonylamino, dihexylsulfonylamino, N-methylsulfonyl-N-ethylsulfonylamino, N-ethylsulfonyl-N-propylsulfonylamino, N-methylsulfonyl-N-butylsulfonylamino, N-methylsulfonyl-N-hexylsulfonylamino groups.

Examples of the lower alkynyl group include linear or branched alkynyl groups having 2 to 6 carbon atoms include an ethynyl group, 2-propynyl group, 2-butynyl group, 3-butynyl group, 1-methyl-2-propynyl group, 2-pentynyl group, and 2-hexynyl group.

Examples of the anilino group which may have a halogen atom as a substituent on the phenyl ring include anilino groups which may have 1 to 3 halogen atoms as substituents on the phenyl ring such as anilino, 2-fluoroanilino, 3-fluoroanilino, 4-fluoroanilino, 2-bromoanilino, 3-bromoanilino, 4-bromoanilino, 2-iodoanilino, 3-iodoanilino, 4-iodoanilino, 2,3-dibromoanilino, 2,4-diiodoanilino, 2,5-difluoroanilino, 2,6-dichloroanilino, 2,4,6-trichloroanilino, 2,6-difluoroanilino, 3,5-

difluoroanilino, 2,6-difluoroanilino, 2-chloroanilino, 3-chloroanilino, 4-chloroanilino, 2,3-dichloroanilino, 2,4-dichloroanilino, 2,5-dichloroanilino, 3,4-dichloroanilino, 2,6-dichloroanilino, 3,5-dichloroanilino, 2,4,6-trifluoroanilino, 2,4-difluoroanilino, 3,4-difluoroanilino groups.

Examples of the piperazinyl group which may have a lower alkyl group as a substituent on the piperazine ring include piperazinyl groups which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the piperazine ring such as a (1-, 2- or 3-)piperazinyl group, 4-methyl-(1-, 2- or 3-)piperazinyl group, 2,3-dimethyl-(1 or 5-)piperazinyl group, and 2,3,4-trimethyl-(1-, 5- or 6-)piperazinyl group.

Examples of the pyrrolidinyl group which may have an oxo group as a substituent on the pyrrolidine ring include pyrrolidinyl groups which may have 1 or 2 oxo groups as substituents on the pyrrolidine ring such as a (1-, 2- or 3-)pyrrolidinyl group, 2-oxo-(1-, 3-, 4- or 5-)pyrrolidinyl group, 3-oxo-(1-, 2-, 4- or 5-)pyrrolidinyl group, 2,3-dioxo-(1-, 4- or 5-)pyrrolidinyl group, and 2,5-dioxo-(1-, 3- or 4-)pyrrolidinyl group.

Examples of the phenyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a lower alkyl group; a lower alkoxy groups which may have a halogen

atom as a substituent; a halogen atom; an amino lower alkoxy group which may have a lower alkyl group as a substituent; a hydroxyl group substituted lower alkyl group; a phenyl lower alkyl group; a lower alkynyl group; an amino group which may have a lower alkylsulfonyl group as a substituent; a lower alkylthio group; a cycloalkyl group; a phenylthio group; an adamantyl group; an anilino group which may have a halogen atom as a substituent on the phenyl ring; a lower alkoxycarbonyl group; a piperazinyl group which may have a lower alkyl group as a substituent on the piperazine ring; a pyrrolidinyl group which may have an oxo group as a substituent on the pyrrolidine ring; a lower alkanoylamino group; a cyano group; and a phenoxy group include phenyl groups which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms; a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms; a halogen atom; an aminoalkoxy group of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms and which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atom as substituents; a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 hydroxyl groups as substituents; a phenylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms; a linear or branched

alkynyl group having 2 to 6 carbon atoms; an amino group which may have 1 or 2 linear or branched alkylsulfonyl groups having 1 to 6 carbon atoms as substituents; a linear or branched alkylthio group having 1 to 6 carbon atoms; a cycloalkyl group having 3 to 16 carbon atoms; a phenylthio group; an adamantyl group; an anilino group which may have 1 to 3 halogen atoms as substituents on the phenyl ring; a linear or branched alkoxycarbonyl group having 1 to 6 carbon atoms; a piperazinyl group which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the piperazine ring; a pyrrolidinyl group which may have 1 or 2 oxo groups as substituents on the pyrrolidine ring; an amino group which may have 1 or 2 linear or branched alkanoyl groups having 2 to 6 carbon atoms; a cyano group; and a phenoxy group such as phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 2-ethylphenyl, 3-ethylphenyl, 4-ethylphenyl, 2-isopropylphenyl, 4-isopropylphenyl, 3-butylphenyl, 4-pentylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 3,4-diethylphenyl, 2,4-dimethylphenyl, 2,5-dimethylphenyl, 2,6-dimethylphenyl, 3,4,5-trimethylphenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 4-isopropoxyphenyl, 3-butoxyphenyl, 4-pentyloxyphenyl, 4-hexyloxyphenyl, 3,4-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,4,5-

trimethoxyphenyl, 2-trifluoromethoxyphenyl, 3-trifluoromethoxyphenyl, 4-trifluoromethoxyphenyl, 2-(bromomethoxy)phenyl, 3-(2-chloroethoxy)phenyl, 4-(2,3-dichloropropoxy)phenyl, 4-(4-fluorobutoxy)phenyl, 3-(5-chloropentyloxy)phenyl, 4-(5-bromohexyloxy)phenyl, 4-(5,6-dibromohexyloxy)phenyl, 3,4-di(trifluoromethoxy)phenyl, 3,4-di(4,4,4-trichlorobutoxy)phenyl, 2,4-di(3-chloro-2-methoxypropyl)phenyl, 2,5-di(3-chloropropoxy)phenyl, 2,6-di(2,2,2-trifluoroethoxy)phenyl, 3,4,5-tri(trifluoromethoxy)phenyl, 4-(2,2,2-trichloroethoxy)phenyl, 2-methyl-4-trifluoromethoxyphenyl, 3-ethyl-4-trichloromethoxyphenyl, 2-methoxy-4-trifluoromethoxyphenyl, 3-ethoxy-4-trichloromethoxyphenyl, 2-methyl-3-trifluoromethoxy-4-trifluoromethoxyphenyl, 2-phenoxyphenyl, 3-phenoxyphenyl, 4-phenoxyphenyl, 2,3-diphenoxyphenyl, 3,4-diphenoxyphenyl, 2,6-diphenoxyphenyl, 3,4,5-triphenoxyphenyl, 2-methyl-4-phenoxyphenyl, 3-ethyl-4-phenoxyphenyl, 2-methoxy-4-phenoxyphenyl, 3-ethoxy-4-phenoxyphenyl, 2-methyl-3-phenoxy-4-trifluoromethoxyphenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,5-dichlorophenyl, 3,4-dichlorophenyl, 2,6-dichlorophenyl, 3,5-dichlorophenyl, 2,4,6-trichlorophenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2,5-difluorophenyl, 2,4-difluorophenyl,

3,4-difluorophenyl, 3,5-difluorophenyl, 2,6-difluorophenyl, 2,4,6-trifluorophenyl, 2-bromophenyl, 3-bromophenyl, 4-bromophenyl, 2-iodophenyl, 3-iodophenyl, 4-iodophenyl, 2,3-dibromophenyl, 2,4-diiodophenyl, 4-methylthiophenyl, 4-cyclohexylphenyl, 4-chloro-2-anilinophenyl, 2-(4-chloroanilino)-5-ethoxycarbonylphenyl, 4-[2-(N,N-diethylamino)ethoxy]phenyl, 4-(4-methyl-1-piperazinyl)phenyl, 4-(2-oxo-1-pyrrolidinyl)phenyl, 4-methylsulfonylaminophenyl, 4-(2-hydroxyethyl)phenyl, 4-benzylphenyl, 4-ethinylphenyl, 4-phenylthiophenyl, 4-(1-adamantyl)phenyl, 5-acetylamino-2-chlorophenyl, 3-cyanophenyl, 2-cyanophenyl, 4-cyanophenyl, 2-propanoylaminophenyl, 3,4-dicyanophenyl, 3,4,5-tricyanophenyl groups.

Examples of the phenyl lower alkyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkoxy group which may have a halogen atom as a substituent, and a lower alkyl group include, in addition to the above described phenyl lower alkyl groups, phenylalkyl groups which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a halogen atom, a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, and a linear or branched alkyl group having 1 to 6 carbon atoms, and of which the alkyl moiety is a linear or

branched alkyl group having 1 to 6 carbon atoms, such as 4-fluorobenzyl, 2-chlorobenzyl, 3-chlorobenzyl, 4-chlorobenzyl, 2-(2-fluorophenyl)ethyl, 2-(4-fluorophenyl)ethyl, 2-(4-chlorophenyl)ethyl, 3,4-dibromobenzyl, 3,4-diiodobenzyl, 2,4-difluorobenzyl, 2,5-dichlorobenzyl, 2,6-dichlorobenzyl, 3,4,5-trifluorobenzyl, 3-(4-chlorophenyl)propyl, 1-(2-bromophenyl)ethyl, 4-(3-fluorophenyl)butyl, 5-(4-iodophenyl)pentyl, 6-(4-chlorophenyl)hexyl, 1,1-dimethyl-2-(3-fluorophenyl)ethyl, 2-methyl-3-(4-chlorophenyl)propyl, 2-methylbenzyl, 2-(3-methylphenyl)ethyl, 3-(4-methylphenyl)propyl, 1-(2-ethylphenyl)ethyl, 4-(3-ethylphenyl)butyl, 5-(4-ethylphenyl)pentyl, 6-(4-isopropylphenyl)hexyl, 1,1-dimethyl-2-(3-butylphenyl)ethyl, 2-methyl-3-(4-pentylphenyl)propyl, 4-hexylbenzyl, 3,4-dimethylbenzyl, 3,4-diethylbenzyl, 2,4-dimethylbenzyl, 2,5-dimethylbenzyl, 2,6-dimethylbenzyl, 3,4,5-trimethylbenzyl, 2-methoxybenzyl, 2-(2-methoxyphenyl)ethyl, 2-(3-methoxyphenyl)ethyl, 2-(4-methoxyphenyl)ethyl, 4-methoxybenzyl, 1-(2-ethoxyphenyl)ethyl, 3-(3-ethoxyphenyl)propyl, 4-(4-ethoxyphenyl)butyl, 5-(4-isopropoxyphenyl)pentyl, 6-(3-butoxyphenyl)hexyl, 1,1-dimethyl-2-(4-pentyloxyphenyl)ethyl, 2-methyl-3-(4-hexyloxyphenyl)propyl, 3,4-dimethoxybenzyl, 3,4-diethoxybenzyl, 2,4-dimethoxybenzyl, 2,5-dimethoxybenzyl, 2,6-dimethoxybenzyl, 3,4,5-

trimethoxybenzyl, 2-trifluoromethoxybenzyl, 3-trifluoromethoxybenzyl, 4-trifluoromethoxybenzyl, 2-[2-(bromomethoxy)phenyl]ethyl, 1-[3-(2-chloroethoxy)phenyl]ethyl, 3-[4-(2,3-dichloropropoxy)phenyl]propyl, 4-[4-(4-fluorobutoxy)phenyl]butyl, 5-[3-(5-chloropentyloxy)phenyl]pentyl, 6-[4-(5-bromohexyloxy)phenyl]hexyl, 1,1-dimethyl-2-[4-(5,6-dibromohexyloxy)phenyl]ethyl, 3,4-di(trifluoromethoxy)benzyl, 3,4-di(4,4,4-trichlorobutoxy)benzyl, 2,4-di(3-chloro-2-methoxypropyl)benzyl, 2,5-di(3-chloropropoxy)benzyl, 2,6-di(2,2,2-trifluoroethoxy)benzyl, 3,4,5-tri(trifluoromethoxy)benzyl, 4-(2,2,2-trichloroethoxy)benzyl, 2-methyl-4-trifluoromethoxybenzyl, 3-ethyl-4-trichloromethoxybenzyl, 2-methoxy-4-trifluoromethoxybenzyl, 3-ethoxy-4-trichloromethoxybenzyl, 2-methyl-3-trifluoromethoxy-4-trifluoromethoxybenzyl, 2-chloro-3-methylbenzyl, 4-fluoro-2-trifluoromethoxybenzyl, 3-chloro-2-methyl-4-methoxybenzyl groups.

Examples of the phenyl lower alkyl group which has a lower alkylenedioxy group as a substituent on the phenyl ring include phenylalkyl groups which has a linear or branched alkylenedioxy group having 1 to 4 carbon atoms on the phenyl ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to

6 carbon atoms such as a 3,4-methylenedioxybenzyl group, 3,4-trimethylenedioxybenzyl group, 2-(2,3-ethylenedioxyphenyl)ethyl group, 1-(3,4-trimethylenedioxyphenyl)ethyl group, 3-(2,3-tetramethylenedioxyphenyl)propyl group, 4-(3,4-methylenedioxyphenyl)butyl group, 5-(2,3-ethylenedioxyphenyl)pentyl group, 6-(3,4-trimethylenedioxyphenyl)hexyl group, 1,1-dimethyl-2-(2,3-metylenedioxyphenyl)ethyl group, and 2-methyl-3-(3,4-ethylenedioxyphenyl)propyl group.

Examples of the amino group which may have a lower alkanoyl group as a substituent include which may have a linear or branched alkanoyl group having 1 to 6 carbon atoms as a substituent such as an amino group, N-acetylamino group, N-formylamino group, N-propionylamino group, N-butyrylamino group, N-isobutyrylamino group, N-pentanoylamino group, N-tert-butylcarbonylamino group, and N-hexanoylamino group.

Examples of the 1,2,3,4-tetrahydroquinolyl group which may have, on the tetrahydroquinoline ring, 1 to 3 substituents selected from the group consisting of an oxo group, a lower alkoxy group, and a lower alkylenedioxy group include 1,2,3,4-tetrahydroquinolyl groups which may have, on the tetrahydroquinoline ring, 1 to 3 substituents selected from the group consisting of an oxo group, a linear or branched alkoxy group having 1 to 6 carbon atoms, and a linear or branched alkylenedioxy group having 1 to 4 carbon atoms such as

(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 2-oxo-(1, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 2-oxo-6,7-methylenedioxy-(1, 3, 4, 5, or 8-)1,2,3,4-tetrahydroquinolyl, 4-oxo-(1, 2, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 2,4-dioxo-(1, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 2,4-dioxo-6,7-methylenedioxy-(1, 3, 5, or 8-)1,2,3,4-tetrahydroquinolyl, 5,6-ethylenedioxy-(1, 2, 3, 4, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 7,8-trimethylenedioxy-(1, 2, 3, 4, 5, or 6-)1,2,3,4-tetrahydroquinolyl, 6,7-tetramethylenedioxy-(1, 2, 3, 4, 5, or 8-)1,2,3,4-tetrahydroquinolyl, 5-methoxy-2-oxo-(1, 3, 4, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl, 2-oxo-6,7-ethylenedioxy-(1, 3, 4, 5, or 8-)1,2,3,4-tetrahydroquinolyl groups.

Examples of the cycloalkyl lower alkyl group include cycloalkylalkyl groups having 3 to 16 carbon atoms of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a cyclopropylmethyl group, cyclohexylmethyl group, 2-cyclopropylethyl group, 1-cyclobutylethyl group, 3-cyclopentylpropyl group, 4-cyclohexylbutyl group, 5-cycloheptylpentyl group, 6-cyclooctylhexyl group, 1,1-dimethyl-2-cyclononylethyl group, 2-methyl-3-cyclodecylpropyl group, cycloundecylmethyl group, 2-cyclododecylethyl group, 1-cyclotridecylethyl group, 3-cyclotetradecylpropyl group, 4-cyclopentadecylbutyl group, and 5-cyclodecylpentyl group.

Examples of the pyridyl lower alkyl group include pyridylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (2,3 or 4-)pyridylmethyl group, 2-[(2,3 or 4-)pyridyl]ethyl group, 1-[(2,3 or 4-)pyridyl]ethyl group, 3-[(2,3 or 4-)pyridyl]propyl group, 4-[(2,3 or 4-)pyridyl]butyl group, 1,1-dimethyl-2-[(2,3 or 4-)pyridyl]ethyl group, 5-[(2,3 or 4-)pyridyl]pentyl group, 6-[(2,3 or 4-)pyridyl]hexyl group, 1-[(2,3 or 4-)pyridyl]isopropyl group, and 2-methyl-3-[(2,3 or 4-)pyridyl]propyl group.

Examples of the amino group substituted lower alkyl group which may have a substituent selected from the group consisting of a lower alkyl group and a lower alkanoyl group include linear or branched alkyl groups having 1 to 6 carbon atoms which has an amino group which may have 1 or 2 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms and a linear or branched alkanoyl group having 1 to 6 carbon atoms such as aminomethyl, 2-aminoethyl, 1-aminoethyl, 3-aminopropyl, 4-aminobutyl, 5-aminopentyl, 6-aminohexyl, 1,1-dimethyl-2-aminoethyl, 2-methyl-3-aminopropyl, methylaminomethyl, 1-ethylaminoethyl, 2-propylaminoethyl, 3-isopropylaminopropyl, 4-butylaminobutyl, 5-pentylaminopentyl, 6-hexylaminohexyl, dimethylaminomethyl, 2-diisopropylaminoethyl, (N-ethyl-N-propylamino)methyl,

2-(N,N-dimethylamino)ethyl, 2-(N-methyl-N-hexylamino)ethyl, formylaminomethyl, acetylaminomethyl, 1-propionylaminoethyl, 2-acetylaminoethyl, 3-butyrylaminopropyl, 4-pentanoylaminobutyl, 5-hexanoylaminopentyl, 6-acetylaminohexyl, N-methyl-N-acetylaminomethyl, 2-(N-ethyl-N-propanoylamino)ethyl, (N-ethyl-N-butyrylamino)methyl, 2-(N-methyl-N-hexanoylamino)ethyl, 3-(N,N-dimethylamino)propyl groups.

Examples of the lower alkoxy lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms which have a linear or branched alkoxy group having 1 to 6 carbon atoms as a substituent such as a methoxymethyl group, 1-ethoxyethyl group, 2-methoxyethyl group, 2-propoxyethyl group, 3-isopropoxypropyl group, 4-butoxybutyl group, 5-pentyloxypentyl group, 6-hexyloxyhexyl group, 1,1-dimethyl-2-methoxyethyl group, 2-methyl-3-ethoxypropyl group, and 3-methoxypropyl group.

Examples of the 1,2,3,4-tetrahydroisoquinolylcarbonyl substituted lower alkyl group include 1,2,3,4-tetrahydroisoquinolylcarbonyl-alkyl groups of which the alkyl moiety is a linear or branched alkyl group such as (1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonylmethyl, 2-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolyl-carbonyl]ethyl, 1-[((1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonyl]ethyl, 3-[(1,

2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolyl-carbonyl]propyl, 4-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonyl]butyl, 1,1-dimethyl-2-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonyl]ethyl, 5-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolyl-carbonyl]pentyl, 6-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonyl]hexyl, 1-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolyl-carbonyl]isopropyl, 2-methyl-3-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroisoquinolylcarbonyl]propyl groups.

Examples of the piperidinylcarbonyl group which may have, on the piperidine ring, a substituent selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, and a furyl lower alkyl group include piperidinylcarbonyl groups which may have, on the piperidine ring, 1 to 3 substituents selected from the group consisting of an alkoxycarbonyl group of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms, a phenylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, and a furylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 2, 3, or 4-)piperidinyl-carbonyl, 1-benzyl-(2, 3, or 4-)piperidinylcarbonyl, 1-(2 or 3-)furylmethyl-(2, 3, or 4-)piperidinylcarbonyl,

1-(2-phenylethyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{2-[(1 or 2-)furyl]ethyl}-(2, 3, or 4-)piperidinylcarbonyl, 1-(1-phenylethyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{3-[(1 or 2-)furyl]propyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1-(3-phenylpropyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{1-[(1 or 2-)furyl]ethyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1-(4-phenylbutyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{4-[(1 or 2-)furyl]-butyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1-(5-phenylpentyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{5-[(1 or 2-)furyl]pentyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1-(6-phenylhexyl)-(2, 3, or 4-)piperidinylcarbonyl, 1-{6-[(1 or 2-)furyl]hexyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1,2-dibenzyl-(3, 4, 5, or 6-)piperidinylcarbonyl, 1,3-di(1 or 2-)furylmethyl-(2, 4, 5, or 6-)piperidinylcarbonyl, 1,3,5-tribenzyl-(2, 4, or 6-)piperidinylcarbonyl, 1,2,6-tri(1 or 2-)furylmethyl-(3, 4, or 5-)piperidinylcarbonyl, 1-benzyl-3-(1 or 2-)furylmethyl-(2, 4, 5, or 6-)piperidinylcarbonyl, 1-{1-[(1 or 2-)furyl]ethyl]}-(2, 3, or 4-)piperidinylcarbonyl, 1-methoxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-ethoxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-propoxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-butoxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-tert-butoxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-pentyloxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1-hexyloxycarbonyl-(2, 3, or 4-)piperidinylcarbonyl, 1,2-dimethoxycarbonyl-(3, 4, 5,

or 6-)piperidinylcarbonyl, 1,2,6-triethoxycarbonyl-(3, 4, or 5-)piperidinylcarbonyl, 1-(1 or 2-)furylmethyl-3-tert-butoxycarbonyl-(3, 4, 5, or 6-)piperidinyl-carbonyl, 1-benzyl-2-methoxycarbonyl-(2, 4, 5, or 6-)piperidinylcarbonyl, 1-(1 or 2-)furylmethyl-2,4-dimethoxycarbonyl-(3, 5, or 6-)piperidinylcarbonyl groups.

Examples of the thiazolidinyl lower alkanoyl group which may have an oxo group as a substituent on the thiazolidine ring include thiazolidinylalkanoyl groups which may have 1 to 3 oxo groups as substituents on the thiazolidine ring and of which the alkanoyl moiety is a linear or branched alkanoyl group having 1 to 6 carbon atoms such as 2-[(2, 3, 4, or 5-)thiazolidinyl]acetyl, 3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 2-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 4-[(2, 3, 4, or 5-)thiazolidinyl]butyryl, 5-[(2, 3, 4, or 5-)1,2,4-thiazolidinyl]pentanoyl, 6-[(2, 3, 4, or 5-)thiazolidinyl]hexanoyl, 2,2-dimethyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 2-methyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 2,4-dioxo-(3 or 5-)thiazolidinylacetyl, 3-[2-oxo-(3, 4, or 5-)thiazolidinyl]propionyl, 2-[4-oxo-(2, 3, or 5-)thiazolidinyl]propionyl, 4-[5-oxo-(2, 3, or 4-)thiazolidinyl]butyryl, 5-[2,5-dioxo-(3 or 4-)thiazolidinyl]pentanoyl, 6-[2,4,5-trioxo-3-thiazolidinyl]hexanoyl, 2-[4,5-dioxo-(2 or

3-)thiazolidinyl]acetyl, 2,2-dimethyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propionyl, 2-methyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propionyl groups.

Examples of the piperidinyl group which may be substituted on the piperidine ring with a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, a lower alkyl group, a benzoyl group and a furyl lower alkyl group include piperidinyl groups which may be substituted on the piperidine ring with 1 to 3 groups selected from the group consisting of an alkoxycarbonyl group of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms, a phenylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, a linear or branched alkyl group having 1 to 6 carbon atoms, a benzoyl group, and a furylalkyl group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 2, 3, or 4-)piperidinyl, 1-benzyl-(2, 3, or 4-)piperidinyl, 1-(2 or 3-)furylmethyl-(2, 3, or 4-)piperidinyl, 1-(2-phenylethyl)-(2, 3, or 4-)piperidinyl, 1-{2-[(1 or 2-)furyl]ethyl}-(2, 3, or 4-)piperidinyl, 1-(1-phenylethyl)-(2, 3, or 4-)piperidinyl, 1-{3-[(1 or 2-)furyl]propyl]}-(2, 3, or 4-)piperidinyl, 1-(3-phenylpropyl)-(2, 3, or 4-)piperidinyl, 1-{1-[(1 or 2-)furyl]ethyl]}-(2, 3, or 4-)piperidinyl, 1-(4-phenylbutyl)-(2, 3, or 4-)piperidinyl, 1-{4-[(1 or

2-)furyl]butyl]}-(2, 3, or 4-)piperidinyl, 1-(5-phenylpentyl)-(2, 3, or 4-)piperidinyl, 1-{5-[(1 or 2-)furyl]pentyl]}-(2, 3, or 4-)piperidinyl, 1-(6-phenylhexyl)-(2, 3, or 4-)piperidinyl, 1-{6-[(1 or 2-)furyl]hexyl]}-(2, 3, or 4-)piperidinyl, 1,2-dibenzyl-(3, 4, 5, or 6-)piperidinyl, 1,3-di(1 or 2-)furylmethyl-(2, 4, 5, or 6-)piperidinyl, 1,3,5-tribenzyl-(2, 4, or 6-)piperidinyl, 1,2,6-tri(1 or 2-)furylmethyl-(3, 4, or 5-)piperidinyl, 1-benzyl-3-(1 or 2-)furylmethyl-(2, 4, 5, or 6-)piperidinyl, 1-{1-[(1 or 2-)furyl]ethyl]}-(2, 3, or 4-)piperidinyl, 1-benzoyl-(2, 3, or 4-)piperidinyl, 1,2-dibenzoyl-(3, 4, 5, or 6-)piperidinyl, 1,3,5-tribenzoyl-(2, 4, or 6-)piperidinyl, 1-methyl-(2, 3, or 4-)piperidinyl, 1-ethyl-(2, 3, or 4-)piperidinyl, 1-propyl-(2, 3, or 4-)piperidinyl, 1-isopropyl-(2, 3, or 4-)piperidinyl, 1-butyl-(2, 3, or 4-)piperidinyl, 1-isobutyl-(2, 3, or 4-)piperidinyl, 1-tert-butyl-(2, 3, or 4-)piperidinyl, 1-pentyl-(2, 3, or 4-)piperidinyl, 1-hexyl-(2, 3, or 4-)piperidinyl, 1,2-dimethyl-(3, 4, 5, or 6-)piperidinyl, 1,2,6-trimethyl-(3, 4, or 5-)piperidinyl, 1-methyl-3-benzyl-(3, 4, 5, or 6-)piperidinyl, 1-benzoyl-2-methyl-(2, 4, 5, or 6-)piperidinyl, 1-(1 or 2-)furylmethyl-2,4-dimethyl-(3, 5, or 6-)piperidinyl, 1-methoxycarbonyl-(2, 3, or 4-)piperidinyl, 1-ethoxycarbonyl-(2, 3, or 4-)piperidinyl, 1-propoxycarbonyl-(2, 3, or 4-)piperidinyl, 1-butoxycarbonyl-(2, 3, or

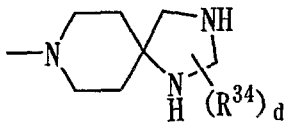
4-)piperidinyl, 1-tert-butoxycarbonyl-(2, 3, or 4-)piperidinyl, 1-pentyloxycarbonyl-(2, 3, or 4-)piperidinyl, 1-hexyloxycarbonyl-(2, 3, or 4-)piperidinyl, 1,2-dimethoxycarbonyl-(3, 4, 5, or 6-)piperidinyl, 1,2,6-triethoxycarbonyl-(3, 4, or 5-)piperidinyl, 1-methyl-3-tert-butoxycarbonyl-(3, 4, 5, or 6-)piperidinyl, 1-benzoyl-2-methoxycarbonyl-(2, 4, 5, or 6-)piperidinyl, 1-(1 or 2-)furylmethyl-2,4-dimethoxycarbonyl-(3, 5, or 6-)piperidinyl, 1-benzyl-2,4-dimethoxycarbonyl-(3, 5, or 6-)piperidinyl groups.

Examples of the carbonyl lower alkyl group substituted with a group:

(hereinafter called "A group") include A group substituted carbonylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as an A group substituted carbonylmethyl group, 2-A group substituted carbonylethyl group, 1-A group substituted carbonylethyl group, 3-A group substituted carbonylpropyl group, 4-A group substituted carbonylbutyl group, 1,1-dimethyl-2-A group substituted carbonylethyl group, 5-A group substituted carbonylpentyl group, 6-A group substituted carbonylhexyl group, 1-A group substituted carbonylisopropyl group, and 2-methyl-3-A group

substituted carbonylpropyl group.

Examples of the carbonyl lower alkyl group substituted with a group:



wherein R^{34} is an oxo group or phenyl group, and d is an integer of 0 to 3 (hereinafter called "B group"), B group substituted carbonylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a B group substituted carbonylmethyl group, 2-B group substituted carbonylethyl group, 1-B group substituted carbonylethyl group, 3-B group substituted carbonylpropyl group, 4-B group substituted carbonylbutyl group, 1,1-dimethyl-2-B group substituted carbonylethyl group, 5-B group substituted carbonylpentyl group, 6-B group substituted carbonylhexyl group, 1-B group substituted carbonylisopropyl group, and 2-methyl-3-B group substituted carbonypropyl group.

Examples of the pyrrolidinyl lower alkyl group include pyrrolidinylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (1-, 2-, or 3-)pyrrolydinylmetyl group, 2-[(1-, 2-, or 3-)pyrrolydinyl]ethyl group, 1-[(1-, 2-, or 3-)pyrrolydinyl]ethyl group, 3-[(1-, 2-, or

3-)pyrrolydinyl]propyl group, 4-[(1-, 2-, or 3-)pyrrolydinyl]butyl group, 5-[(1-, 2-, or 3-)pyrrolydinyl]pentyl group, 6-[(1-, 2-, or 3-)pyrrolydinyl]hexyl group, 1,1-dimethyl-2-[(1-, 2-, or 3-)pyrrolydinyl]ethyl group, and 2-methyl-3-[(1-, 2-, or 3-)pyrrolydinyl]propyl group.

Examples of the morpholino lower alkyl group include morpholinoalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (2-, 3- or 4-)morpholinomethyl group, 2-[(2-, 3- or 4-)morpholino]ethyl group, 1-[(2-, 3- or 4-)morpholino]ethyl group, 3-[(2-, 3- or 4-)morpholino]propyl group, 4-[(2-, 3- or 4-)morpholino]butyl group, 5-[(2-, 3- or 4-)morpholino]pentyl group, 6-[(2-, 3- or 4-)morpholino]hexyl group, 1,1-dimethyl-2-[(2-, 3- or 4-)morpholino]ethyl group, and 2-methyl-3-[(2-, 3- or 4-)morpholino]propyl group.

Examples of the phenyl lower alkenyl group include phenylalkenyl groups of which the alkenyl moiety is a linear or branched alkenyl group having 2 to 6 carbon atoms and which have 1 to 3 double bonds such as a styryl group, 3-phenyl-2-propenyl group (trivial name: cinnamyl group), 4-phenyl-2-butenyl group, 4-phenyl-3-butenyl group, 5-phenyl-4-pentenyl group, 5-phenyl-3-pentenyl group, 6-phenyl-5-hexenyl group, 6-phenyl-4-hexenyl group, 6-phenyl-3-hexenyl group, 4-phenyl-1,3-butadienyl group, and 6-phenyl-

1,3,5-hexatrienyl group.

Examples of the anilinocarbonyl lower alkyl group which may have a lower alkyl group as a substituent on the phenyl ring include anilinocarbonylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms and which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the phenyl ring such as anilinocarbonylmethyl, 2-anilinocarbonylethyl, 1-anilinocarbonylethyl, 3-anilinocarbonylpropyl, 4-anilinocarbonylbutyl, 5-anilinocarbonylpentyl, 6-anilinocarbonylhexyl, 1,1-dimethyl-2-anilinocarbonylethyl, 2-methyl-3-anilinocarbonylpropyl, (4-methylanilinocarbonyl)methyl, 2-(3-methylanilinocarbonyl)ethyl, 3-(4-methylanilinocarbonyl)propyl, 1-(2-ethylanilinocarbonyl)ethyl, 4-(3-ethylanilinocarbonyl)butyl, 5-(4-ethylanilinocarbonyl)pentyl, 6-(4-isopropylanilinocarbonyl)hexyl, 1,1-dimethyl-2-(3-butylanilinocarbonyl)ethyl, 2-methyl-3-(4-pentylanilinocarbonyl)propyl, 4-hexylanilinocarbonylmethyl, 3,4-dimethylanilinocarbonylmethyl, 3,4-diethylanilinocarbonylmethyl, 2,4-dimethylanilinocarbonylmethyl, 2,5-dimethylanilinocarbonylmethyl, 2,6-

dimethylanilinocarbonylmethyl, 3,4,5-trimethylanilinocarbonylmethyl groups.

Examples of the piperazinyl lower alkyl group which may have, on the piperazine ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring include piperazinylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms and which may have, on the piperazine ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms and a phenylalkyl group which may have a linear or branched alkylenedioxy group having 1 to 4 carbon atoms as a substituent on the phenyl ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(1-, 2-, or 3-)piperazinyl]methyl, 2-[(1-, 2-, or 3-)piperazinyl]ethyl, 1-[(1-, 2-, or 3-)piperazinyl]ethyl, 3-[(1-, 2-, or 3-)piperazinyl]propyl, 4-[(1-, 2-, or 3-)piperazinyl]butyl, 5-[(1-, 2-, or 3-)piperazinyl]pentyl, 6-[(1-, 2-, or 3-)piperazinyl]hexyl, 1,1-dimethyl-2-[(1-, 2-, or 3-)piperazinyl]ethyl, 2-methyl-3-[(1-, 2-, or 3-)piperazinyl]propyl, [1-methyl-(2-, 3-, or 4-)piperazinyl]methyl, 2-[1-ethyl-(2-, 3-, or 4-)piperazinyl]ethyl, 1-[4-propyl-(1-, 2-, or

3-)piperazinyl]ethyl, 3-[3-isopropyl-(1-, 2-, 4-, 5-, or 6-)piperazinyl]propyl, 4-[2-butyl-(1-, 3, 4-, 5-, or 6-)piperazinyl]butyl, 5-[1-isobutyl-(2-, 3-, or 4-)piperazinyl]pentyl, 3-[4-methyl-(1-, 2-, or 3-)piperazinyl]propyl, 6-[1-tert-butyl-(2-, 3-, or 4-)piperazinyl]hexyl, 1,1-dimethyl-2-[4-pentyl-(1-, 2-, or 3-)piperazinyl]ethyl, [1,2-dimethyl-(3-, 4-, 5-, or 6-)piperazinyl]methyl, [1,2,6-trimethyl-(3-, 4-, or 5-)piperazinyl]methyl, 2-[4-(3,4-methylenedioxybenzyl)-(1-, 2-, or 3-)piperazinyl]ethyl groups.

Examples of the amidino lower alkyl group which may have a lower alkyl group as a substituent include amidinoalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms and which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms such as an amidinomethyl group, 2-amidinoethyl group, 1-amidinoethyl group, 3-amidinopropyl group, 4-amidinobutyl group, 5-amidinopentyl group, 6-amidinohexyl group, 1,1-dimethyl-2-amidinoethyl group, 2-methyl-3-amidinopropyl group, N,N-dimethylamidinomethyl group, 2-(N,N-dimethylamidino)ethyl group, 1-(N-methylamidino)ethyl group, 3-(N-ethylamidino)propyl group, 4-(N-n-propylamidino)propyl group, 5-(N-n-pentylamidino)pentyl group, 6-(N-n-hexylamidino)hexyl group, and (N-methyl-N-ethylamidino)methyl group.

Examples of the carbazolyl group which may

have a lower alkyl group as a substituent on the carbazole ring include carbazolyl groups which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the carbazole ring such as (1-, 2-, 3-, or 4-)carbazolyl, 9-methyl-(1-, 2-, 3-, or 4-)carbazolyl, 9-ethyl-(1-, 2-, 3-, or 4-)carbazolyl, 1-ethyl-(2-, 3-, 4-, 5-, 6-, 7-, 8-, or 9-)carbazolyl, 2-n-propyl-(1-, 3-, 4-, 5-, 6-, 8-, or 9-)carbazolyl, 3-n-butyl-(1-, 2-, 4-, 5-, 6-, 7-, 8-, or 9-)carbazolyl, 4-n-pentyl-(1-, 2-, 3-, 5-, 6-, 7-, 8-, or 9-)carbazolyl, 5-n-hexyl-(1-, 2-, 3-, 4-, 6-, 7-, 8-, or 9-)carbazolyl, 6,9-dimethyl-(1-, 2-, 3-, 4-, 5-, 7-, or 8-)carbazolyl, 1,7,8-trityl-(2-, 3-, 4-, 5-, 6-, 7-, 8-, or 9-)carbazolyl groups.

Examples of the amidino group which may have a lower alkyl group as a substituent include amidino groups which may have 1 or 2 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents such as an amidino group, N,N-dimethylamidino group, N-methylamidino group, N-ethylamidino group, N-n-propylamidino group, N-n-butylamidino group, N-n-pentylamidino group, N-n-hexylamidino group, N,N-diethylamidino group, and N-methyl-N-ethylamidino group.

Examples of the 5- to 7-membered saturated heterocyclic group formed by binding R^{36} and R^{37} each other, together with nitrogen atoms bound to them, through or not through a nitrogen atom, an oxygen atom

or a sulfur atom, include a pyrrolidinyl group, piperidinyl group, piperazinyl group, morpholino group, thiomorpholino group, and homopiperazinyl group.

Examples of the 5- to 10-membered saturated or unsaturated heterocyclic group formed by binding R^{14} and R^{15} each other, together with nitrogen atoms bound to them, through or not through a nitrogen atom, an oxygen atom or a sulfur atom, include 1,2,3,4,5,6-hexahydropyrimidinyl, pyrrolidinyl, piperidinyl, piperazinyl, morpholino, thiomorpholino, homopiperazinyl, homopiperidinyl, thiazolidinyl, 1,2,5,6-tetrahydropyridyl, pyrrolyl, pyrazolyl, imidazolyl, 2-pyrrolinyl, 2-imidazolinyl, imidazolidinyl, 2-pyrazolinyl, pyrazolidinyl, 1,2-dihydropyridyl, 1,2-dihydroquinolyl, 1,2,3,4-tetrahydroquinolyl, 1,2,3,4-tetrahydroisoquinolyl, 1,2-dihydroisoquinolyl, indolyl, isoindolyl, indolinyl, isoindolinyl, 3,4-dihydro-2H-1,4-benzoxadinyl, 3,4-dihydro-2H-1,4-benzothiazolidinyl, 1,4-benzothiazinyl, 1,2,3,4-tetrahydroquinoxalinyl, 1,2,3,4-tetrahydrocinnolinyl, 1,2,3,4-tetrahydrophthalazinyl, 1,2,3,4-tetrahydroquinazolinyl, 1,2-dihydroquinoxalinyl, 3,4-dihydroquinoxalinyl, 1,4-dihydroquinoxalinyl, 1,2-dihydrocinnolinyl, 1,2-dihydrophthalazinyl, 3,4-dihydrophthalazinyl, 1,2-dihydroquinazolinyl, 3,4-dihydroquinazolinyl, indazolyl, indazolinyl, 6-azabicyclo[3,2,1]octyl, 3-aza-spiro[5,5]undecyl, thiazolidinyl groups.

Examples of the phenyl lower alkoxy group include phenylalkoxy groups of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms such as a benzyloxy group, 2-phenylethoxy group, 1-phenylethoxy group, 3-phenylpropoxy group, 4-phenylbutoxy group, 5-phenylpentyloxy group, 6-phenylhexyloxy group, 1,1-dimethyl-2-phenylethoxy group, and 2-methyl-3-phenylpropoxy group.

Examples of the phenyl substituted lower alkyl group which has 1 or 2 phenyl groups which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a lower alkanoyl group, an amino group which may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy groups; and which may have a pyridyl group on the lower alkyl group include, in addition to the above described phenyl lower alkyl groups, phenyl substituted alkyl groups which have 1 or 2 phenyls which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a linear or branched alkanoyl group having 1 to 6 carbon atoms, an amino group which may have 1 or 2 linear or branched alkanoyl groups having 1 to 6 carbon atoms as

substituents, a linear or branched alkoxycarbonyl group having 1 to 6 carbon atoms, a cyano group, a nitro group, a phenyl group, a halogen atom, a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, a phenylalkoxy groups of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms, a hydroxy group, and a linear or branched alkylenedioxy group having 1 to 4 carbon atoms; and which may have a pyridyl group on the alkyl group, of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, such as 1-phenyl-1-(2, 3, or 4-)pyridylmethyl, 1,1-diphenylmethyl, 1,1-di(4-fluorophenyl)methyl, 1-phenyl-1-(4-methoxyphenyl)methyl, 3,4-methylenedioxybenzyl, 3,4-ethylenedioxybenzyl, 3,4-trimethylenedioxybenzyl, 2,5-difluorobenzyl, 2,4-difluorobenzyl, 3,4-difluorobenzyl, 3,5-difluorobenzyl, 2,6-difluorobenzyl, 3-trifluoromethylbenzyl, 2-trifluoromethylbenzyl, 4-trifluoromethylbenzyl, 3,4-dimethoxybenzyl, 3,5-dimethoxybenzyl, 2-chlorobenzyl, 3-chlorobenzyl, 4-chlorobenzyl, 2-methylbenzyl, 3-methylbenzyl, 4-methylbenzyl, 3,4-dimethylbenzyl, 2,3-dimethylbenzyl, 2-methoxybenzyl, 3-methoxybenzyl, 4-cyanobenzyl, 2-cyanobenzyl, 3-cyanobenzyl, 4-methoxybenzyl, 2,3-dichlorobenzyl, 2,4-dichlorobenzyl, 2,5-dichlorobenzyl,

3,4-dichlorobenzyl, 2,6-dichlorobenzyl, 4-fluorobenzyl, 3-fluorobenzyl, 2-fluorobenzyl, 4-nitrobenzyl, 3-nitrobenzyl, 2-nitrobenzyl, 3-trifluoromethoxybenzyl, 4-trifluoromethoxybenzyl, 2-trifluoromethoxybenzyl, 4-methoxycarbonylbenzyl, 3-methoxycarbonylbenzyl, 4-tert-butylbenzyl, 4-ethylbenzyl, 4-isopropylbenzyl, 4-methoxy-3-chlorobenzyl, 2-(4-methoxyphenyl)ethyl, 2-(4-fluorophenyl)ethyl, 2-(4-chlorophenyl)ethyl, 2-(3-methoxyphenyl)ethyl, 2-(4-methylphenyl)ethyl, 4-phenylbenzyl, 3,3-diphenylpropyl, 3-methyl-4-nitrobenzyl, 4-(4-methoxyphenyl)butyl, 2-(4-methylphenyl)ethyl, 4-tert-butoxycarbonylbenzyl, 3-chloro-6-methoxybenzyl, 4-acetylaminobenzyl, 4-nitro-3-methylbenzyl, 4-hydroxybenzyl, 3-hydroxybenzyl, 2-hydroxybenzyl, 4-tert-butyrylbenzyl, 4-benzyloxybenzyl, 4-pivaloylbenzyl, 2-(4-acetylphenyl)ethyl, 1-(3-propionylphenyl)ethyl, 3-(2-butyrylphenyl)propyl, 4-(4-pentanoylphenyl)butyl, 5-(3-hexanoylphenyl)pentyl, 6-(2,4-diacetylphenyl)hexyl, 1,1-dimethyl-2-(2,4,6-triacetylphenyl)ethyl, 2-methyl-3-(3,4-diacetylphenyl)propyl, 2-(4-aminophenyl)ethyl, 1-(3-propionylaminophenyl)ethyl, 3-(2-butyrylaminophenyl)propyl, 4-(4-pentanoylamino)phenylbutyl, 5-(hexanoylaminophenyl)pentyl, 6-(N-acetyl-N-propionylaminophenyl)hexyl, 1,1-dimethyl-2-(3,4-diaminophenyl)ethyl, 2-methyl-3-(3,4,5-triacetylaminophenyl)propyl, 2-(2-

ethoxycarbonylphenyl)ethyl, 1-(3-propoxycarbonylphenyl)ethyl, 3-(4-pentyloxycarbonylphenyl)propyl, 4-(3-hexyloxycarbonylphenyl)butyl, 5-(3,4-dimethoxycarbonylphenyl)pentyl, 6-(3,4,5-triethoxycarbonylphenyl)hexyl, 1,1-dimethyl-2-(4-butoxycarbonylphenyl)ethyl, 2-methyl-3-(4-methoxycarbonylphenyl)propyl, 2-(2-cyanophenyl)ethyl, 1-(3-cyanophenyl)ethyl, 3-(4-cyanophenyl)propyl, 4-(2-cyanophenyl)butyl, 5-(3-cyanophenyl)pentyl, 6-(4-cyanophenyl)hexyl, 1,1-dimethyl-2-(2,4-dicyanophenyl)ethyl, 2-methyl-3-(2,4,6-tricyanophenyl)propyl, 2-(2-nitrophenyl)ethyl, 1-(3-nitrophenyl)ethyl, 3-(4-nitrophenyl)propyl, 4-(2-nitrophenyl)butyl, 5-(3-nitrophenyl)pentyl, 6-(4-nitrophenyl)hexyl, 1,1-dimethyl-2-(2,4-dinitrophenyl)ethyl, 2-methyl-3-(2,4,6-trinitrophenyl)propyl, 2-(2-phenylphenyl)ethyl, 1-(3-phenylphenyl)ethyl, 3-(4-phenylphenyl)propyl, 4-(2-phenylphenyl)butyl, 5-(3-phenylphenyl)pentyl, 6-(4-phenylphenyl)hexyl, 1,1-dimethyl-2-(2,4-diphenylphenyl)ethyl, 2-methyl-3-(2,4,6-triphenylphenyl)propyl, 2-(2-fluorophenyl)ethyl, 1-(3-bromophenyl)ethyl, 3-(4-iodophenyl)propyl, 4-(2-bromophenyl)butyl, 5-(3-chlorophenyl)pentyl, 6-(4-bromophenyl)hexyl, 1,1-dimethyl-2-(2,4-dichlorophenyl)ethyl, 2-methyl-3-(2,4,6-trifluorophenyl)propyl, 2-(2-ethylphenyl)ethyl, 1-(3-

propylphenyl)ethyl, 3-(4-butylphenyl)propyl, 4-(2-pentylphenyl)butyl, 5-(3-hexylphenyl)pentyl, 6-(4-trifluoromethylphenyl)hexyl, 1,1-dimethyl-2-(2,4-dimethylphenyl)ethyl, 2-methyl-3-[2,4,6-tri(trifluoromethyl)phenyl]propyl, 2-(2-ethoxyphenyl)ethyl, 1-(3-propoxyphenyl)ethyl, 3-(4-butoxyphenyl)propyl, 4-(2-pentyloxyphenyl)butyl, 5-(3-hexyloxyphenyl)pentyl, 6-(4-trifluoromethoxyphenyl)hexyl, 1,1-dimethyl-2-(2,4-dimethoxyphenyl)ethyl, 2-methyl-3-[2,4,6-tri(trifluoromethoxy)phenyl]propyl, 2-(2-benzyloxyphenyl)ethyl, 1-[3-(2-phenylethoxy)phenyl]ethyl, 3-[4-(3-phenylpropoxy)phenyl]propyl, 4-[2-(4-phenylbutoxy)phenyl]butyl, 5-[3-(5-phenylpentyloxy)phenyl]pentyl, 6-[4-(6-phenylhexyloxy)phenyl]hexyl, 1,1-dimethyl-2-(2,4-dibenzyloxyphenyl)ethyl, 2-methyl-3-(2,4,6-tribenzyloxyphenyl)propyl, 2-(2-hydroxyphenyl)ethyl, 1-(3-hydroxyphenyl)ethyl, 3-(4-hydroxyphenyl)propyl, 4-(2-hydroxyphenyl)butyl, 5-(3-hydroxyphenyl)pentyl, 6-(4-hydroxyphenyl)hexyl, 1,1-dimethyl-2-(2,4-dihydroxyphenyl)ethyl, 2-methyl-3-(2,4,6-trihydroxyphenyl)propyl, 2-(3,4-methylenedioxyphenyl)ethyl, 1-(2,3-ethylenedioxyphenyl)ethyl, 3-(3,4-trimethylenedioxyphenyl)propyl, 4-(3,4-tetramethylenedioxyphenyl)butyl, 5-(3,4-

methylenedioxyphenyl)pentyl, 6-(3,4-ethylenedioxyphenyl)hexyl, 1,1-dimethyl-2-(3,4-methylenedioxy)ethyl, 2-methyl-3-(3,4-methylenedioxyphenyl)propyl groups.

Examples of the pyridyl lower alkyl group which may have, on the pyridine ring, 1 to 3 substituents selected from the group consisting of a hydroxyl group and a lower alkyl group which may have a hydroxyl group as a substituent include, in addition to the above described pyridyl lower alkyl groups, pyridylalkyl groups which may have, on the pyridine ring, 1 to 3 substituents selected from the group consisting of a hydroxy group and a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 hydroxy groups as substituents, and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [2-methyl-(3, 4, 5, or 6-)pyridyl]methyl, [2-methyl-3-hydroxy-5-hydroxymethyl-(4 or 6-)pyridyl]methyl, 2-[3-ethyl-(2, 4, 5, or 6-)pyridyl]ethyl, 1-[4-propyl-(2, 3, 5, or 6-)pyridyl]ethyl, 3-[2-butyl-(3, 4, 5, or 6-)pyridyl]propyl, 4-[3-pentyl-(2, 4, 5, or 6-)pyridyl]butyl, 1,1-dimethyl-2-[4-hexyl-(2, 3, 5, or 6-)pyridyl]ethyl, 5-[2,3-dimethyl-(4, 5, or 6-)pyridyl]pentyl, 6-[2,4,6-trimethyl-(3 or 5-)pyridyl]hexyl, 1-[2-hydroxy-(2, 3, 5, or 6-)pyridyl]isopropyl, 2-methyl-3-[3-hydroxy-(2, 4, 5, or 6-)pyridyl]propyl, [2-hydroxy-(3, 4, 5, or

6-)pyridyl]methyl, 2-[3-hydroxy-(2, 4, 5, or 6-)pyridyl]ethyl, 1-[4-hydroxy-(2, 3, 5, or 6-)pyridyl]ethyl, 3-[2-hydroxy-(3, 4, 5, or 6-)pyridyl]propyl, 4-[3-hydroxy-(2, 4, 5, or 6-)pyridyl]butyl, 1,1-dimethyl-2-[4-hydroxy-(2, 3, 5, or 6-)pyridyl]ethyl, 5-[2,3-dihydroxy-(4, 5, or 6-)pyridyl]pentyl, 6-[2,4,6-trihydroxy-(3 or 5-)pyridyl]hexyl, [2-hydroxymethyl-(3, 4, 5, or 6-)pyridyl]methyl, 2-[3-(2-hydroxyethyl)-(2, 4, 5, or 6-)pyridyl}ethyl, 1-[4-(3-hydroxypropyl)-(2, 3, 5, or 6-)pyridyl]ethyl, 3-[2-(4-hydroxybutyl)-(3, 4, 5, or 6-)pyridyl]propyl, 4-[3-(5-hydroxypentyl)-(2, 4, 5, or 6-)pyridyl]butyl, 1,1-dimethyl-2-[4-(6-hydroxyhexyl)-(2, 3, 5, or 6-)pyridyl]ethyl, 5-[2,3-di(hydroxymethyl)-(4, 5, or 6-)pyridyl]pentyl, 6-[2,4,6-tri(hydroxymethyl)-(3 or 5-)pyridyl]hexyl, 1-[2-hydroxymethyl-(2, 3, 5, or 6-)pyridyl]isopropyl, 2-methyl-3-[3-(2,3-dihydroxypropyl)-(2, 4, 5, or 6-)pyridyl]propyl, [2-methyl-3-(2,2,4-trihydroxybutyl)-(4, 5, or 6-)pyridyl]methyl, [2-methyl-5-hydroxymethyl-(3, 4, or 6-)pyridyl]methyl groups.

Examples of the pyrrolyl lower alkyl group which may have 1 to 3 lower alkyl groups as substituents on the pyrrole ring include pyrrolylalkyl groups which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms on the pyrrole and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(1, 2, or

3-)pyrrolyl]methyl, 2-[(1, 2, or 3-)pyrrolyl]ethyl, 1-[(1, 2, or 3-)pyrrolyl]ethyl, 3-[(1, 2, or 3-)pyrrolyl]propyl, 4-[(1, 2, or 3-)pyrrolyl]butyl, 5-[(1, 2, or 3-)pyrrolyl]pentyl, 6-[(1, 2, or 3-)pyrrolyl]hexyl, 1,1-dimethyl-2-[(1, 2, or 3-)pyrrolyl]ethyl, 2-methyl-3-[(1, 2, or 3-)pyrrolyl]propyl, [1-methyl-(2 or 3-)pyrrolyl]methyl, 2-[2-ethyl-(1, 3, 4, or 5-)pyrrolyl]ethyl, 1-[3-propyl-(1, 2, 4, or 5-)pyrrolyl]ethyl, 3-[1-butyl-(2, 3, or 4-)pyrrolyl]propyl, 4-[2-pentyl-(1, 3, 4, or 5-)pyrrolyl]butyl, 5-[3-hexyl-(1, 2, 4, or 5-)pyrrolyl]pentyl, 6-[1,2-dimethyl-(3, 4, or 5-)pyrrolyl]hexyl, 1,1-dimethyl-2-[1,2,3-trimethyl-(4 or 5-)pyrrolyl]ethyl, 2-methyl-3-[1-ethyl-2-methyl-(3, 4, or 5-)pyrrolyl]propyl groups.

Examples of the benzoxazolyl lower alkyl group include benzoxazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(2, 4, 5, 6, or 7-)benzoxazolyl]methyl, 2-[(2, 4, 5, 6, or 7-)benzoxazolyl]ethyl, 1-[(2, 4, 5, 6, or 7-)benzoxazolyl]ethyl, 3-[(2, 4, 5, 6, or 7-)benzoxazolyl]propyl, 4-[(2, 4, 5, 6, or 7-)benzoxazolyl]butyl, 5-[(2, 4, 5, 6, or 7-)benzoxazolyl]pentyl, 6-[(2, 4, 5, 6, or 7-)benzoxazolyl]hexyl, 1,1-dimethyl-2-[(2, 4, 5, 6, or 7-)benzoxazolyl]ethyl, 2-methyl-3-[(2, 4, 5, 6, or 7-)benzoxazolyl]propyl.

Examples of the benzothiazolyl lower alkyl group include benzothiazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(2, 4, 5, 6, or 7-)benzothiazolyl]methyl, 2-[(2, 4, 5, 6, or 7-)benzothiazolyl]ethyl, 1-[(2, 4, 5, 6, or 7-)benzothiazolyl]ethyl, 3-[(2, 4, 5, 6, or 7-)benzothiazolyl]propyl, 4-[(2, 4, 5, 6, or 7-)benzothiazolyl]butyl, 5-[(2, 4, 5, 6, or 7-)benzothiazolyl]pentyl, 6-[(2, 4, 5, 6, or 7-)benzothiazolyl]hexyl, 1,1-dimethyl-2-[(2, 4, 5, 6, or 7-)benzothiazolyl]ethyl, 2-methyl-3-[(2, 4, 5, 6, or 7-)benzothiazolyl]propyl.

Examples of the furyl lower alkyl group include furylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a [(2 or 3-)furyl]methyl group, 2-[(2 or 3-)furyl]ethyl group, 1-[(2 or 3-)furyl]ethyl group, 3-[(2 or 3-)furyl]propyl group, 4-[(2 or 3-)furyl]butyl group, 5-[(2 or 3-)furyl]pentyl group, 6-[(2 or 3-)furyl]hexyl group, 1,1-dimethyl-2-[(2 or 3-)furyl]ethyl group, and 2-methyl-3-[(2 or 3-)furyl]propyl group.

Examples of the thiazolidinyl lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring include thiazolidinylalkyl groups which may have 1 to 3 oxo groups as substituents on the thiazolidine ring and of which the alkyl moiety is a

linear or branched alkyl group having 1 to 6 carbon atoms such as (2, 3, 4, or 5-)thiazolidinylmethyl, 2-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 1-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 3-[(2, 3, 4, or 5-)thiazolidinyl]propyl, 4-[(2, 3, 4, or 5-)thiazolidinyl]butyl, 5-[(2, 3, 4, or 5-)thiazolidinyl]pentyl, 6-[(2, 3, 4, or 5-)thiazolidinyl]hexyl, 1,1-dimethyl-2-[(2, 3, 4, or 5-)thiazolidinyl]ethyl, 2-methyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propyl, [2,4-dioxo-(3 or 5-)thiazolidinyl]methyl, 2-[2-oxo-(3, 4, or 5-)thiazolidinyl]ethyl, 1-[4-oxo-(2, 3, or 5-)thiazolidinyl]ethyl, 3-[2-oxo-(3, 4, or 5-)thiazolidinyl]propyl, 4-[5-oxo-(2, 3, or 4-)thiazolidinyl]butyl, 5-[2,5-dioxo-(3 or 4-)thiazolidinyl]pentyl, 6-[2,4,5-trioxo-3-thiazolidinyl]hexyl, 1-[4,5-dioxo-(2 or 3-)thiazolidinyl]ethyl, 2-[4,5-dioxo-(2- or 3-)thiazolidinyl]ethyl, 1,1-dimethyl-2-[2,4-dioxo-(3 or 5-)thiazolidinyl]ethyl, 2-methyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propyl groups.

Examples of the thiazolidinylidene lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring include thiazolidinylidenealkyl groups which may have 1 to 3 oxo groups as substituents on the thiazolidine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (2, 4, or

5-)thiazolidinylidenemethyl, (2, 4, or 5-)thiazolidinylideneethyl, (2, 4, or 5-)thiazolidinylidenepropyl, (2, 4, or 5-)thiazolidinylideneisopropyl, (2, 4, or 5-)thiazolidinylidenebutyl, (2, 4, or 5-)thiazolidinylidenepentyl, (2, 4, or 5-)thiazolidinylidenehexyl, 4,5-dioxo-2-thiazolidinylidenemethyl, 2,5-dioxo-4-thiazolidinylidenemethyl, 2,4-dioxo-5-thiazolidinylidenemethyl, 4-oxo-(2 or 5-)thiazolidinylideneethyl, 5-oxo-(2 or 4-)thiazolidinylidenepropyl, 2-oxo-(4, or 5-)thiazolidinylidenebutyl groups.

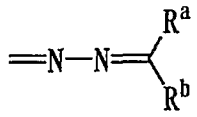
Examples of the benzoyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a cyano group, an amino group which may have a lower alkylsulfonyl group as a substituent, a halogen atom, a lower alkoxy group, a lower alkyl group which may have a halogen atom, a thiazolidinyl lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring, a thiazolidinylidene lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring, and a lower alkylenedioxy group include benzoyl groups which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a cyano group; an amino group which may have 1 or 2 linear or branched alkylsulfonyl groups having 1 to 6 carbon

atoms as substituents; a halogen atom; a linear or branched alkoxy group having 1 to 6 carbon atoms; a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents; a thiazolidinylalkyl group which may have 1 to 3 oxo groups as substituents on the thiazolidine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms; a thiazolidinylidenealkyl group which may have 1 to 3 oxo groups as substituents on the thiazolidine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms; and a linear or branched alkylenedioxy group having 1 to 4 carbon atoms such as benzoyl, 4-cyanobenzoyl, 3,4-methylenedioxybenzoyl, 2-aminobenzoyl, 3-aminobenzoyl, 4-aminobenzoyl, 3,4-diaminobenzoyl, 2,4,6-triaminobenzoyl, 4-methoxybenzoyl, 4-trifluoromethylbenzoyl, 4-chlorobenzoyl, 3,4-difluorobenzoyl, 2-fluorobenzoyl, 3-bromobenzoyl, 4-iodobenzoyl, 3,4-dimethoxybenzoyl, 4-fluorobenzoyl, 3-cyanobenzoyl, 2-cyanobenzoyl, 2,3-dicyanobenzoyl, 3,4,5-tricyanobenzoyl, 4-methylbenzoyl, 4-(2,4-dioxothiazolidinylmethyl)benzoyl, 4-(2,4-dioxothiazolidinylidenemethyl)benzoyl, 2-methylbenzoyl, 3-methylbenzoyl, 2-ethylbenzoyl, 3-ethylbenzoyl, 4-ethylbenzoyl, 4-isopropylbenzoyl, 3-butylbenzoyl, 4-pentylbenzoyl, 4-hexylbenzoyl, 3,4-dimethylbenzoyl, 3,4-diethylbenzoyl, 2,4-dimethylbenzoyl, 2,5-

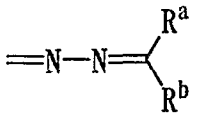
dimethylbenzoyl, 2,6-dimethylbenzoyl, 3,4,5-trimethylbenzoyl, 2-methoxybenzoyl, 3-methoxybenzoyl, 2-ethoxybenzoyl, 3-ethoxybenzoyl, 4-ethoxybenzoyl, 4-isopropoxybenzoyl, 3-butoxybenzoyl, 4-pentyloxybenzoyl, 4-hexyloxybenzoyl, 3,4-diethoxybenzoyl, 2,4-dimethoxybenzoyl, 2,5-dimethoxybenzoyl, 2,6-dimethoxybenzoyl, 3,4,5-trimethoxybenzoyl, 2-trifluoromethylbenzoyl, 3-trifluoromethylbenzoyl, 4-trifluoromethylbenzoyl, 2-(bromomethyl)benzoyl, 3-(2-chloroethyl)benzoyl, 4-(2,3-dichloropropyl)benzoyl, 4-(4-fluorobutyl)benzoyl, 3-(5-chloropentyl)benzoyl, 4-(5-bromohexyl)benzoyl, 4-(5,6-dibromohexyl)benzoyl, 3,4-di(trifluoromethyl)benzoyl, 3,4-di(4,4,4-trichlorobutyl)benzoyl, 2,4-di(3-chloro-2-methylpropyl)benzoyl, 2,5-di(3-chloropropyl)benzoyl, 2,6-di(2,2,2-trifluoroethyl)benzoyl, 3,4,5-tri(trifluoromethyl)benzoyl, 4-(2,2,2-trichloroethyl)benzoyl, 2-methyl-4-trifluoromethylbenzoyl, 3-ethyl-4-trichloromethylbenzoyl, 2-methoxy-4-trifluoromethylbenzoyl, 3-ethyl-4-fluorobenzoyl, 3-ethoxy-4-trichloromethylbenzoyl, 2-methyl-3-trifluoromethyl-4-trifluoromethylbenzoyl, 3-fluorobenzoyl, 4-fluorobenzoyl, 2-bromobenzoyl, 4-bromobenzoyl, 2-iodobenzoyl, 3-iodobenzoyl, 2,3-dibromobenzoyl, 2,4-diiodobenzoyl, 2,5-difluorobenzoyl, 2,6-dichlorobenzoyl, 2,4,6-trichlorobenzoyl, 2,4-difluorobenzoyl, 3,4-difluorobenzoyl, 3,5-

difluorobenzoyl, 2,6-difluorobenzoyl, 2-chlorobenzoyl, 3-chlorobenzoyl, 4-chlorobenzoyl, 2,3-dichlorobenzoyl, 2,4-dichlorobenzoyl, 2,5-dichlorobenzoyl, 3,4-dichlorobenzoyl, 2,6-dichlorobenzoyl, 3,5-dichlorobenzoyl, 2,4,6-trifluorobenzoyl, 2,4-difluorobenzoyl, 3,4-difluorobenzoyl, 3,4-methylenedioxybenzoyl, 3,4-trimethylenedioxybenzoyl, 2,3-ethylenedioxybenzoyl, 3,4-trimethylenedioxybenzoyl, 2,3-tetramethylenedioxybenzoyl, 2,3-methylenedioxybenzoyl, 3,4-ethylenedioxybenzoyl, 2-methanesulfonylaminobenzoyl groups.

Examples of the thiazolidinyl lower alkanoyl group which may be substituted on the thiazolidine ring with 1 to 3 groups selected from the group consisting of an oxo group and a group of the formula:



wherein R^a and R^b each represent a lower alkyl group, include thiazolidinylalkanoyl groups which may be substituted on the thiazolidine ring with 1 to 3 substituents selected from the group consisting of an oxo group and a group of the formula:



wherein R^a and R^b each represent a linear or branched alkyl group having 1 to 6 carbon atoms, and of which

the alkanoyl moiety is a linear or branched alkanoyl group having 2 to 6 carbon atoms such as 2-[(2, 3, 4, or 5-)thiazolidinyl]acetyl, 3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 2-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 4-[(2, 3, 4, or 5-)thiazolidinyl]butyryl, 5-[(2, 3, 4, or 5-)thiazolidinyl]pentanoyl, 6-[(2, 3, 4, or 5-)thiazolidinyl]hexanoyl, 2,2-dimethyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, 2-methyl-3-[(2, 3, 4, or 5-)thiazolidinyl]propionyl, [2,4-dioxo-(3 or 5-)thiazolidinyl]acetyl, 3-[2-oxo-(3, 4, or 5-)thiazolidinyl]propionyl, 2-[4-oxo-(2, 3, or 5-)thiazolidinyl]propionyl, 4-[5-oxo-(2, 3, or 4-)thiazolidinyl]butyryl, 5-[2,5-dioxo-(3 or 4-)thiazolidinyl]pentanoyl, 6-[2,4,5-trioxo-3-thiazolidinyl]hexanoyl, 2-[4,5-dioxo-(2 or 3-)thiazolidinyl]acetyl, 2,2-dimethyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propionyl, 2-methyl-3-[2,4-dioxo-(3 or 5-)thiazolidinyl]propionyl, 2-[4-oxo-2-isopropylidenehydrazono-(3 or 5-)thiazolidinyl]acetyl, 2-[2-oxo-5-isopropylidenehydrazono-(3 or 4-)thiazolidinyl]acetyl, 2-[2,4-di(isopropylidenehydrazono)-(3 or 5-)thiazolidinyl]acetyl, 3-[2-methylidenehydrazono-(3, 4, or 5-)thiazolidinyl]propionyl, 2-[4-ethylidenehydrazono-(2, 3, or 5-)thiazolidinyl]-propionyl, 4-[5-propylidenehydrazono-(2, 3, or 4-)thiazolidinyl]butyryl, 5-[2,5-di(isopropyl-

idenehydrazono)-(3 or 4-)thiazolidinyl]pentanoyl, 6-[2,4,5-tri(isopropylidenehydrazono)-3-thiazolidinyl]-hexanoyl, 2-[4,5-di(isopropylidenehydrazono)-(2 or 3-)thiazolidinyl]acetyl, 2,2-dimethyl-3-[4-butylidenehydrazono-(2, 3, or 5-)thiazolidinyl]-propionyl, 2-methyl-3-[5-pentylidene-(2, 3, or 4-)thiazolidinyl]propionyl, 2-(hexylidenehydrazono)-(3, 4, or 5-)thiazolidinylacetyl groups.

Examples of the lower alkyl group which may have a substituent selected from the group consisting of a hydroxyl group and a halogen atom include, in addition to the above described lower alkyl groups, linear or branched alkyl groups having 1 to 6 carbon atoms which may have 1 to 3 substituents selected from the group consisting of a hydroxy group and a halogen atom such as hydroxymethyl, 2-hydroxyethyl, 1-hydroxyethyl, 3-hydroxypropyl, 2,3-dihydroxypropyl, 4-hydroxybutyl, 1,1-dimethyl-2-hydroxyethyl, 5,5,4-trihydroxypentyl, 5-hydroxypentyl, 6-hydroxyhexyl, 1-hydroxyisopropyl, 2-methyl-3-hydroxypropyl, trifluoromethyl, trichloromethyl, chloromethyl, bromomethyl, fluoromethyl, iodomethyl, difluoromethyl, dibromomethyl, 2-chloroethyl, 2,2,2-trifluoroethyl, 2,2,2-trichloroethyl, 3-chloropropyl, 2,3-dichloropropyl, 4,4,4-trichlorobutyl, 4-fluorobutyl, 5-chloropentyl, 3-chloro-2-methylpropyl, 5-bromohexyl, 5,6-dibromohexyl, 2-hydroxy-3-fluoropropyl, 2,2-dichloro-3-hydroxybutyl groups.

Examples of the phenyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a carbamoyl group which may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group, a lower alkoxycarbonyl group, a carboxy group, a cyano group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, a benzoyl group which may have a halogen atom as a substituent on the phenyl ring, a phenyl lower alkyl group which may have a halogen atom as a substituent on the phenyl ring, and a hydroxyl group include phenyl groups which may be substituted on the phenyl group with 1 to 3 groups selected from the group consisting of a carbamoyl group which may have 1 or 2 groups selected from the group consisting of an alkoxyalkyl group of the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms and a linear or branched alkyl group having 1 to 6 carbon atoms, a linear or branched alkoxycarbonyl group having 1 to 6 carbon atoms, a carboxy group, a cyano group, a phenyl group, a halogen atom, a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, a benzoyl group which may have 1 to 3

halogen atoms as substituents on the phenyl ring, a phenylalkyl group which may have 1 to 3 halogen atoms as substituents on the phenyl ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, and a hydroxyl group such as phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 2-ethylphenyl, 3-ethylphenyl, 4-ethylphenyl, 4-isopropylphenyl, 3-butylphenyl, 4-pentylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 3,4-diethylphenyl, 2,4-dimethylphenyl, 2,3-dimethylphenyl, 2,5-dimethylphenyl, 2,6-dimethylphenyl, 3,4,5-trimethylphenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 4-isopropoxyphenyl, 3-butoxyphenyl, 4-pentyloxyphenyl, 4-hexyloxyphenyl, 3,4-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 2-trifluoromethoxyphenyl, 3-trifluoromethoxyphenyl, 4-trifluoromethoxyphenyl, 2-(bromomethoxy)phenyl, 3-(2-chloroethoxy)phenyl, 4-(2,3-dichloropropoxy)phenyl, 4-(4-fluorobutoxy)phenyl, 3-(5-chloropentyloxy)phenyl, 4-(5-bromohexyloxy)phenyl, 4-(5,6-dibromohexyloxy)phenyl, 3,4-di(trifluoromethoxy)phenyl, 3,4-di(4,4,4-trichlorobutoxy)phenyl, 2,4-di(3-chloro-2-methoxypropyl)phenyl, 2,5-di(3-chloropropoxy)phenyl, 2,6-di(2,2,2-trifluoroethoxy)phenyl, 3,4,5-tri(trifluoromethoxy)phenyl, 4-(2,2,2-

trichloroethoxy)phenyl, 2-methyl-4-trifluoromethoxyphenyl, 3-ethyl-4-trichloromethoxyphenyl, 2-methoxy-4-trifluoromethoxyphenyl, 3-ethoxy-4-trichloromethoxyphenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-(bromomethyl)phenyl, 3-(2-chloroethyl)phenyl, 4-(2,3-dichloropropyl)phenyl, 4-(4-fluorobutyl)phenyl, 3-(5-chloropentyl)phenyl, 4-(5-bromohexyl)phenyl, 4-(5,6-dibromohexyl)phenyl, 3,4-di(trifluoromethyl)phenyl, 3,4-di(4,4,4-trichlorobutyl)phenyl, 2,4-di(3-chloro-2-methylpropyl)phenyl, 2,5-di(3-chloropropyl)phenyl, 2,6-di(2,2,2-trifluoroethyl)phenyl, 3,4,5-tri(trifluoromethyl)phenyl, 4-(2,2,2-trichloroethyl)phenyl, 2-methyl-4-trifluoromethylphenyl, 3-ethyl-4-trichloromethylphenyl, 2-methoxycarbonylphenyl, 3-methoxycarbonylphenyl, 4-methoxycarbonylphenyl, 2-ethoxycarbonylphenyl, 3-ethoxycarbonylphenyl, 4-ethoxycarbonylphenyl, 4-isopropoxycarbonylphenyl, 3-butoxycarbonylphenyl, 4-tert-butoxycarbonylphenyl, 4-pentyloxycarbonylphenyl, 4-hexyloxycarbonylphenyl, 3,4-dimethoxycarbonylphenyl, 3,4-diethoxycarbonylphenyl, 2,4-dimethoxycarbonylphenyl, 2,5-diethoxycarbonylphenyl, 2,6-dimethoxycarbonylphenyl, 3,4,5-triethoxycarbonylphenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 3,4-dicyanophenyl, 3,5-dicyanophenyl, 2,4-dicyanophenyl, 2,5-dicyanophenyl, 2,6-dicyanophenyl, 3,4,5-tricyanophenyl, 2-phenylphenyl, 3-

phenylphenyl, 4-phenylphenyl, 3,4-diphenylphenyl, 3,5-diphenylphenyl, 2,4-diphenylphenyl, 2,5-diphenylphenyl, 2,6-diphenylphenyl, 3,4,5-triphenylphenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,5-dichlorophenyl, 3,4-dichlorophenyl, 2,6-dichlorophenyl, 3,5-dichlorophenyl, 2,4,6-trichlorophenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2,5-difluorophenyl, 2,4-difluorophenyl, 3,4-difluorophenyl, 3,5-difluorophenyl, 2,6-difluorophenyl, 2,4,6-trifluorophenyl, 2-bromophenyl, 3-bromophenyl, 4-bromophenyl, 2-iodophenyl, 3-iodophenyl, 4-iodophenyl, 2,3-dibromophenyl, 2,4-diiodophenyl, 2-hydroxyphenyl, 3-hydroxyphenyl, 4-hydroxyphenyl, 3,4-dihydroxyphenyl, 3,5-dihydroxyphenyl, 2,4-dihydroxyphenyl, 2,5-dihydroxyphenyl, 2,6-dihydroxyphenyl, 3,4,5-trihydroxyphenyl, 3-benzylphenyl, 2-(2-phenylethyl)phenyl, 4-(1-phenylethyl)phenyl, 2-(3-phenylpropyl)phenyl, 3-(4-phenylbutyl)phenyl, 4-(5-phenylpentyl)phenyl, 2-(6-phenylhexyl)phenyl, 4-(1,1-dimethyl-2-phenylethyl)phenyl, 3-(2-methyl-3-phenylpropyl)phenyl, 2-(4-fluorobenzyl)phenyl, 2-methyl-5-chlorophenyl, 2-methoxy-5-chlorophenyl, 4-(4-fluorobenzoyl)phenyl, 4-(4-fluorobenzyl)phenyl, 3-(2-chlorobenzyl)phenyl, 4-(3-chlorobenzyl)phenyl, 2-(4-chlorobenzyl)phenyl, 3-[2-(4-fluorophenyl)ethyl]phenyl, 4-[2-(4-chlorophenyl)ethyl]phenyl, 2-(3,4-dibromobenzyl)phenyl, 3-(3,4-diiodobenzyl)phenyl, 4-

(2,4-difluorobenzyl)phenyl, 2-(2,5-dichlorobenzyl)-phenyl, 3-(2,6-dichlorobenzyl)phenyl, 4-(3,4,5-trifluorobenzyl)phenyl, 2-[3-(4-chlorophenyl)propyl]phenyl, 3-[1-(2-bromophenyl)ethyl]phenyl, 4-[4-(3-fluorophenyl)butyl]phenyl, 2-[5-(4-iodophenyl)pentyl]phenyl, 3-[6-(4-chlorophenyl)hexyl]phenyl, 2-[1,1-dimethyl-2-(3-fluorophenyl)ethyl]phenyl, 4-[2-methyl-3-(4-chlorophenyl)propyl]phenyl, 2,4-dibenzylphenyl, 2,4,6-tribenzylphenyl, 2-chloro-4-cyanophenyl, 3-hydroxy-4-phenylphenyl, 3-ethoxycarbonyl-2-benzoylphenyl, 2-benzyl-4-methyl-6-methoxyphenyl, 4-[(2-methoxyethyl)carbamoyl]phenyl, 3-(N-ethyl-N-isopropylcarbamoyl)phenyl, 4-dimethylcarbamoylphenyl, 2-carboxyphenyl, 3-carboxyphenyl, 4-carboxyphenyl, groups.

Examples of the phenyl group which has a lower alkylenedioxy group as a substituent on the phenyl ring include phenyl groups which has a linear or branched alkylenedioxy group having 1 to 4 carbon atom as a substituent on the phenyl ring such as a 3,4-methylenedioxyphenyl group, 3,4-trimethylenedioxyphenyl group, 2,3-ethylenedioxyphenyl group, 2,3-tetramethylenedioxyphenyl group, 2,3-methylenedioxyphenyl group, 3,4-ethylenedioxyphenyl group, and 2,3-trimethylenedioxyphenyl group.

Examples of the naphthyl lower alkyl group

include naphthylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (1 or 2-)naphthylmethyl group, 2-[(1 or 2-)naphthyl]ethyl group, 1-[(1 or 2-)naphthyl]ethyl group, 3-[(1 or 2-)naphthyl]propyl group, 4-[(1 or 2-)naphthyl]butyl group, 5-[(1 or 2-)naphthyl]pentyl group, 6-[(1 or 2-)naphthyl]hexyl group, 1,1-dimethyl-2-[(1 or 2-)naphthyl]ethyl group, and 2-methyl-3-[(1 or 2-)naphthyl]propyl group.

Examples of the phenoxy group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a cyano group, a lower alkyl group which may have a halogen atom as a substituent, and a lower alkoxy group which may have a halogen atom as a substituent include phenoxy groups which may be substituted on the phenyl group with 1 to 3 groups selected from the group consisting of a cyano group, a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, and a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as phenoxy, 2-methylphenoxy, 3-methylphenyl, 4-methylphenoxy, 2-ethylphenoxy, 3-ethylphenoxy, 4-ethylphenoxy, 4-isopropylphenoxy, 3-butylphenoxy, 4-pentylphenoxy, 4-hexylphenoxy, 3,4-dimethylphenoxy, 3,4-diethylphenoxy, 2,4-dimethylphenoxy, 2,5-dimethylphenoxy, 2,6-dimethylphenoxy, 3,4,5-trimethylphenoxy, 2-

methoxyphenoxy, 3-methoxyphenoxy, 4-methoxyphenoxy, 2-ethoxyphenoxy, 3-ethoxyphenoxy, 4-ethoxyphenoxy, 4-isopropoxyphenoxy, 3-butoxyphenoxy, 4-pentyloxyphenoxy, 4-hexyloxyphenoxy, 3,4-dimethoxyphenoxy, 3,4-diethoxyphenoxy, 2,4-dimethoxyphenoxy, 2,5-dimethoxyphenoxy, 2,6-dimethoxyphenoxy, 3,4,5-trimethoxyphenoxy, 2-trifluoromethoxyphenoxy, 3-trifluoromethoxyphenoxy, 4-trifluoromethoxyphenoxy, 2-(bromomethoxy)phenoxy, 3-(2-chloroethoxy)phenoxy, 4-(2,3-dichloropropoxy)phenoxy, 4-(4-fluorobutoxy)phenoxy, 3-(5-chloropentyloxy)phenoxy, 4-(5-bromohexyloxy)phenoxy, 4-(5,6-dibromohexyloxy)phenoxy, 3,4-di(trifluoromethoxy)phenoxy, 3,4-di(4,4,4-trichlorobutoxy)phenoxy, 2,4-di(3-chloro-2-methoxypropyl)phenoxy, 2,5-di(3-chloropropoxy)phenoxy, 2,6-di(2,2,2-trifluoroethoxy)phenoxy, 3,4,5-tri(trifluoromethoxy)phenoxy, 4-(2,2,2-trichloroethoxy)phenoxy, 2-methyl-4-trifluoromethoxyphenoxy, 3-ethyl-4-trichloromethoxyphenoxy, 2-methoxy-4-trifluoromethoxyphenoxy, 3-ethoxy-4-trichloromethoxyphenoxy, 2-trifluoromethylphenoxy, 3-trifluoromethylphenoxy, 4-trifluoromethylphenoxy, 2-(bromomethyl)phenoxy, 3-(2-chloroethyl)phenoxy, 4-(2,3-dichloropropyl)phenoxy, 4-(4-fluorobutyl)phenoxy, 3-(5-chloropentyl)phenoxy, 4-(5-bromohexyl)phenoxy, 4-(5,6-dibromohexyl)phenoxy, 3,4-di(trifluoromethyl)phenoxy,

3,4-di(4,4,4-trichlorobutyl)phenoxy, 2,4-di(3-chloro-2-methylpropyl)phenoxy, 2,5-di(3-chloropropyl)phenoxy, 2,6-di(2,2,2-trifluoroethyl)phenoxy, 3,4,5-tri(trifluoromethyl)phenoxy, 4-(2,2,2-trichloroethyl)phenoxy, 2-methyl-4-trifluoromethylphenoxy, 3-ethyl-4-trichloromethylphenoxy, 2-cyanophenoxy, 3-cyanophenoxy, 4-cyanophenoxy, 3,5-dicyanophenoxy, 3,4-dicyanophenoxy, 2,3-dicyanophenoxy, 2,4-dicyanophenoxy, 2,5-dicyanophenoxy, 2,6-dicyanophenoxy, 3,4,5-tricyanophenoxy, 2-cyano-4-methylphenoxy, 3-cyano-4-methoxyphenoxy, 3-cyano-5-trifluoromethylphenoxy, 4-cyano-3-trifluoromethoxyphenoxy groups.

Examples of the phenyl lower alkoxy group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, and a lower alkyoxy group which may have a halogen atom as a substituent include, in addition to the above described phenyl lower alkoxy groups, phenylalkoxy groups which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a halogen atom, a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, and a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, and of which the alkoxy moiety is a

linear or branched alkoxy group having 1 to 6 carbon atoms such as 2,5-difluorobenzyloxy, 2,4-difluorobenzyloxy, 3,4-difluorobenzyloxy, 3,5-difluorobenzyloxy, 2,6-difluorobenzyloxy, 3-trifluoromethylbenzyloxy, 2-trifluoromethylbenzyloxy, 4-trifluoromethylbenzyloxy, 3,4-dimethoxybenzyloxy, 3,5-dimethoxybenzyloxy, 2-chlorobenzyloxy, 3-chlorobenzyloxy, 4-chlorobenzyloxy, 2-methylbenzyloxy, 3-methylbenzyloxy, 4-methylbenzyloxy, 3,4-dimethylbenzyloxy, 2,3-dimethylbenzyloxy, 2-methoxybenzyloxy, 3-methoxybenzyloxy, 4-methoxybenzyloxy, 2,3-dichlorobenzyloxy, 2,4-dichlorobenzyloxy, 2,5-dichlorobenzyloxy, 3,4-dichlorobenzyloxy, 2,6-dichlorobenzyloxy, 4-fluorobenzyloxy, 3-fluorobenzyloxy, 2-fluorobenzyloxy, 3-trifluoromethoxybenzyloxy, 4-trifluoromethoxybenzyloxy, 2-trifluoromethoxybenzyloxy, 4-tert-butylbenzyloxy, 4-ethylbenzyloxy, 4-isopropylbenzyloxy, 4-methoxy-3-chlorobenzyloxy, 2-(4-methoxyphenyl)ethoxy, 2-(4-fluorophenyl)ethoxy, 2-(4-chlorophenyl)ethoxy, 2-(3-methoxyphenyl)ethoxy, 2-(4-methylphenyl)ethoxy, 3-methyl-4-chlorobenzyloxy, 4-(4-methoxyphenyl)butoxy, 2-(4-methylphenyl)ethoxy, 4-tert-butoxybenzyloxy, 3-chloro-6-methoxybenzyloxy, 4-methoxy-3-methylbenzyloxy, 2-(2-fluorophenyl)ethoxy, 1-(3-bromophenyl)ethoxy, 3-(4-iodophenyl)propoxy, 4-(2-bromophenyl)butoxy, 5-(3-chlorophenyl)pentyloxy, 6-(4-bromophenyl)hexyloxy, 1,1-dimethyl-2-(2,4-

dichlorophenyl)ethoxy, 2-methyl-3-(2,4,6-trifluorophenyl)propoxy, 2-(2-ethylphenyl)ethoxy, 1-(3-propylphenyl)ethoxy, 3-(4-butylphenyl)propoxy, 4-(2-pentylphenyl)butoxy, 5-(3-hexylphenyl)pentyloxy, 6-(4-trifluoromethylphenyl)hexyloxy, 1,1-dimethyl-2-(2,4-dimethylphenyl)ethoxy, 2-methyl-3-[2,4,6-tri(trifluoromethyl)phenyl]propoxy, 2-(2-ethoxyphenyl)ethoxy, 1-(3-propoxyphenyl)ethoxy, 3-(4-butoxyphenyl)propoxy, 4-(2-pentyloxyphenyl)butoxy, 5-(3-hexyloxyphenyl)pentyloxy, 6-(4-trifluoromethoxyphenyl)hexyloxy, 1,1-dimethyl-2-(2,4-dimethoxyphenyl)ethoxy, 2-methyl-3-[2,4,6-tri(trifluoromethoxy)phenyl]propoxy groups.

Examples of the 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring include 1,2,3,4-tetrahydronaphthyl substituted alkyl groups which may have 1 to 5 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the 1,2,3,4-tetrahydronaphthalene ring, and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthylmethyl, 2-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]ethyl, 1-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]ethyl, 3-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]propyl, 4-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]butyl, 5-[(1, 2, 5, or 6-)1,2,3,4-

tetrahydronaphthyl]pentyl, 6-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]hexyl, 1,1-dimethyl-2-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]ethyl, 2-methyl-3-[(1, 2, 5, or 6-)1,2,3,4-tetrahydronaphthyl]propyl, 1,1,4,4-tetramethyl(2, 3, 5, or 6-)1,2,3,4-tetrahydronaphthylmethyl, 1,1,4,4,5-pentamethyl(2,3,6,7, or 8-)1,2,3,4-tetrahydronaphthylmethyl, 1,4,4-trimethyl(2, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthylmethyl, 5,6-dimethyl(2, 3, 7, or 8-)1,2,3,4-tetrahydronaphthylmethyl, 2-[1-methyl-(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]ethyl, 1-[2-ethyl-(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]ethyl, 3-[3-propyl-(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]propyl, 4-[(4-butyl-1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]butyl, 5-[5-pentyl-(1, 2, 3, 4, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]pentyl, 6-[6-hexyl-(1, 2, 3, 4, 5, 7, or 8-)1,2,3,4-tetrahydronaphthyl]hexyl, 1,1-dimethyl-2-[1,7-dimethyl-(1, 2, 3, 4, 5, 6, or 8-)1,2,3,4-tetrahydronaphthyl]ethyl, 2-methyl-3-[1,1,4-trimethyl-(2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydronaphthyl]propyl groups.

Examples of the piperidinyl group which may have 1 to 3 lower alkyl groups as substituents on the piperidine ring include piperidinyl group which may have 1 to 3 linear or branched alkyl groups having 1 to

6 carbon atoms as substituents on the piperidine ring such as (1, 2, 3, or 4-)piperidinyl, 1-methyl-(2, 3, or 4-)piperidinyl, 1-ethyl-(2, 3, or 4-)piperidinyl, 1-propyl-(2, 3, or 4-)piperidinyl, 1-isopropyl-(2, 3, or 4-)piperidinyl, 1-butyl-(2, 3, or 4-)piperidinyl, 1-isobutyl-(2, 3, or 4-)piperidinyl, 1-tert-butyl-(2, 3, or 4-)piperidinyl, 1-pentyl-(2, 3, or 4-)piperidinyl, 1-hexyl-(2, 3, or 4-)piperidinyl, 1,2-dimethyl-(3, 4, 5, or 6-)piperidinyl, 1,2,6-trimethyl-(3, 4, or 5-)piperidinyl groups.

Examples of the quinolyl lower alkyl group include quinolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (2,3,4,5,6,7 or 8-)quinolyl-methyl group, 2-[(2,3,4,5,6,7 or 8-)quinolyl]ethyl group, 1-[(2,3,4,5,6,7 or 8-)quinolyl]ethyl group, 3-[(2,3,4,5,6,7 or 8-)quinolyl]propyl group, 4-[(2,3,4,5,6,7 or 8-)quinolyl]butyl group, 5-[(2,3,4,5,6,7 or 8-)quinolyl]pentyl group, and 6-[(2,3,4,5,6,7 or 8-)quinolyl]hexyl group.

Examples of the 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group include 1,2,3,4-tetrazolylalkyl groups which may have, on the tetrazole ring, a substituent selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms and of which the alkyl

moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, the 1,2,3,4-tetrazolylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms, such as [(1 or 5-)1,2,3,4-tetrazolyl]methyl, 2-[(1 or 5-)1,2,3,4-tetrazolyl]ethyl, 1-[(1 or 5-)1,2,3,4-tetrazolyl]ethyl, 3-[(1 or 5-)1,2,3,4-tetrazolyl]propyl, 4-[(1 or 5-)1,2,3,4-tetrazolyl]butyl, 5-[(1 or 5-)1,2,3,4,-tetrazolyl]pentyl, 6-[(1 or 5-)1,2,3,4-tetrazolyl]hexyl, 5-[1-methyl-5-(1,2,3,4-tetrazolyl)]pentyl, 6-[1-methyl-5-(1,2,3,4-tetrazolyl)]hexyl, 5-methyl-1-(1,2,3,4-tetrazolyl)methyl, 2-[5-ethyl-1-(1,2,3,4-tetrazolyl]hexyl, 1,1-dimethyl-2-[(1 or 5-)1,2,3,4-tetrazolyl)]ethyl, 2-methyl-3-[(1 or 5-)1,2,3,4-tetrazolyl]propyl, [1-methyl-5-(1,2,3,4-tetrazolyl)]methyl, [1-ethyl-5-(1,2,3,4-tetrazolyl)]methyl, 2-[1-propyl-5-(1,2,3,4-tetrazolyl)]ethyl, 1-[1-butyl-5-(1,2,3,4-tetrazolyl)]ethyl, 3-[1-pentyl-5-(1,2,3,4-tetrazolyl)]propyl, 3-[5-propyl-1-(1,2,3,4-tetrazolyl)]propyl, 4-[5-butyl-1-(1,2,3,4-tetrazolyl)]butyl, 5-[5-pentyl-1-(1,2,3,4-tetrazolyl)]pentyl, 6-[5-hexyl-1-(1,2,3,4-tetrazolyl)]hexyl, [1-ethyl-5-(1,2,3,4-tetrazolyl)]methyl, [1-benzyl-5-(1,2,3,4-tetrazolyl)]methyl, 1-[(2-phenylethyl)-5-(1,2,3,4-tetrazolyl)]methyl, 2-[1-(3-phenylpropyl)-5-(1,2,3,4-

tetrazolyl)]ethyl, 1-[1-(4-phenylbutyl)-5-(1,2,3,4-tetrazolyl)]ethyl, 3-[1-(5-phenylpentyl)-5-(1,2,3,4-tetrazolyl)]propyl, 4-[1-(6-phenylhexyl)-5-(1,2,3,4-tetrazolyl)]butyl, 5-[1-(1,1-dimethyl-2-phenylethyl)-5-(1,2,3,4-tetrazolyl)]methyl, 6-[1-(2-methyl-3-phenylpropyl)-5-(1,2,3,4-tetrazolyl)]hexyl, 5-benzyl-1-(1,2,3,4-tetrazolyl)methyl, 2-[5-(1-phenylethyl)-1-(1,2,3,4-tetrazolyl)]ethyl, 3-[5-(3-phenylpropyl)-1-(1,2,3,4-tetrazolyl)]propyl, 4-[5-(4-phenylbutyl)-1-(1,2,3,4-tetrazolyl)]butyl, 5-[5-(5-phenylpentyl)-1-(1,2,3,4-tetrazolyl)]pentyl, 6-[5-(6-phenylhexyl)-1-(1,2,3,4-tetrazolyl)]hexyl groups.

Examples of the thiazolyl lower alkyl group which may have a phenyl group as a substituent on the thiazole ring include thiazolylalkyl groups which may have 1 or 2 phenyl groups as substituents on the thiazole ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(2, 4, or 5-)thiazolyl]methyl, 2-[(2, 4, or 5-)thiazolyl]ethyl, 1-[(2, 4, or 5-)thiazolyl]ethyl, 3-[(2, 4, or 5-)thiazolyl]propyl, 4-[(2, 4, or 5-)thiazolyl]butyl, 5-[(2, 4, or 5-)thiazolyl]pentyl, 6-[(2, 4, or 5-)thiazolyl]hexyl, 1,1-dimethyl-2-[(2, 4, or 5-)thiazolyl]ethyl, 2-methyl-3-[(2, 4, or 5-)thiazolyl]propyl, [2-phenyl-(4 or 5-)thiazolyl]-methyl, 2-[4-phenyl-(2 or 5-)thiazolyl]ethyl, 1-[5-phenyl-(2 or 4-)thiazolyl]ethyl, 3-[2-phenyl-(2 or 5-)thiazolyl]propyl, 4-(2,4-diphenyl-5-thiazolyl)butyl,

5-(2,5-diphenyl-4-thiazolyl)pentyl, 6-(4,5-diphenyl-2-thiazolyl)hexyl, 1,1-dimethyl-2-[2-phenyl-(4 or 5-)thiazolyl]ethyl, 2-methyl-3-[4-phenyl-(2 or 5-)thiazolyl]propyl, [4-phenyl-(2 or 5-)thiazolyl]-methyl, [5-phenyl-(2 or 4-)thiazolyl]methyl, (2,4-diphenyl-5-thiazolyl)methyl, (2,5-diphenyl-4-thiazolyl)methyl, (4,5-diphenyl-2-thiazolyl)methyl groups.

Examples of the benzoyl lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxy group and a halogen atom include benzoylalkyl groups which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkoxy group having 1 to 6 carbon atoms and a halogen atom such as benzoylmethyl, 2-benzoylethyl, 1-benzoylethyl, 3-benzoylpropyl, 4-benzoylbutyl, 5-benzoylpentyl, 6-benzoylhexyl, 1,1-dimethyl-2-benzoylethyl, 2-methyl-3-benzoylpropyl, 4-fluorobenzoylmethyl, 2-chlorobenzoylmethyl, 3-chlorobenzoylmethyl, 4-chlorobenzoylmethyl, 2-(4-fluorobenzoyl)ethyl, 2-(4-chlorobenzoyl)ethyl, 3,4-dibromobenzoylmethyl, 3,4-diiodobenzoylmethyl, 2,4-difluorobenzoylmethyl, 2,5-dichlorobenzoylmethyl, 2,6-dichlorobenzoylmethyl, 3,4,5-trifluorobenzoylmethyl, 3-(4-chlorobenzoyl)propyl, 1-(2-bromobenzoyl)ethyl, 4-(3-fluorobenzoyl)butyl, 5-(4-iodobenzoyl)pentyl, 6-(4-chlorobenzoyl)hexyl, 1,1-dimethyl-2-(3-

fluorobenzoyl)ethyl, 2-methyl-3-(4-chlorobenzoyl)propyl, 2-methoxybenzoylmethyl, 2-(3-methoxybenzoyl)ethyl, 2-(4-methoxybenzoyl)ethyl, 4-methoxybenzoylmethyl, 1-(2-ethoxybenzoyl)ethyl, 3-(3-ethoxybenzoyl)propyl, 4-(4-ethoxybenzoyl)butyl, 5-(4-isopropoxybenzoyl)pentyl, 6-(3-butoxybenzoyl)hexyl, 1,1-dimethyl-2-(4-pentyloxybenzoyl)ethyl, 2-methyl-3-(4-hexyloxybenzoyl)propyl, 3,4-dimethoxybenzoylmethyl, 3,4-diethoxybenzoylmethyl, 2,4-dimethoxybenzoylmethyl, 2,5-dimethoxybenzoylmethyl, 2,6-dimethoxybenzoylmethyl, 3,4,5-trimethoxybenzoylmethyl, 2-chloro-4-methoxybenzoylmethyl, 3-fluoro-5-ethoxybenzoylmethyl groups.

Examples of the piperidinyl lower alkyl group which may have a lower alkyl group as a substituent on the piperidine ring include piperidinylalkyl groups which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms on the piperidine ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(1, 2, 3, or 4-)piperidinyl]methyl, 2-[(1, 2, 3, or 4-)piperidinyl]-ethyl, 1-[(1, 2, 3, or 4-)piperidinyl]ethyl, 3-[(1, 2, 3, or 4-)piperidinyl]propyl, 4-[(1, 2, 3, or 4-)piperidinyl]butyl, 5-[(1, 2, 3, or 4-)piperidinyl]pentyl, 6-[(1, 2, 3, or 4-)piperidinyl]hexyl, 1,1-dimethyl-2-[(1, 2, 3, or 4-)piperidinyl]ethyl, 2-methyl-3-[(1, 2, 3, or 4-)piperidinyl]propyl, [1-methyl-(2, 3, or

4-)piperidinyl]methyl, 2-[1-ethyl-(2, 3, or 4-)piperidinyl]ethyl, 1-[4-propyl-(1, 2, or 3-)piperidinyl]ethyl, 3-[3-isopropyl-(1, 2, 4, 5, or 6-)piperidinyl]propyl, 4-[2-butyl-(1, 3, 4, 5, or 6-)piperidinyl]butyl, 5-[1-isobutyl-(2, 3, or 4-)piperidinyl]pentyl, 6-[1-tert-butyl-(2, 3, or 4-)piperidinyl]hexyl, 1,1-dimethyl-2-[4-pentyl-(1, 2, or 3-)piperidinyl]ethyl, 2-methyl-3-[1-hexyl-(2, 3, or 4-)piperidinyl]propyl, [1,2-dimethyl-(3, 4, 5, or 6-)piperidinyl]methyl, [1,2,6-trimethyl-(3, 4, or 5-)piperidinyl]methyl groups.

Examples of the imidazolyl group which may have 1 to 3 phenyl groups as substituents on the imidazole ring include imidazolyl groups which may have 1 to 3 phenyl groups as substituents on the imidazole ring such as a (1,2,4 or 5-)imidazolyl group, 1-phenyl-(2,4 or 5-)imidazolyl group, 2-phenyl-(1,4 or 5-)imidazolyl group, 4-phenyl-(1,2 or 5-)imidazolyl group, 5-phenyl-(1,2 or 4-)imidazolyl group, 1,2-diphenyl-(4 or 5-)imidazolyl group, 2,4-diphenyl-(1 or 5-)imidazolyl group, 4,5-diphenyl-(1 or 2-)imidazolyl group, 2,5-diphenyl-(1 or 4-)imidazolyl group, and 2,4,5-triphenyl-1-imidazolyl group.

Examples of the benzimidazolyl group which may have 1 to 3 lower alkyl groups as substituents on the benzimidazole ring include benzimidazolyl group which may have 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms as substituents on the

benzimidazole ring such as (1, 2, 4, 5, 6, or 7-)benzimidazolyl, 1-methyl-(2, 4, 5, 6, or 7-)benzimidazolyl, 2-ethyl-(1, 4, 5, 6, or 7-)benzimidazolyl, 4-propyl-(1, 2, 5, 6, or 7-)benzimidazolyl, 5-butyl-(1, 2, 4, 6, or 7-)benzimidazolyl, 6-pentyl-(1, 2, 4, 5, or 7-)benzimidazolyl, 7-hexyl-(1, 2, 4, 5, or 6-)benzimidazolyl, 1-ethyl-(2, 4, 5, 6, or 7-)benzimidazolyl]hexyl, 1-butyl-(2, 4, 5, 6, or 7-)benzimidazolyl, 1-isopropyl-(1, 2, 4, 5, 6, or 7-)benzimidazolyl, 1,2-dimethyl-(4, 5, 6, or 7-)benzimidazolyl, 1-methyl-4-ethyl-(2, 5, 6, or 7-)benzimidazolyl, 1-propyl-5-methyl-(2, 4, 6, or 7-)benzimidazolyl, 1,2,5-trimethyl-(2, 4, 5, 6, or 7-)benzimidazolyl groups.

Examples of the pyridyl lower alkoxy group include pyridylalkoxy group of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (2,3 or 4-)pyridylmethoxy group, 2-[(2,3 or 4-)pyridyl]ethoxy group, 1-[(2,3 or 4-)pyridyl]ethoxy group, 3-[(2,3 or 4-)pyridyl]propoxy group, 4-[(2,3 or 4-)pyridyl]butoxy group, 1-1-dimethyl-2-[(2,3 or 4-)pyridyl]ethoxy group, 5-[(2,3 or 4-)pyridyl]pentyloxy group, 6-[(2,3 or 4-)pyridyl]hexyloxy group, 1-[(2,3 or 4-)pyridyl]isopropoxy group, and 2-methyl-3-[(2,3 or 4-)pyridyl]propoxy group.

Examples of the 1,2,3,4-tetrahydroquinolyl

lower alkyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring include 1,2,3,4-tetrahydroquinolylalkyl groups which may have 1 or 2 oxo groups as substituents on the tetrahydroquinoline ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolylmethyl, 2-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]ethyl, 1-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]ethyl, 3-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]propyl, 4-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]butyl, 5-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]pentyl, 6-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]hexyl, 1,1-dimethyl-2-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]ethyl, 2-methyl-3-[(1, 2, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]propyl, [2-oxo-(1, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]methyl, [4-oxo-(1, 2, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]methyl, [2,4-dioxo-(1, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]methyl, 2-[2-oxo-(1, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]ethyl, 3-[4-oxo-(1, 2, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]propyl, 4-[2,4-dioxo-(1, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]butyl, 5-[2-oxo-(1, 3, 4, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]pentyl, 6-[4-oxo-(1,

2, 3, 5, 6, 7, or 8-)1,2,3,4-tetrahydroquinolyl]hexyl groups.

Examples of the 1,3,4-oxadiazolyl lower alkyl group which may have an oxo group as a substituent on the oxadiazole ring include 1,3,4-oxadiazolylalkyl groups which may have an oxo group as a substituent on the oxadiazole ring and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as (2 or 5-)1,3,4-oxadiazolylmethyl, 2-[(2 or 5-)1,3,4-oxadiazolyl]ethyl, 1-[(2 or 5-)1,3,4-oxadiazolyl]ethyl, 3-[(2 or 5-)1,3,4-oxadiazolyl]propyl, 4-[(2 or 5-)1,3,4-oxadiazolyl]butyl, 5-[(2 or 5-)1,3,4-oxadiazolyl]pentyl, 6-[(2 or 5-)1,3,4-oxadiazolyl]hexyl, 1,1-dimethyl-2-[(2 or 5-)1,3,4-oxadiazolyl]ethyl, 2-methyl-3-[(2 or 5-)1,3,4-oxadiazolyl]propyl, 2-oxo-[(3 or 5-)1,3,4-oxadiazolyl]methyl, 5-oxo-[(2 or 3-)1,3,4-oxadiazolyl]methyl, 2-[2-oxo-(3 or 5-)(1,3,4-oxadiazolyl)]ethyl, 1-[5-oxo-(2 or 3-)1,3,4-oxadiazolyl]ethyl, 3-[(2 or 5-)1,3,4-oxadiazolyl]propyl, 4-[2-oxo(3 or 5-)1,3,4-oxadiazolyl]butyl, 5-[5-oxo(2 or 3-)1,3,4-oxadiazolyl]pentyl, 6-[2-oxo(3 or 5-)1,3,4-oxadiazolyl]hexyl, 1,1-dimethyl-2-[5-oxo(2 or 3-)1,3,4-oxadiazolyl]ethyl, 2-methyl-3-[2-oxo(3 or 5-)1,3,4-oxadiazolyl]propyl groups.

Examples of the thienyl lower alkyl group

include thienylalkyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a (2 or 3-)thienylmethyl group, 2-[(2 or 3-)thienyl]ethyl group, 1-[(2 or 3-)thienyl]ethyl group, 3-[(2 or 3-)thienyl]propyl group, 4-[(2 or 3-)thienyl]butyl group, 5-[(2 or 3-)thienyl]pentyl group, 6-[(2 or 3-)thienyl]hexyl group, 1,1-dimethyl-2-[(2 or 3-)thienyl]ethyl group, and 2-methyl-3-[(2 or 3-)thienyl]propyl group.

Examples of the pyrimidinylcarbonyl group which may have an oxo group as a substituent on the pyrimidine ring include pyrimidinylcarbonyl groups which may have 1 to 3 oxo groups as substituents on the pyrimidine ring such as a (2,3,4 or 6-)pyrimidinylcarbonyl group, 2,6-dioxo-(1,3,4 or 5-)pyrimidinylcarbonyl group, 2-oxo-(1,3,4,5 or 6-)pyrimidinylcarbonyl group, 6-oxo-(1,2,3,4 or 5-)pyrimidinylcarbonyl group, 4-oxo-(1,2,3,4 or 6-)pyrimidylcarbonyl group, 2,4-dioxo-(1,3,4 or 6-)pyrimidinylcarbonyl group, and 2,4,6-trioxo-(1,3 or 5-)pyrimidylcarbonyl group.

Examples of the lower alkoxy lower alkoxy group include linear or branched alkoxy groups having 1 to 6 carbon atoms which may have a linear or branched alkoxy group having 1 to 6 carbon atoms as a substituent such as a methoxymethoxy group, 1-ethoxyethoxy group, 2-methoxyethoxy group, 2-propoxyethoxy group, 3-isopropoxypropoxy group, 4-

butoxybutoxy group, 5-pentyloxypentyloxy group, 6-hexyloxyhexyloxy group, 1,1-dimethyl-2-methoxyethoxy group, 2-methyl-3-ethoxypropoxy group, and 3-methoxypropoxy group.

Examples of the lower alkoxycarbonyl lower alkoxy group include alkoxycarbonylalkoxy groups of which both alkoxy moieties are linear or branched alkoxy groups having 1 to 6 carbon atoms such as methoxycarbonylmethoxy, ethoxycarbonylmethoxy, 2-methoxycarbonylethoxy, 2-ethoxycarbonylethoxy, 1-ethoxycarbonylethoxy, 3-methoxycarbonylpropoxy, 3-ethoxycarbonylpropoxy, 4-ethoxycarbonylbutoxy, 5-isopropoxycarbonylpentyloxy, 6-propoxycarbonylhexyloxy, 1,1-dimethyl-2-butoxycarbonylethoxy, 2-methyl-3-tert-butoxycarbonylpropoxy, 2-pentyloxycarbonylethoxy, hexyloxycarbonylmethoxy groups.

Examples of the carboxy lower alkoxy group include carboxyalkoxy groups of which the alkoxy moiety is a linear or branched alkoxy group having 1 to 6 carbon atoms such as a carboxymethoxy group, 2-carboxyethoxy group, 1-carboxyethoxy group, 3-carboxypropoxy group, 4-carboxybutoxy group, 5-carboxypentyloxy group, 6-carboxyhexyloxy group, 1,1-dimethyl-2-carboxyethoxy group, and 2-methyl-3-carboxypropoxy group.

Examples of the phenoxy lower alkanoyl group include phenoxyalkanoyl groups of which the alkanoyl moiety is a linear or branched alkanoyl group having 2

to 6 carbon atoms such as a 2-phenoxyacetyl group, 3-phenoxypropionyl group, 2-phenoxypropionyl group, 4-phenoxybutyryl group, 5-phenoxypentanoyl group, 6-phenoxyhexanoyl group, 2,2-dimethyl-2-phenoxypropionyl group, and 2-methyl-3-phenoxypropionyl group.

Examples of the 1,2,3,4-tetrahydroquinolylcarbonyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring include 1,2,3,4-tetrahydroquinolylcarbonyl groups which may have 1 or 2 oxo groups as substituents on the tetrahydroquinoline ring such as a [(1,3,4,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl]carbonyl group, [2-oxo-(1,3,4,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl]carbonyl group, [4-oxo-(1,2,3,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl]carbonyl group, and [2,4-dioxo-(1,3,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl]carbonyl group.

Examples of the 1,2,3,4-tetrahydroquinolyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring include 1,2,3,4-tetrahydroquinolyl groups which may have 1 or 2 oxo groups as substituents on the tetrahydroquinoline ring such as a (1,2,3,4,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl group, 2-oxo-(1,3,4,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl group, 4-oxo-(1,2,3,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl group, and 2,4-dioxo-(1,3,5,6,7 or 8-)1,2,3,4-tetrahydroquinolyl group.

Examples of the amino group which may have a

lower alkoxycarbonyl group as a substituent include amino groups which may have a linear or branched chain alkoxycarbonyl group having 1 to 6 carbon atoms such as an amino group, methoxycarbonylamino group, ethoxycarbonylamino group, propoxycarbonylamino group, isopropoxycarbonylamino group, butoxycarbonylamino group, tert-butoxycarbonylamino group, pentyloxycarbonylamino group, and hexyloxycarbonylamino group.

Examples of the benzoyl group which may have 1 to 3 lower alkoxy groups as substituents on the phenyl ring include benzoyl groups which may have 1 to 3 linear or branched alkoxy groups having 1 to 6 carbon atoms as substituents on the phenyl ring such as a benzoyl group, 2-methoxybenzoyl group, 3-methoxybenzoyl group, 4-methoxybenzoyl group, 2-ethoxybenzoyl group, 3-ethoxybenzoyl group, 4-ethoxybenzoyl group, 4-isopropoxybenzoyl group, 3-butoxybenzoyl group, 4-pentyloxybenzoyl group, 4-hexyloxybenzoyl group, 3,4-dimethoxybenzoyl group, 3,4-diethoxybenzoyl group, 2,4-dimethoxybenzoyl group, 2,5-dimethoxybenzoyl group, 2,6-dimethoxybenzoyl group, and 3,4,5-trimethoxybenzoyl group.

Examples of the lower alkyl group which have 1 or 2 phenyls which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl

group which may have a halogen atom as a substituent, a lower alkoxy group, and a lower alkylthio group include, in addition to the above described phenyl lower alkyl groups, linear or branched alkyl groups which have 1 to 6 carbon atoms which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkoxycarbonyl group having 1 to 6 carbon atoms, a cyano group, a nitro group, a phenyl group, a halogen atom, a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents, and a linear or branched alkylthio group having 1 to 6 carbon atoms such as 1,1-diphenylmethyl, 1,1-di(4-fluorophenyl)methyl, 1-phenyl-1-(4-methoxyphenyl)methyl, 3,3-diphenylpropyl, 2,5-difluorobenzyl, 2,4-difluorobenzyl, 3,4-difluorobenzyl, 3,5-difluorobenzyl, 2,6-difluorobenzyl, 3-trifluoromethylbenzyl, 2-trifluoromethylbenzyl, 4-trifluoromethylbenzyl, 3,4-dimethoxybenzyl, 3,5-dimethoxybenzyl, 2-chlorobenzyl, 3-chlorobenzyl, 4-chlorobenzyl, 2-methylbenzyl, 3-methylbenzyl, 4-methylbenzyl, 3,4-dimethylbenzyl, 2,3-dimethylbenzyl, 2-methoxybenzyl, 3-methoxybenzyl, 4-cyanobenzyl, 2-cyanobenzyl, 3-cyanobenzyl, 4-methoxybenzyl, 2,3-dichlorobenzyl, 2,4-dichlorobenzyl, 2,5-dichlorobenzyl, 3,4-dichlorobenzyl, 2,6-dichlorobenzyl, 4-fluorobenzyl,

3-fluorobenzyl, 2-fluorobenzyl, 4-nitrobenzyl, 3-nitrobenzyl, 2-nitrobenzyl, 3-trifluoromethoxybenzyl, 4-trifluoromethoxybenzyl, 2-trifluoromethoxybenzyl, 4-methoxycarbonylbenzyl, 3-methoxycarbonylbenzyl, 4-tert-butylbenzyl, 4-ethylbenzyl, 4-isopropylbenzyl, 4-methoxy-3-chlorobenzyl, 2-(4-methoxyphenyl)ethyl, 2-(4-fluorophenyl)ethyl, 2-(4-chlorophenyl)ethyl, 2-(3-methoxyphenyl)ethyl, 2-(4-methylphenyl)ethyl, 4-phenylbenzyl, 3,3-diphenylpropyl, 3-methyl-4-nitrobenzyl, 4-(4-methoxyphenyl)butyl, 2-(4-methylphenyl)ethyl, 4-tert-butoxycarbonylbenzyl, 3-chloro-6-methoxybenzyl, 4-nitro-3-methylbenzyl, 4-tert-butyrylbenzyl, 2-(2-ethoxycarbonylphenyl)ethyl, 1-(3-propoxycarbonylphenyl)ethyl, 3-(4-pentyloxycarbonylphenyl)propyl, 4-(3-hexyloxycarbonylphenyl)butyl, 5-(3,4-dimethoxycarbonylphenyl)pentyl, 6-(3,4,5-diethoxycarbonylphenyl)hexyl, 1,1-dimethyl-2-(4-butoxycarbonylphenyl)ethyl, 2-methyl-3-(4-methoxycarbonylphenyl)propyl, 2-(2-cyanophenyl)ethyl, 1-(3-cyanophenyl)ethyl, 3-(4-cyanophenyl)propyl, 4-(2-cyanophenyl)butyl, 5-(3-cyanophenyl)pentyl, 6-(4-cyanophenyl)hexyl, 1,1-dimethyl-2-(2,4-dicyanophenyl)ethyl, 2-methyl-3-(2,4,6-tricyanophenyl)propyl, 2-(2-nitrophenyl)ethyl, 1-(3-nitrophenyl)ethyl, 3-(4-nitrophenyl)propyl, 4-(2-nitrophenyl)butyl, 5-(3-nitrophenyl)pentyl, 6-(4-nitrophenyl)hexyl, 1,1-dimethyl-2-(2,4-

dinitrophenyl)ethyl, 2-methyl-3-(2,4,6-trinitrophenyl)propyl, 2-(2-phenylphenyl)ethyl, 1-(3-phenylphenyl)ethyl, 3-(4-phenylphenyl)propyl, 4-(2-phenylphenyl)butyl, 5-(3-phenylphenyl)pentyl, 6-(4-phenylphenyl)hexyl, 1,1-dimethyl-2-(2,4-diphenylphenyl)ethyl, 2-methyl-3-(2,4,6-triphenylphenyl)propyl, 2-(2-fluorophenyl)ethyl, 1-(3-bromophenyl)ethyl, 3-(4-iodophenyl)propyl, 4-(2-bromophenyl)butyl, 5-(3-chlorophenyl)pentyl, 6-(4-bromophenyl)hexyl, 1,1-dimethyl-2-(2,4-dichlorophenyl)ethyl, 2-methyl-3-(2,4,6-trifluorophenyl)propyl, 2-(2-ethylphenyl)ethyl, 1-(3-propylphenyl)ethyl, 3-(4-butylphenyl)propyl, 4-(2-pentylphenyl)butyl, 5-(3-hexylphenyl)pentyl, 6-(4-trifluoromethylphenyl)hexyl, 1,1-dimethyl-2-(2,4-dimethylphenyl)ethyl, 2-methyl-3-[2,4,6-tri(trifluoromethyl)phenyl]propyl, 2-(2-ethoxyphenyl)ethyl, 1-(3-propoxyphenyl)ethyl, 3-(4-butoxyphenyl)propyl, 4-(2-pentyloxyphenyl)butyl, 5-(3-hexyloxyphenyl)pentyl, 6-(4-trifluoromethoxyphenyl)hexyl, 1,1-dimethyl-2-(2,4-dimethoxyphenyl)ethyl, 2-methyl-3-[2,4,6-tri(trifluoromethoxy)phenyl]propyl, 2-methylthiobenzyl, 3-methylthiobenzyl, 4-methylthiobenzyl, 3,4-dimethylthiobenzyl, 2,3-dimethylthiobenzyl, 2-(2-ethylthiophenyl)ethyl, 2-(4-methylthiophenyl)ethyl, 1-(3-propylthiophenyl)ethyl, 3-(4-butylthiophenyl)propyl, 4-(2-pentylthiophenyl)butyl, 5-(3-

hexylthiophenyl)pentyl, 6-(4-methylthiophenyl)hexyl, 1,1-dimethyl-2-(2,4-dimethylthiophenyl)ethyl, 2-methyl-3-[2,4,6-trimethylthiophenyl]propyl, 2-methyl-4-cyanobenzyl, 3-ethoxy-4-ethoxycarbonylbenzyl, 4-phenyl-3-nitrobenzyl, 3-fluoro-4-methoxybenzyl, 4-trifluoromethyl-3-cyanobenzyl, 3-trifluoromethoxy-3-fluorobenzyl groups.

Examples of the phenyl group which may have, on the phenyl ring, 1 to 3 groups selected from the group consisting of a linear or branched alkoxy group having 1 to 6 carbon atoms which may have a halogen atom as a substituent and a linear or branched alkyl group having 1 to 6 carbon atoms which may have a halogen atom as a substituent include phenyl groups which may have, on the phenyl ring, 1 to 3 groups selected from the group consisting of a linear or branched alkoxy group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents and a linear or branched alkyl group having 1 to 6 carbon atoms which may have 1 to 3 halogen atoms as substituents such as phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 2-ethylphenyl, 3-ethylphenyl, 4-ethylphenyl, 4-isopropylphenyl, 3-butylphenyl, 4-pentylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 3,4-diethylphenyl, 2,4-dimethylphenyl, 2,5-dimethylphenyl, 2,6-dimethylphenyl, 3,4,5-trimethylphenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxylphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-

ethoxyphenyl, 4-isopropoxyphenyl, 3-butoxyphenyl, 4-pentyloxyphenyl, 4-hexyloxyphenyl, 3,4-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 2-trifluoromethoxyphenyl, 3-trifluoromethoxyphenyl, 4-trifluoromethoxyphenyl, 2-(bromomethoxy)phenyl, 3-(2-chloroethoxy)phenyl, 4-(2,3-dichloropropoxy)phenyl, 4-(4-fluorobutoxy)phenyl, 3-(5-chloropentyloxy)phenyl, 4-(5-bromohexyloxy)phenyl, 4-(5,6-dibromohexyloxy)phenyl, 3,4-di(trifluoromethoxy)phenyl, 3,4-di(4,4,4-trichlorobutoxy)phenyl, 2,4-di(3-chloro-2-methoxypropyl)phenyl, 2,5-di(3-chloropropoxy)phenyl, 2,6-di(2,2,2-trifluoroethoxy)phenyl, 3,4,5-tri(trifluoromethoxy)phenyl, 4-(2,2,2-trichloroethoxy)phenyl, 2-methyl-4-trifluoromethoxyphenyl, 3-ethyl-4-trichloromethoxyphenyl, 2-methoxy-4-trifluoromethoxyphenyl, 3-ethoxy-4-trichloromethoxyphenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-(bromomethyl)phenyl, 3-(2-chloroethyl)phenyl, 4-(2,3-dichloropropyl)phenyl, 4-(4-fluorobutyl)phenyl, 3-(5-chloropentyl)phenyl, 4-(5-bromohexyl)phenyl, 4-(5,6-dibromohexyl)phenyl, 3,4-di(trifluoromethyl)phenyl, 3,4-di(4,4,4-trichlorobutyl)phenyl, 2,4-di(3-chloro-2-methylpropyl)phenyl, 2,5-di(3-chloropropyl)phenyl, 2,6-di(2,2,2-trifluoroethyl)phenyl, 3,4,5-

tri(trifluoromethyl)phenyl, 4-(2,2,2-trichloroethyl)phenyl, 2-methyl-4-trifluoromethylphenyl, 3-ethyl-4-trichloromethylphenyl groups.

Examples of the pyrrolidinyl lower alkyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent include pyrrolidinylalkyl groups which may have, on the pyrrolidine ring, 1 to 3 linear or branched alkyl groups having 1 to 6 carbon atoms which may have 1 to 3 hydroxyl groups as substituents and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(1, 2, or 3-)pyrrolidinyl]methyl, 2-[(1, 2, or 3-)pyrrolidinyl]-ethyl, 1-[(1, 2, or 3-)pyrrolidinyl]ethyl, 3-[(1, 2, or 3-)pyrrolidinyl]propyl, 4-[(1, 2, or 3-)pyrrolidinyl]-butyl, 5-[(1, 2, or 3-)pyrrolidinyl]pentyl, 6-[(1, 2, or 3-)pyrrolidinyl]hexyl, 1,1-dimethyl-2-[(1, 2, or 3-)pyrrolidinyl]ethyl, 2-methyl-3-[(1, 2, or 3-)pyrrolidinyl]propyl, [1-methyl-(2 or 3-)pyrrolidinyl]methyl, 2-[2-ethyl-(1, 3, 4, or 5-)pyrrolidinyl]ethyl, 1-[3-propyl-(1, 2, 4, or 5-)pyrrolidinyl]ethyl, 3-[1-butyl-(2 or 3-)pyrrolidinyl]propyl, 4-[2-pentyl-(1, 3, 4, or 5-)pyrrolidinyl]butyl, 5-[3-hexyl-(1, 2, 4, or 5-)pyrrolidinyl]pentyl, 6-[1,2-dimethyl-(3, 4, or 5-)pyrrolidinyl]hexyl, 1,1-dimethyl-2-[1,2,3-trimethyl-(4 or 5-)pyrrolidinyl]ethyl, 2-methyl-3-[1-ethyl-2-

methyl-(3, 4, or 5-)pyrrolidinyl]propyl, [1-(2-hydroxyethyl)-(2 or 3-)pyrrolidinyl]methyl, [2-hydroxymethyl-(1, 3, 4, or 5-)pyrrolidinyl]methyl, 2-[2-hydroxymethyl-(1, 3, 4, or 5-)pyrrolidinyl]ethyl, 1-[3-(3-hydroxypropyl)-(1, 2, 4, or 5-)pyrrolidinyl]ethyl, 3-[1-(4-hydroxybutyl)-(2 or 3-)pyrrolidinyl]propyl, 4-[2-(5-hydroxypentyl)-(1, 3, 4, or 5-)pyrrolidinyl]butyl, 5-[3-(6-hydroxyhexyl)-(1, 2, 4, or 5-)pyrrolidinyl]pentyl, 6-[1,2-dihydroxymethyl-(3, 4, or 5-)pyrrolidinyl]hexyl, 1,1-dimethyl-2-[1,2,3-trihydroxymethyl-(4 or 5-)pyrrolidinyl]ethyl, 2-methyl-3-[2-(1,2-hydroxyethyl)-(1, 3, 4, or 5-)pyrrolidinyl]propyl, [2-(2,3,4-trihydroxybutyl)-(1, 3, 4, or 5-)pyrrolidinyl]methyl groups.

Examples of the amino substituted lower alkyl group which may have a substituent selected from the group consisting of a phenyl group and a lower alkyl group include linear or branched alkyl groups having 1 to 6 carbon atoms substituted with an amino group which may have 1 or 2 substituents selected from the group consisting of a phenyl group and a linear or branched alkyl group having 1 to 6 carbon atoms such as aminomethyl, 2-aminomethyl, 1-aminoethyl, 3-aminopropyl, 4-aminobutyl, 5-aminopentyl, 6-aminohexyl, 1,1-dimethyl-2-aminoethyl, N,N-diethyl-2-aminoethyl, 2-methyl-3-aminopropyl, methylaminomethyl, 1-ethylaminoethyl, 2-propylaminoethyl, 3-

isopropylaminopropyl, 4-butylaminobutyl, 5-pentylaminopentyl, 6-hexylaminohexyl, dimethylaminomethyl, 2-diisopropylaminoethyl, (N-ethyl-N-propylamino)methyl, 2-(N-methyl-N-hexylamino)ethyl, phenylaminomethyl, 1-phenylaminoethyl, 2-phenylaminoethyl, 3-phenylaminopropyl, 4-phenylaminobutyl, 5-phenylaminopentyl, 6-phenylaminohexyl, N-methyl-N-phenylaminomethyl, 2-(N-ethyl-N-phenylamino)ethyl, (N-ethyl-N-phenylamino)methyl, 2-(N-methyl-N-phenylamino)ethyl groups.

Examples of the tetrahydrofuryl lower alkyl group which may have a hydroxyl group as a substituent on the lower alkyl group include tetrahydrofurylalkyl groups which may have a hydroxyl group as a substituent on the lower alkyl group and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as [(2 or 3-)tetrahydrofuryl]methyl, 2-[(2 or 3-)tetrahydrofuryl]ethyl, 1-[(2 or 3-)tetrahydrofuryl]ethyl, 3-[(2 or 3-)tetrahydrotetrahydrofuryl]propyl, 4-[(2 or 3-)tetrahydrofuryl]butyl, 5-[(2 or 3-)tetrahydrofuryl]pentyl, 6-[(2 or 3-)tetrahydrofuryl]hexyl, 1,1-dimethyl-2-[(2 or 3-)tetrahydrofuryl]ethyl, 2-methyl-3-[(2 or 3-)tetrahydrofuryl]propyl, 1-hydroxy-1-[(2 or 3-)tetrahydrofuryl]methyl, 2-hydroxy-2-[(2 or 3-)tetrahydrofuryl]ethyl, 2-hydroxy-1-[(2 or 3-)tetrahydrofuryl]ethyl, 3-hydroxy-3-[(2 or

3-)tetrahydrotetrahydrofuryl]propyl, 4-hydroxy-4-[(2 or 3-)tetrahydrofuryl]butyl, 5-hydroxy-5-[(2 or 3-)tetrahydrofuryl]pentyl, 6-hydroxy-6-[(2 or 3-)tetrahydrofuryl]hexyl, 2-hydroxy-1,1-dimethyl-2-[(2 or 3-)tetrahydrofuryl]ethyl, 3-hydroxy-2-methyl-3-[(2 or 3-)tetrahydrofuryl]propyl groups.

Examples of the phenoxy lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a nitro group include, in addition to the above described phenoxy lower alkyl groups, phenoxyalkyl groups which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a linear or branched alkyl group having 1 to 6 carbon atoms and a nitro group and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as 2-methylphenoxymethyl, 3-methylphenoxymethyl, 4-methylphenoxymethyl, 3,4-dimethylphenoxymethyl, 2,3-dimethylphenoxymethyl, 3,4,5-trimethylphenoxymethyl, 2-(2-ethylphenoxy)ethyl, 2-(3-methylphenoxy)ethyl, 2-(4-methylphenoxy)ethyl, 1-(3-propylphenoxy)ethyl, 3-(4-butylphenoxy)propyl, 4-(2-pentylphenoxy)butyl, 5-(3-hexylphenoxy)pentyl, 6-(4-methylphenoxy)hexyl, 1,1-dimethyl-2-(2,4-dimethylphenoxy)ethyl, 2-methyl-3-(2,4,6-trimethylphenoxy)propyl, 2-(4-nitro-3-methylphenoxy)ethyl, 4-nitrophenoxymethyl, 3-nitrophenoxymethyl, 2-nitrophenoxymethyl, 2-(2-

nitrophenoxy)ethyl, 2-(4-nitrophenoxy)ethyl, 1-(3-nitrophenoxy)ethyl, 3-(4-nitrophenoxy)propyl, 4-(2-nitrophenoxy)butyl, 5-(3-nitrophenoxy)pentyl, 6-(4-nitrophenoxy)hexyl, 1,1-dimethyl-2-(2,4-dinitrophenoxy)ethyl, 2-methyl-3-(2,4,6-trinitrophenoxy)propyl.

Examples of the phenyl lower alkanoyl group include phenylalkanoyl groups of which the alkanoyl moiety is a linear or branched alkanoyl group having 2 to 6 carbon atoms such as a 2-phenylacetyl group, 3-phenylpropionyl group, 2-phenylpropionyl group, 4-phenylbutyryl group, 5-phenylpentanoyl group, 6-phenylhexanoyl group, 2,2-dimethyl-3-phenylpropionyl group, and 2-methyl-3-phenypropionyl group.

Examples of the 5- to 7- membered saturated heterocyclic group formed by mutually binding R^{20} and R^{21}, R^{22} and R^{23}, R^{26} and R^{27}, R^{29} and R^{30} or R^{32} and R^{33} together with the nitrogen atoms bound to them, through or not through a nitrogen atom, a oxygen atom or a sulfur atom, include a pyrrolidinyl group, piperidinyl group, piperazinyl group, morpholino group, thiomorpholino group, and homopiperazinyl group.

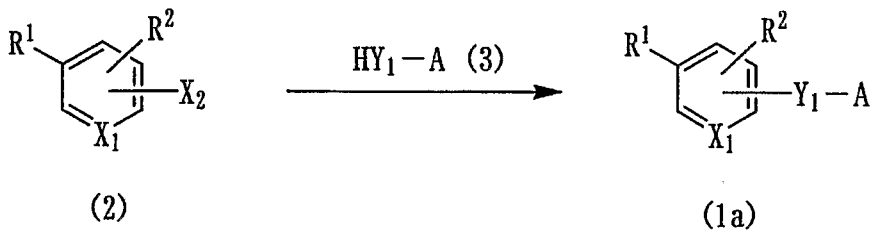
Examples of the phenoxy lower alkyl group which may have a lower alkyl group as a substituent on the phenyl ring include, in addition to the above described phenoxy lower alkyl groups, phenoxyalkyl groups which may have, on the phenyl ring, 1 to 3 linear or branched alkyls having 1 to 6 carbon atoms as

substituents and of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as 2-methylphenoxymethyl, 3-methylphenoxymethyl, 4-methylphenoxymethyl, 3,4-dimethylphenoxymethyl, 2,3-dimethylphenoxymethyl, 3,4,5-trimethylphenoxymethyl, 2-(2-ethylphenoxy)ethyl, 2-(4-methylphenoxy)ethyl, 1-(3-propylphenoxy)ethyl, 3-(4-butylphenoxy)propyl, 4-(2-pentylphenoxy)butyl, 5-(3-hexylphenoxy)pentyl, 6-(4-methylphenoxy)hexyl, 1,1-dimethyl-2-(2,4-dimethylphenoxy)ethyl, 2-methyl-3-(2,4,6-trimethylphenoxy)propyl groups.

Methods for producing the compound of the present invention will be described below.

The compound of the present invention of the general formula (1) which have various Ys is produced, for example, as shown by the following reaction formulas 1 to 4.

[Reaction formula 1]



In the formula, R^1, R^2, X_1 and A are the same as described before, Y_1 represents an -O- group, an -S- group or an -NH group, and X_2 represents a halogen atom.

The reaction between the compound (2) and the compound (3) is generally carried out in an appropriate

solvent or without a solvent, and in the presence or absence of a basic compound.

Examples of the inert solvent used include aromatic hydrocarbons such as benzene, toluene, and xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, and diglyme, halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, lower alcohols such as methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, fatty acids such as acetic acid, esters such as ethyl acetate and methyl acetate, ketones such as acetone and methyl ethyl ketone, acetonitrile, pyridine, dimethylsulfoxide, N,N-dimethylformamide, N-methylpyrrolidone, and hexamethylphosphoric acid triamide, and a mixture thereof.

Examples of the basic compound include carbonates such as sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, and cesium carbonate, metal hydroxides such as sodium hydroxide, potassium hydroxide, and calcium hydroxide, sodium hydride, potassium hydride, potassium, sodium, sodium amide, metal alcoholates such as sodium methylate, sodium ethylate, and sodium n-butoxide, and organic bases such as pyridine, imidazole, N-ethyldiisopropylamine, dimethylaminopyridine, triethylamine, trimethylamine, dimethylaniline, N-methylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5

(DBN), 1,8-diazabicyclo[5.4.0]undecene-7 (DBU), and 1,4-diazabicyclo[2.2.2]octane (DABCO), and a mixture thereof.

When the reaction is carried out in the presence of a basic compound, the basic compound is used in an amount typically equimolar to the compound (2), and preferably 1 to 10 times of the compound (2) on a molar basis.

The compound (3) is used in an amount typically at least equimolar to the compound (2), and preferably 1 to 10 times of the compound (2) on a molar basis.

The reaction is carried out typically at -30 to 200°C, and preferably at about -30 to 150°C, and is generally completed in about 5 minutes to 80 hours.

To this reaction system, an alkali metal halide such as sodium iodide or potassium iodide may be added, and a phase-transfer catalyst may be added.

Examples of the phase-transfer catalyst include quaternary ammonium salts substituted with a group selected from the group consisting of a linear or branched alkyl group having 1 to 18 carbon atoms, a phenyl lower alkyl group which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms and a phenyl group, such as tetrabutylammonium chloride, tetrabutylammonium bromide, tetrabutylammonium fluoride, tetrabutylammonium iodide, tetrabutylammonium hydroxide, tetrabutylammonium

hydrogensulfite, tributylmethylammonium chloride, tributylbenzylammonium chloride, tetrapentylammonium chloride, tetrapentylammonium bromide, tetrahexylammonium chloride, benzyldimethyloctylammonium chloride, methyltrihexylammonium chloride, benzyldimethyloctadecanylammonium chloride, methyltridecanylammonium chloride, benzyltripropylammonium chloride, benzyltriethylammonium chloride, phenyltriethylammonium chloride, tetraethylammonium chloride, tetramethylammonium chloride; phosphonium salts substituted with a linear or branched having 1 to 18 carbon atoms such as tetrabutylphosphonium chloride; and pyridinium salts substituted with a linear or branched alkyl group having 1 to 18 carbon atoms such as 1-dodecanylpyridinium chloride. These phase-transfer catalysts are used singly or in a combination of two or more.

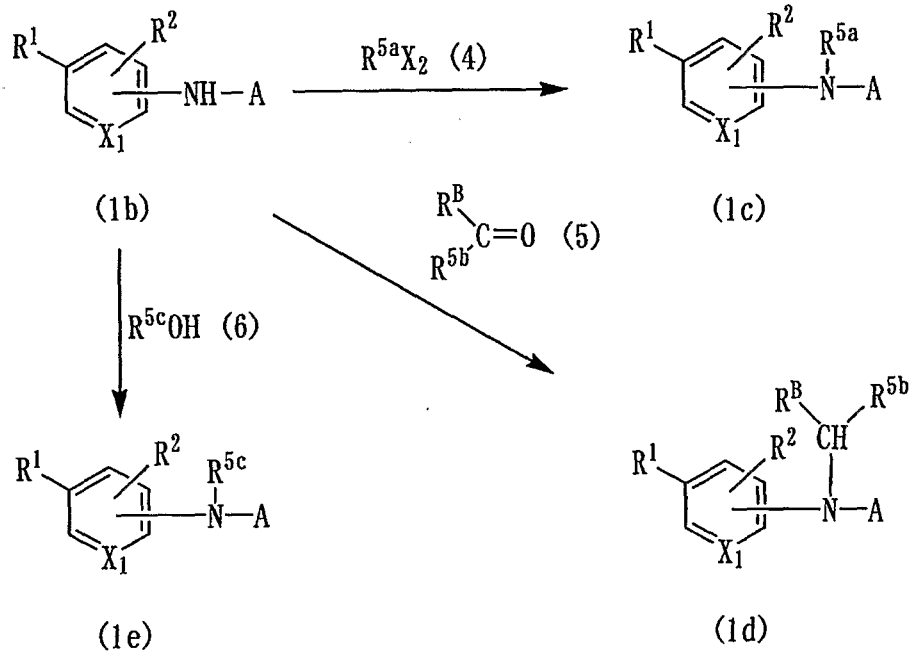
Typically the phase-transfer catalyst is used in an amount of 0.1 to 1 times of the compound (2), and preferably 0.1 to 0.5 times of the compound (2).

The compound (1a), wherein Y_1 represents an -NH group, may also be produced by reacting the compound (2) with the compound (3) in the presence of an acid in place of a base. Examples of the acid used here include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, and organic acids

such as acetic acid, trifluoroacetic acid, and p-toluenesulfonic acid. These acids are used singly or as a mixture of two or more.

The compound (1), wherein Y represents an $-N(R^5)-$ group, and R^5 is R^5 other than a hydrogen atom, may be produced from the corresponding compound (1) wherein Y represents an -NH- group, as shown in the following reaction formula 2.

[Reaction formula 2]



wherein R^1, R^2, X_1, A and X_2 are the same as described above, R^{5a} represents a lower alkyl group, phenyl lower alkyl group or cycloalkyl group, R^{5b} represents a hydrogen atom, lower alkyl group, phenyl group or phenyl lower alkyl group, R^{5c} represents a lower alkanoyl group or benzoyl group. R^B represents a

hydrogen atom or lower alkyl group, and R^{5b} and R^{B}, together with carbon atoms bound to these groups, may form a cycloalkyl ring by binding each other, provided that the alkyl moiety in the $-CHR^{B}R^{5b}$ group of the compound (1d) has 1 to 6 carbon atoms.

The reaction of the compound (1b) with the compound (4) is carried out under the similar condition as that for the reaction of the compound (2) with the compound (3) as shown by the above described reaction formula 1.

The reaction of the compound (1b) with the compound (5) is carried out, for example, in the presence of a reducing agent without a solvent or with an appropriate solvent. Hereinafter, this method is called "method A".

Examples of the solvent used here include water, lower alcohols such as, methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, acetonitrile, fatty acids such as formic acid, and acetic acid, ethers such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, and diglyme, aromatic hydrocarbons such as benzene, toluene, and xylene, and halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, and a mixture thereof.

Examples of the reducing agent include fatty acids and alkali metal salts thereof such as formic acid, sodium formate, and sodium acetate, hydride

reducing agents such as sodium borohydride, sodium cyanoborohydride, sodium triacetyloxyborohydride, and aluminum lithium hydride, or a mixture of these hydride reducing agents, and catalytic hydrogen reducing agents such as palladium black, palladium-carbon, platinum oxide, platinum black, and Raney nickel.

In using a fatty acid or an alkali metal salt thereof such as formic acid, sodium formate, or sodium acetate as a reducing agent, the appropriate reaction temperature is typically from room temperature to about 200°C, and preferably about 50 to about 150°C, and the reaction is completed generally in about 10 minutes to 10 hours. It is preferable to use a fatty acid or an alkali metal salt thereof in a large excess amount with respect to the compound (1b).

In using a hydride reducing agent, the appropriate reaction temperature is typically -80 to 100°C, and preferably -80 to 70°C, and the reaction is completed in general in 30 minutes to 60 hours. The hydride reducing agent is used in an amount typically 1 to 20 times of the compound (1b), and preferably 1 to 6 times of the compound (1b) on a molar basis. Especially in using aluminum lithium hydride as a hydride reducing agent, it is preferable to employ an ether such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, or diglyme, or an aromatic hydrocarbon such as benzene, toluene, or xylene. To the reaction system, an amine such as trimethylamine, triethylamine,

and N-ethyldiisopropylamine, or molecular sieves such as Molecular Sieves 3A (MS-3A) or Molecular Sieves 4A (MS-4A) may be added.

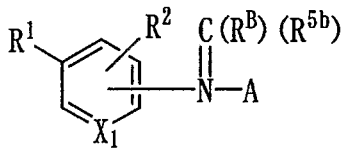
In using a catalytic hydrogen reducing agent, the reaction is preferably carried out in a hydrogen atmosphere typically at a normal pressure to about 20 atm, and preferably at a normal atmosphere to about 10 atm, or in the presence of a hydrogen donor such as formic acid, ammonium formate, cyclohexene, or hydrazine hydrate, at a temperature of typically -30 to 100°C, and preferably 0 to 60°C. The above described reaction is in general completed in about 1 to 12 hours. The catalytic hydrogen reducing agent is used typically in an amount of about 0.1% to 40% by weight, and about 1 to 20% by weight based on the compound (1b).

In the reaction of the compound (1b) with the compound (5), the compound (5) is typically used in an amount at least equimolar to the compound (1b), and preferably used in an equal amount to a large excess amount of compound (5) on a molar basis.

When the compound (5), wherein R^B and R^{5b} are mutually bound together with the carbon atoms which bind to these groups to form a cycloalkyl ring, is used as a starting material, and the hydride reducing agent is used to carry out the reaction, cycloalkyloxytrialkylsilane such as [(1-ethoxycyclopropyl)oxy]trimethylsilane may be used in

place of the compound (5) as the starting material to produce the above described compound (5) in the reaction system.

The compound (1d) may be produced by reacting the compound (1b) with compound (5) under the reaction condition similar to the reaction condition of the compound (1f) with hydroxylamine of the later described reaction formula 3, and then reducing the resulting compound represented by the general formula:



wherein R^1, R^2, X_1, R^B and R^{5b} are the same as described above.

A reaction condition similar to that of the method A may be applied to this reducing reaction.

The reaction of the compound (1b) with the compound (6) is carried out by a method for reacting the compound (1b) with carboxylic acid of the compound (6) in a typical reaction for producing an amide bond. Known reactions for producing an amide bond may be applied to this reaction for producing an amide bond. Specific methods thereof include: (a) a mixed acid anhydride method, specifically, a method of reacting an alkylhalocarboxylic acid with the carboxylic acid (6) to prepare a mixed acid anhydride, and then reacting

the amine (1b) with the mixed acid anhydride; (b) an active ester method, specifically, a method of preparing, from the carboxylic acid (6), an active ester such as a phenyl ester, p-nitrophenyl ester, N-hydroxysuccinimide ester, or 1-hydroxybenzotriazole ester, or an active amide with benzoxazoline-2-thione, and then reacting the active ester or amide with the amine (1b); (c) a carbodiimide method, specifically, a method of condensation reaction of wherein the carboxylic acid (6) with the amine (1b) in the presence of an activator such as dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide (WSC), or carbonyldiimidazole; (d) other methods, for example, a method of preparing carboxylic anhydride from the carboxylic acid (6) by the action of a dehydrator such as acetic anhydride, and then reacting the carboxylic anhydride with the amine (1b), a method of reacting an ester of the carboxylic acid (6) with a lower alcohol with the amine (1b) at a high pressure and a high temperature, and a method of reacting an acid halide of the carboxylic acid (6), that is, carboxylic acid halide, with the amine (1b).

The mixed acid anhydride used in the mixed anhydride method (a) described above, may be obtained by a typical Schotten-Baumann reaction, and the compound of the present invention of the general formula (1e) can be produced by reacting the amine (2) with the mixed acid anhydride without isolation.

The Schotten-Baumann reaction described above is carried out in the presence of a basic compound.

The basic compounds used include compounds commonly used in Schotten-Baumann reaction, for example, organic bases such as triethylamine, trimethylamine, pyridine, dimethylaniline, N-ethyldiisopropylamine, dimethylaminopyridine, N-methylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5 (DBN), 1,8-diazabicyclo[5.4.0]undecene-7, and 1,4-diazabicyclo[2.2.2]octane (DABCO), and inorganic bases such as carbonates such as sodium carbonate, potassium carbonate, sodium bicarbonate, and potassium bicarbonate, metal hydroxides such as sodium hydroxide, potassium hydroxide, and calcium hydroxide, potassium hydride, sodium hydride, potassium, sodium, sodium amide, and metal alcoholates such as sodium methylate and sodium ethylate. These basic compounds are used singly or in a combination of two or more. The reaction is carried out at typically about -20 to 100°C, and preferably about 0 to 50°C, and the reaction time is about 5 minutes to 10 hours, and preferably about 5 minutes to 2 hours.

The resulting mixed acid anhydride is reacted with the amine (1b) at typically about -20 to 150°C, preferably about 10 to 50°C, and the reaction time is about 5 minutes to 10 hours, and preferably about 5 minutes to 5 hours.

The mixed acid anhydride method is, in

general, carried out in a solvent. Any of the solvent conventionally used for the mixed acid anhydride method may be used. Specific examples of the solvent include halogenated hydrocarbons such as chloroform, dichloromethane, dichloroethane, and carbon tetrachloride, aromatic hydrocarbons such as benzene, toluene and xylene, ethers such as diethyl ether, diisopropyl ether, tetrahydrofuran, and dimethoxyethane, esters such as methyl acetate, ethyl acetate, and isopropyl acetate, and aprotic polar solvents such as N,N-dimethylformamide, dimethylsulfoxide, and hexamethylphosphoric acid triamide, and a mixture thereof.

Examples of the alkylhalocarboxylic acid used in the mixed acid anhydride method include methyl chloroformate, methyl bromoformate, ethyl chlorformate, ethyl bromoformate, and isobutyl chloroformate.

In the mixed acid anhydride method, it is typically preferable to use the carboxylic acid (6), alkylhalocarboxylic acid and the amine (1b) equimolar to each other. However, each of alkyl halocarboxylic acid and the carboxylic acid (6) may be used 1 to 1.5 times of the amine (1b) on a molar basis, respectively.

In the above described method (c) of condensation reaction in the presence of an activator, the reaction is carried out in an appropriate solvent in the presence or absence of a basic compound. Any of the solvents and basic compounds used in the reaction

in the other methods (d) described above of reacting carboxylic acid halide with the amine may be used for this reaction. It is appropriate to use the activator in an amount typically at least equimolar to the compound (1b), and preferably 1 to 5 times of the compound (1b) on a molar basis. When WSC is used as an activator, the reaction may be carried out advantageously by adding 1-hydroxybenzotriazole and/or an acid such as hydrochloric acid. This reaction is carried out at typically about -20 to 180°C, and preferably about 0 to 150°C, and is completed typically in about 5 minutes to 90 hours.

In the other method (d) described above, wherein the amine (1b) is reacted with carboxylic acid halide, the reaction is carried out in an appropriate solvent in the presence of a basic compound. As such a basic compound, known basic compounds may be widely used, and, for example, any of compounds used for the Shotten-Baumann reaction described above may be used. Examples of the solvent include, in addition to the solvents used in the mixed acid anhydride method described above, alcohols such as methanol, ethanol, isopropanol, propanol, butanol, 3-methoxy-1-butanol, ethyl cellosolve, and methyl cellosolve, acetonitrile, pyridine, acetone, and water. The ratio of the amine (1b) to the carboxylic acid halide in the reaction is not specified and may be appropriately selected in a wide range. Typically, the former may be used in an

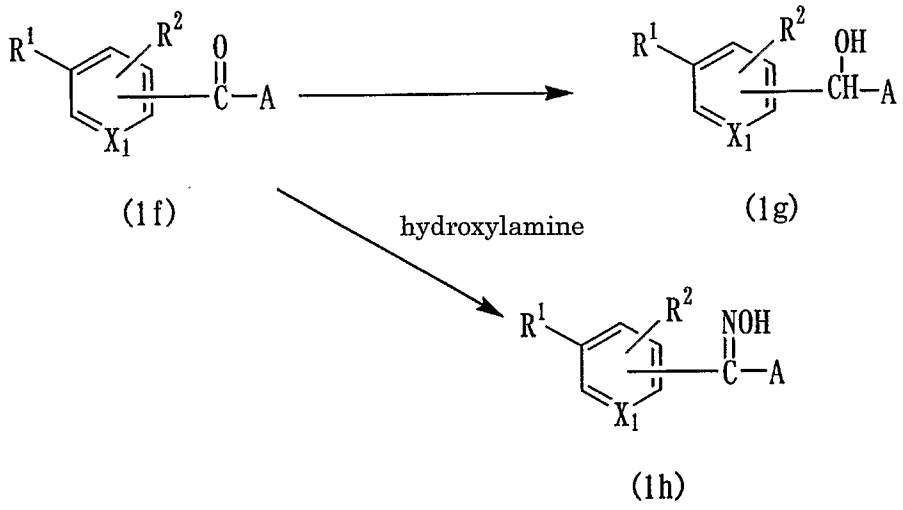
amount at least about equimolar to the latter, and preferably about 1 to 5 times of the latter on a molar basis. This reaction is carried out at typically about -20 to 180°C, and preferably about 0 to 150°C, and is completed typically in 5 minutes to 50 hours.

Further, the reaction for producing an amide bond shown in the above described reaction formula 2 may be carried out by reacting the carboxylic acid (6) and the amine (1b) in the presence of a condensation agent of a phosphorus compound such as triphenylphosphine, diphenylphosphinyl chloride, phenyl-N-phenylphosphoramide chloridate, diethyl chlorophosphate, diethyl cyanophosphate, diphenylphosphoric acid azide, or bis(2-oxo-3-oxazolidinyl)phosphinic chloride. The condensation agent described above is used singly or in a combination of two or more.

The above described reaction is carried out, in the presence of the solvent and the basic compound which are used in the method for reacting the carboxylic acid halide with the amine (1b) described above, at typically about -20 to 150°C, and preferably about 0 to 100°C, and is completed typically in 5 minutes to about 30 hours. The condensation agent and the carboxylic acid (6) may be used respectively in an amount at least about equimolar to the amine (1b), and preferably about 1 to 2 times of the amine (1b) on a molar basis.

The compound (1), wherein Y represents a -CH(OH)- or -C(=N-OH) group, is produced from the corresponding compound wherein Y represents a -CO- group, as shown in the reaction formula 3.

[Reaction formula 3]



wherein R^1, R^2, X_1 and A are the same as described above.

The compound (1g) is produced by reducing the compound (1f).

In the reducing reaction described above, a reducing method employing a hydride reducing agent is favorably used. Examples of the reducing agent used include aluminum lithium hydride, sodium borohydride, borane, diborane, and lithium borohydride-trimethoxyborane. These reducing agents are used singly or in a mixture of two or more. The reducing agent may be used in an amount typically at least equimolar to the compound (1f), and preferably 1 to 15 times of the compound (1f) on a molar basis. This

reducing reaction is typically carried out in an appropriate solvent, for example, water, a lower alcohol such as methanol, ethanol, or isopropanol, an ether such as tetrahydrofuran, diethyl ether, diisopropyl ether, or diglyme, or a halogenated hydrocarbon such as dichloromethane, chloroform, or carbon tetrachloride, or a mixture thereof, at about -60 to 150°C, preferably from about -30 to 100°C, in general for about 10 minutes to 40 hours. In the case where aluminum lithium hydride or borane is used as the reducing agent, it is preferable to use an anhydrous solvent of tetrahydrofuran, diethyl ether, diisopropyl ether, diglyme, or the like.

The compound (1h) is produced by reacting the compound (1f) and hydroxylamine in an appropriate inert solvent in the presence or absence of a basic compound.

Examples of the basic compound used in this reaction include inorganic basic compounds such as sodium hydroxide, potassium hydroxide, calcium hydroxide, sodium carbonate, and potassium carbonate, fatty acid alkali metal salts such as sodium acetate, organic bases such as piperidine, piperidinium acetate, triethylamine, trimethylamine, pyridine, dimethylaniline, N-ethyldiisopropylamine, dimethylaminopyridine, N-methylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5 (DBN), 1,8-diazabicyclo[5.4.0]undecene-7 (DBU), and 1,4-diazabicyclo[2.2.2]octane (DABCO). These basic

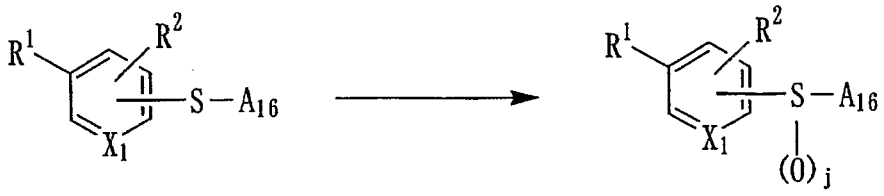
compounds may be used singly or in a mixture of two or more.

Any of inert solvents which do not have adverse effects on the reaction may be used. Examples thereof include water, aromatic hydrocarbons such as benzene, toluene, and xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, and diglyme, halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, lower alcohols such as methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, fatty acids such as acetic acid, esters such as ethyl acetate and methyl acetate, ketones such as acetone and methyl ethyl ketone, acetonitrile, pyridine, dimethyl sulfoxide, N,N-dimethylformamide, and hexamethyl phosphate triamide, and a mixture thereof.

Hydroxylamine is used in an amount typically at least equimolar to the compound (1f), and preferably 1 to 5 times of the compound (1f) on a molar basis. The reaction temperature is typically at room temperature to 200°C, and preferably about 50 to 150°C, and the reaction is in general completed in about 5 minutes to 30 hours.

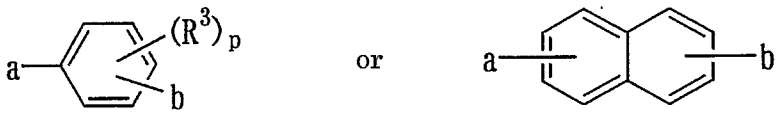
The compound (1), wherein Y represents an -S(O)n group (n = 1 or 2), is produced from the corresponding compound wherein Y represents an -S- group, as shown in the reaction formula 4.

[Reaction formula 4]



(1zzzz) (1aaaaa)

wherein R^1, R^2, X_1 and A are the same as described above, A_{16} represents a -A group or a $-A_{10}-T_2-COOR^{59a}$ group, T_2 represents an $-N(R^{17})-B_3-$ group, a $-B^{19}-N(R^{18})-$ group, a $-B_4-$ group, a $-Q-B_5-$ group, a $-B_6-N-(R^{19})-B_7-$ group, a $-CO-B_{10}-$ group, a $-CH(OH)-B_{11}-$ group, a $-B_{23a}-CO-$ group, or a direct bond, wherein R^{17}, B_3, B_{19}, R^{18}, B_4, B_5, B_6, R^{19}, B_7, B_{10} and B_{11} are the same as described above, A^{10} represents a group of the formula:



wherein R^3 and p are the same as described above, provided that the a is bound to a -S group or a -S(O)j group, and the b is bound to $-T_2$,

R^{59a} is a hydrogen atom or a lower alkyl group, and

j is 1 or 2.

The reaction for converting the compound (1zzzz) into the compound (1aaaaa) is carried out in an appropriate solvent and in the presence of an oxidizing agent.

Examples of the solvent include water, fatty

acids such as formic acid, acetic acid, and trifluoroacetic acid, alcohols such as methanol and ethanol, and halogenated hydrocarbons such as chloroform and dichloromethane, and a mixture thereof.

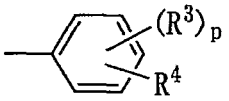
Examples of the oxidizing agent include peracids such as performic acid, peracetic acid, pertrifluoroacetic acid, perbenzoic acid, m-chloroperbenzoic acid, and o-carboxyperbenzoic acid, hydrogen peroxide, sodium metaperidodate, dichromic acid, dichromates such as sodium dichromate and potassium dichromate, permanganic acid, permanganates such as sodium permanganate and potassium permanganate, and lead salts such as lead tetraacetate. These oxidizing agents are used singly or in a mixture of two or more.

The oxidizing agent is appropriately used in an amount typically at least equimolar to the compound (1zzzz), and preferably 1 to 2 times of the compound (1zzzz) on a molar basis. In the oxidizing reaction which converts a sulfur atom into a sulfonyl group (j=2), it is appropriate to use the oxidizing agent in an amount typically at least two times of the compound (1zzzz), and preferably 2 to 4 times of the compound (1zzzz) on a molar basis.

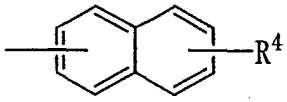
The above described reaction is carried out at typically -10 to 150°C, and preferably about -10 to 100°C and is, in general, completed in about 1 to 100 hours.

The compound of the present invention, which has the general formula (1) with various As, is produced, for example, as shown in the following reaction formulas 5 to 36.

The compound (1), wherein A represents a group of the formula:

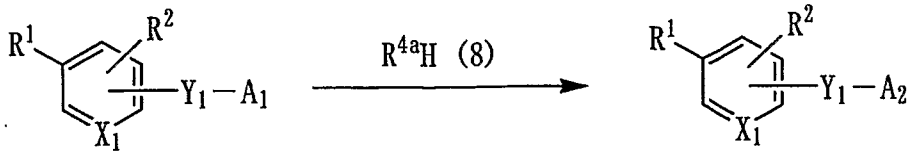


or



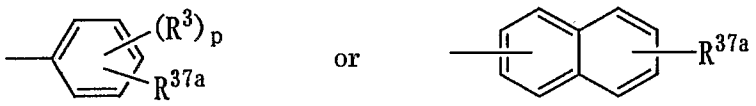
wherein R^4 represents an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group which may have an oxo group as a substituent on the pyrimidine ring, a 1,2,4-oxadiazolyl lower alkyl group which may have an lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring, or a $-(T)_l-NR^{14}R^{15}$ group, wherein T is a lower alkylene group and l is 1, is produced by reacting the compound (7) with the compound (8) as shown in the reaction formula 5.

[Reaction formula 5]

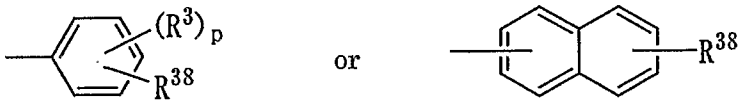


(7) (1i)

wherein R^1, R^2 Y_1 and X_1 are the same as described above, A_1 represents a group of the formula:



wherein R^3 and p are the same as described above, R^{37a} represents a $-B_{21}-X_2$ group, B_{21} represents a lower alkylene group, and X_2 is the same as described above, and A_2 represents a group of the formula:

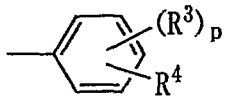


wherein R^3 and p are the same as described above, R^{38} represents a $-B_{21}-R^{4a}$ group, B_{21} is the same as described above, R^{4a} represents an imidazolyl group, a 1,2,4-triazolyl group, a 1,2,3-triazolyl group, a 1,2,5-triazolyl group, a pyrazolyl group, a pyrimidynyl group which has an oxo group as a substituent on the pyrimidine ring, a 1,2,4-oxadiazolyl group which may

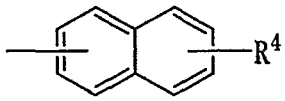
have as a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl group which may have an oxo group as a substituent on the thiazolidine ring, or an $-NR^{14}R^{15}$ group, and R^{14} and R^{15} are the same as described above.

The reaction of the compound (7) with the compound (8) is carried out under the reaction condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The compound (1), wherein A represents a group of the formula:



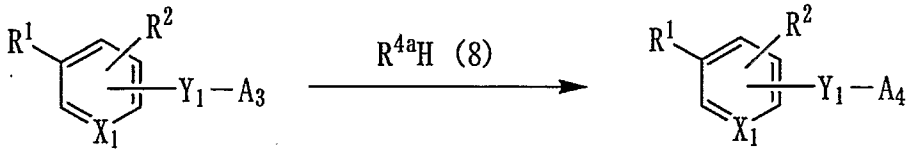
or



wherein R^4 is an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group which has an oxo group as a substituent on the pyrimidine ring, a 1,2,4-oxadiazolyl lower alkyl group which has a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group which has an oxo group as a substituent on the thiazolidin ring, or a $(T)_l-NR^{14}R^{15}$ group, wherein T is a lower alkylene group and l is 1, is also produced by reacting the compound (8) with the compound (9) as

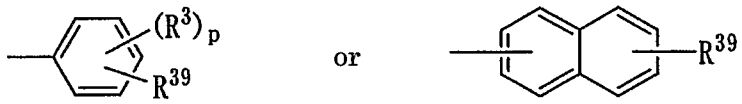
shown in the reaction formula 6.

[Reaction formula 6]

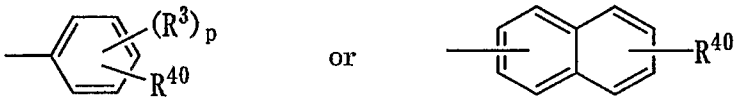


(9) (1j)

wherein R^1, R^2, X_1 and Y_1 and R^{4a} are the same as described above, A_3 represents a group of the formula:



wherein R^3 and p are the same as described above, R^{39} represents a $(B_{21})_fCOR^A$ group, B_{21} is the same as described above, R^A represents a hydrogen atom or a lower alkyl group, and f represents 0 or 1, and A_4 represents a group of the formula:

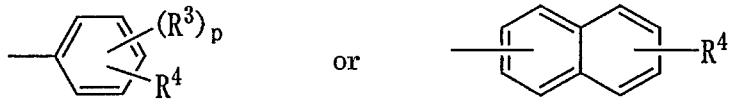


wherein R^3 and p are the same as described above, R^{40} represents a $-(B_{21})_fCHR^AR^{4a}$ group, and B_{21}, R^A, f and R^{4a} are the same as described above, provided that the alkyl moiety of the $-(B_{21})_fCHR^AR^{4a}$ group has not more than 6 carbon atoms.

The reaction of the compound (9) with the compound (8) is carried out under the same condition as in the reaction of the compound (1b) with the compound

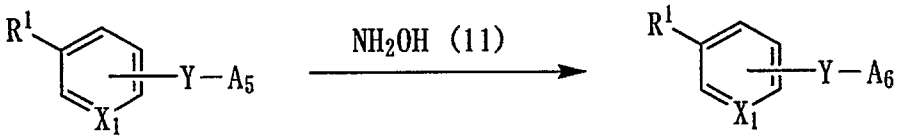
(5) of the above described reaction formula 2.

The compound (1), wherein A represents a group of the formula:



wherein R^4 represents a 3,5-dioxoisooxazolidinyl lower alkylidene group which may have an oxo group as a substituent on the 3,5-dioxoisooxazolidine ring, is produced by reacting the compound (11) with the compound (10) as shown in the reaction formula 7.

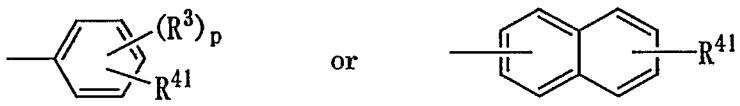
[Reaction formula 7]



(10) (1k)

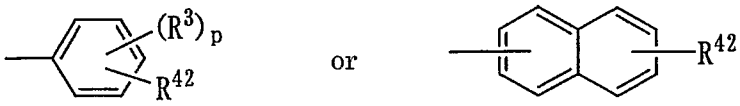
wherein R^1, R^2, X_1 and Y are the same as described above,

A^5 represents a group of the formula:

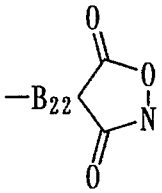


wherein R^3 and p are the same as described above, R^{41} represents a $-B_{22}(CO_2R^{43})(CO_2R^{44})$ group, B_{22} represents a lower alkylidene group, and R^{43} and R^{44} represent a lower alkyl group, and

A^6 represents a group of the formula:



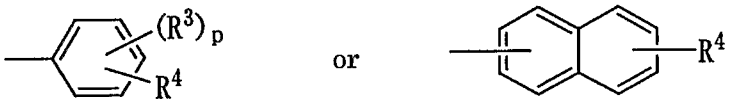
wherein R^3 and p are the same as described above, and R^{42} represents



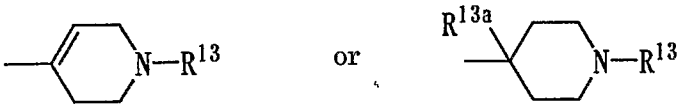
wherein B_{22} is the same as described above.

The reaction of the compound (10) with the compound(11) is carried out under the same condition as that of the reaction which converts the compound (1f) into the compound (1h) of the reaction formula 3.

The compound (1), wherein A represents a group of the formula:

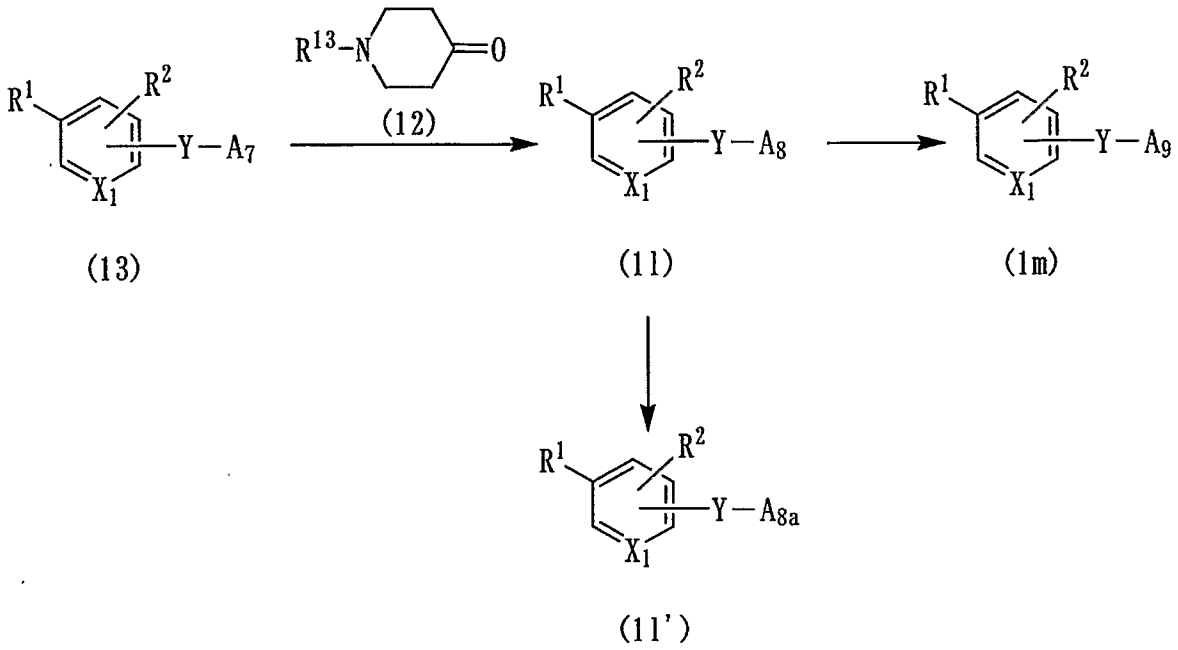


wherein R^4 represents a group of the formula:



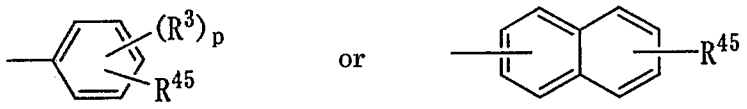
is produced from the compound (13), as shown in the reaction formula 8.

[Reaction formula 8]



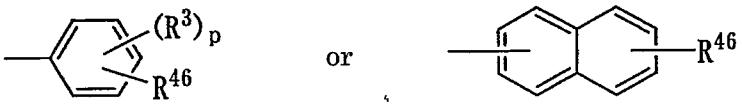
wherein R^1, R^2, X_1, Y and R^{13} are the same as described above,

A_7 represents of the formula:

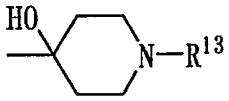


wherein R^3 and p are the same as described above, and R^{45} represents a halogen atom,

A_8 represents a group of the formula:

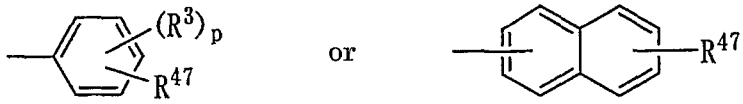


wherein R^3 and p are the same as described above, and R^{46} represents



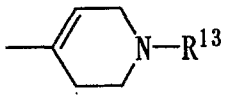
wherein R^{13} is the same as described above,

A^9 represents a group of the formula:



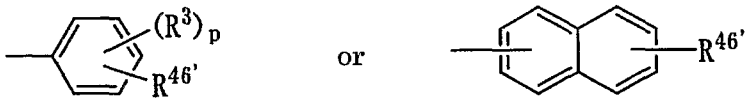
wherein R^3 and p are the same as described above, and

R^{47} represents a group of the formula:



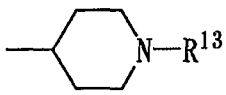
wherein R^{13} is the same as described above, and

A^{8a} represents a group of the formula:



wherein R^3 and p are the same as described above, and

$R^{46'}$ represents a group



wherein R^{13} is the same as described above.

The reaction of the compound (13) with the compound (12) is carried out in an appropriate inert solvent in the presence of a basic compound.

Examples of the basic compound used here include such as sodium, potassium, magnesium, sodium hydride, sodium amide, metal alcoholates such as sodium methylate, sodium ethylate, and potassium tert-

butoxide, and alkyl and aryl lithiums or lithium amides such as methyl lithium, n-butyl lithium, phenyl lithium, and lithium diisopropylamide. These basic compounds are used singly or in a mixture of two or more.

The basic compound is appropriately used in an amount typically at least equimolar to the compound (13), and preferably 1 to 5 times of the compound (13) on a molar basis.

Examples of the inert solvent used include aromatic hydrocarbons such as benzene, toluene, and xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, and diglyme, aliphatic hydrocarbons such as n-hexane, heptane, and cyclohexane, halogenated hydrocarbons such as chloroform, dichloromethane, dichloroethane, and carbon tetrachloride, dimethylsulfoxide, and N,N-dimethylformamide, and a mixture thereof.

The reaction is carried out at typically about -90 to 150°C, and preferably about -90 to 120°C, and is completed in general in about 10 minutes to 10 hours.

The compound (12) is appropriately used in an amount typically at least equimolar to the compound (13), and preferably 1 to 5 times of the compound (13) on a molar basis.

The reaction which converts the compound (11) into the compound (1m) is carried out in an appropriate

inert solvent and in the presence of an acid.

Examples of the acid used here include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, and organic acids such as sulfonic acids including p-toluenesulfonic acid. These acids are used singly or in a mixture of two or more.

It is appropriate to use the acid typically in an amount at least equimolar to the compound (11), and preferably in an equal amount to a large excess amount with respect to the compound (11) on a molar basis.

Any of the inert solvents used in the reaction of the compound (13) with the compound (12) may be used in this reaction.

This reaction is suitably carried out at typically room temperature to 200°C, preferably room temperature to about 150°C, and is completed in general in about 1 to 20 hours.

The reaction which converts the compound (11) into the compound (11′) is carried out in an appropriate solvent and in the presence of an acid and a catalyst.

Examples of the solvent used include water, lower alcohols such as methanol, ethanol, and isopropanol, ketones such as acetone and methyl ethyl ketone, halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, ethers such as diethyl ether,

dimethoxyethane, tetrahydrofuran, diisopropyl ether, diglyme, and 1,4-dioxane, aromatic hydrocarbons such as benzene, toluene, and xylene, acetonitrile, dimethyl sulfoxide, N,N-dimethylacetamide, N,N-dimethylformamide, and N-methylpyrrolidone, and a mixture thereof.

Examples of the acid used here include inorganic acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, and organic acids such as boron trifluoride diethyl etherate, formic acid, acetic acid, trifluoroacetic acid, and p-toluenesulfonic acid.

Examples of the catalyst include alkylsilane compounds such as triethylsilane.

The acids and the catalysts described above are respectively used typically in an amount about 0.01 to 5 times of the compound (11), and preferably about 0.01 to 1 time of the compound (11) on a molar basis.

The above described reaction is carried out at about room temperature to 200°C, and preferably about room temperature to 150°C, and is completed in general in about 1 to 10 hours.

The reaction which converts the compound (11) into the compound (11′) may be carried out in an appropriate solvent and in the presence of a catalytic hydrogen reducing agent.

Examples of the solvent used include water, fatty acids such as acetic acid, alcohols such as methanol, ethanol, and isopropanol, aliphatic

hydrocarbons such as n-hexane, alicyclic hydrocarbons such as cyclohexane, ethers such as diethyl ether, dimethoxyethane, tetrahydrofuran, monoglyme, diglyme, and 1,4-dioxane, esters such as methyl acetate, ethyl acetate, and butyl acetate, and aprotic polar solvents such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone, and a mixture thereof.

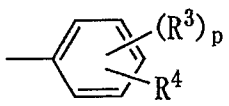
Examples of the catalytic hydrogen reducing agent include palladium, palladium-black, palladium-carbon, palladium hydroxide-carbon, rhodium-alumina, platinum, platinum oxide, copper chromite, Raney nickel, and palladium acetate.

The catalytic hydrogen reducing agent is used typically in an amount of 0.01 to 1 times of the compound (11) on a weight basis.

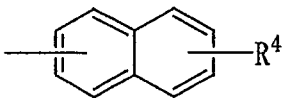
The above described reaction favorably proceeds at typically about -20 to 100°C, and preferably about 0 to 80°C, and is completed generally in about 0.5 to 20 hours, and the hydrogen pressure is typically at 1 to 10 atm.

It is preferable to add a mineral acid such as hydrochloric acid to this reaction system.

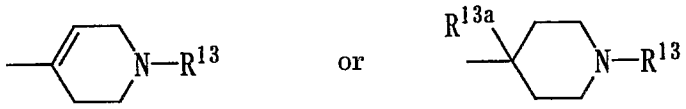
The compound (1), wherein A represents a group of the formula:



or

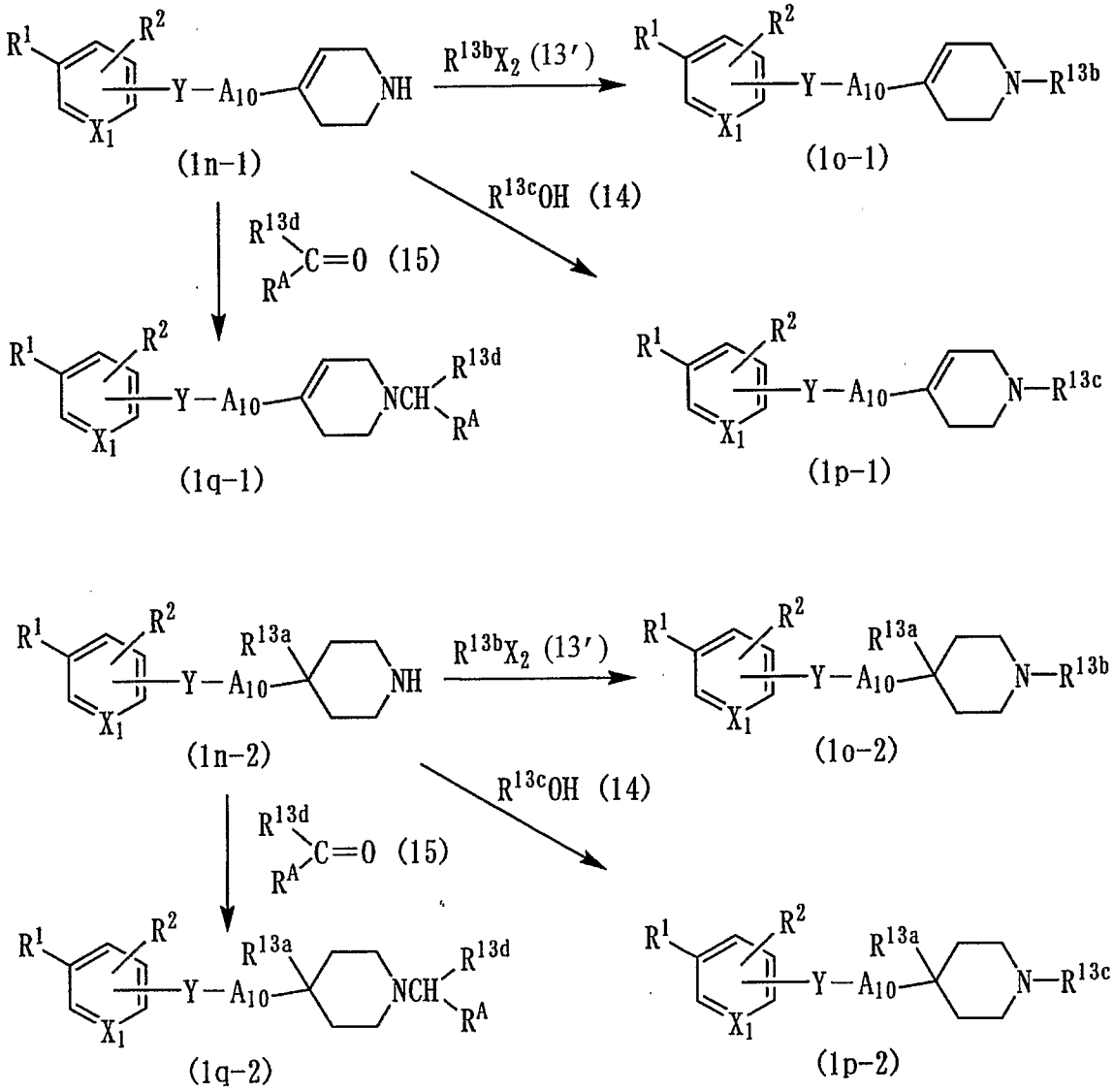


wherein R^4 represents a group of the formula:



wherein R^{13} represents a group other than a hydrogen atom, is produced from the corresponding compound wherein R^{13} is a hydrogen atom, as shown in the following reaction formula 9.

[Reaction formula 9]



wherein R^1, R^2, X_1, Y, A_{10}, R^A, R^{13a} and X_2 are the same as

described above, provided that the a and the b of A_{10} are bound to Y and the piperidinyl group, respectively, R^{13b} represents a lower alkyl group which may have a halogen atom as a substituent, a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl lower alkyl group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group, a piperazinylcarbonyl lower alkyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, or a morpholinocarbonyl substituted lower alkyl group,

R^{13c} represents a lower alkanoyl group which may have a halogen atom as a substituent, a lower alkoxy carbonyl group, a benzoyl group, a morpholino substituted alkanoyl group, a piperazinyl lower alkanoyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group on the phenyl ring; or an imidazolyl lower alkanoyl group, and

R^{13d} represents a hydrogen atom, a lower alkyl group which may have a halogen atom as a substituent, a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, a phenyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl group, an imidazolyl lower alkyl

group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group, a piperazinylcarbonyl lower alkyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, or a morpholinocarbonyl substituted lower alkyl group,

provided that the alkyl moiety of the side chain ($-CHR^{A}R^{13d}$) of the compound (1q) has not more than 6 carbon atoms.

The reaction of the compound (1n-1) with the compound (13′) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1n-1) with the compound (14) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (1n-1) with the compound (15) is carried out under the condition to similar that of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

Also, the reaction of the compound (1n-2) with the compound (13′) is carried out under the condition similar to that of the reaction of the

compound (1b) with the compound (4) of the above described reaction formula 2, the reaction of the compound (1n-2) with the compound (14) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2, and the reaction of the compound (1n-2) with the compound (15) is carried out under the condition to similar that of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

In the reaction formula 9, the hydrolysis of the compounds (1o-1) and (1o-2), wherein R^{13b} represents a lower alkoxycarbonyl lower alkyl group, may produce the corresponding compounds (1o-1) and (1o-2), wherein R^{13b} represents a carboxy lower alkyl group.

In the reaction formula 9, the hydrolysis of compounds (1p-1) and (1p-2), wherein R^{13c} represents a lower alkoxycarbonyl group, may produce the corresponding compounds (1p-1) and (1p-2), wherein R^{13c} is a hydrogen atom.

The hydrolysis reaction (hereinafter this hydrolysis reaction is called "hydrolysis B") may be carried out in an appropriate solvent or without a solvent, in the presence of an acidic or basic compound.

Examples of the solvent used include water, lower alcohols such as methanol, ethanol, isopropanol, and tert-butanol, ketones such as acetone and methyl

ethyl ketone, ethers such as diethyl ether, dioxane, tetrahydrofuran, monoglyme, and diglyme, fatty acids such as acetic acid and formic acid, esters such as methyl acetate and ethyl acetate, halogenated hydrocarbons such as chloroform, dichloromethane, dichloroethane, and carbon tetrachloride, dimethylsulfoxide, N,N-dimethylformamide, and hexamethylphosphoric acid triamide, and a mixture thereof.

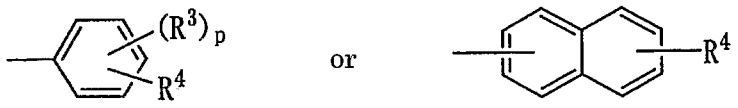
Examples of the acid include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, organic acids such as formic acid, acetic acid, trifluoroacetic acid, sulfonic acids including p-toluenesulfonic acid, and Lewis acids such as boron tribromide and boron trichloride. These acids are used singly or in a mixture of two or more.

Examples of the basic compound include carbonates such as sodium carbonate, potassium carbonate, sodium bicarbonate, and potassium bicarbonate, and metal hydroxides such as sodium hydroxide, potassium hydroxide, calcium hydroxide, and lithium hydroxide. These basic compounds are used singly or in a mixture of two or more.

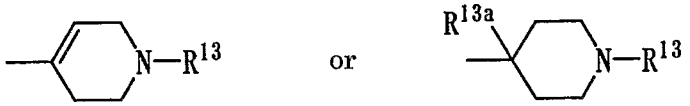
The hydrolysis reaction is favorably carried out at typically about 0 to about 200°C, and preferably about 0 to 150°C, and is completed in general in about 10 minutes to 50 hours.

The compound (1), wherein A represents a

group of the formula:

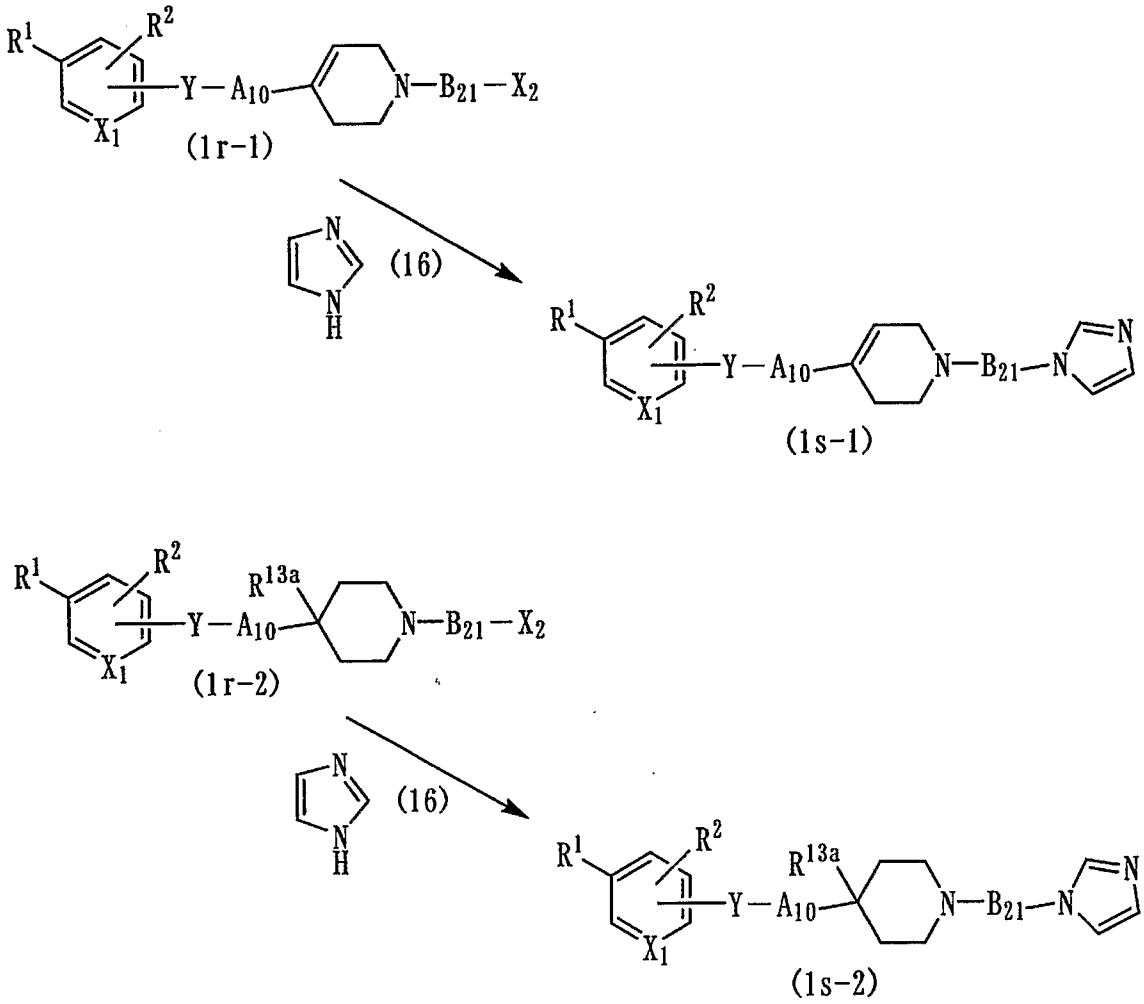


wherein R^4 represents a group of the formula:



wherein R^{13} represents an imidazolyl lower alkyl group, is produced as shown in the following reaction formula 10.

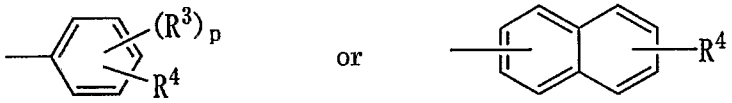
[Reaction formula 10]



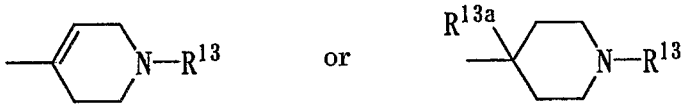
wherein R^1, R^2, X_1, Y, A_{10}, R^{13a}, B_{21} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and the piperidinyl group, respectively.

The reaction of the compound (1r-1) with the compound (16) with and the reaction of the compound (1r-2) with the compound (16) are carried out under the condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The compound (1), wherein A represents a group of the formula:

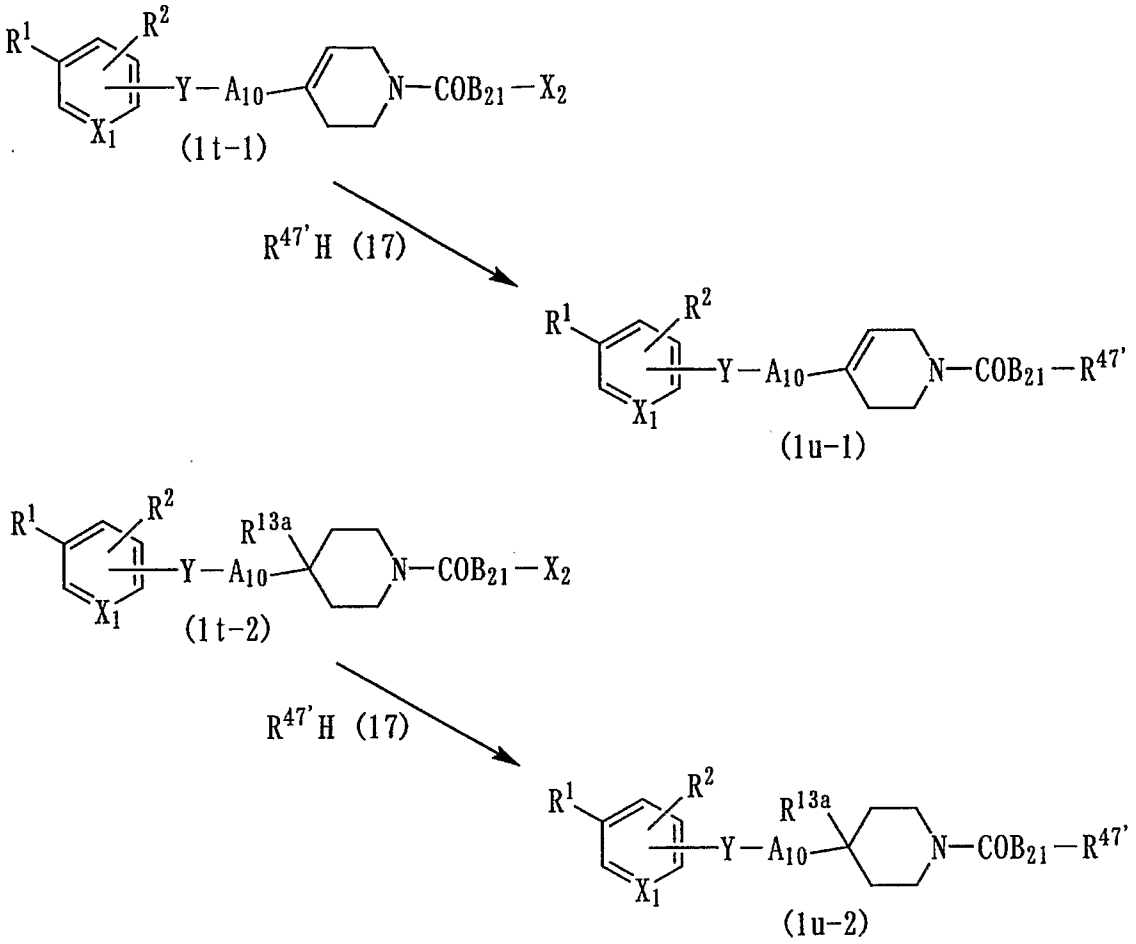


wherein R^4 represents a group of the formula:



wherein R^{13} represents a morpholino substituted alkanoyl group, a piperazinyl lower alkanoyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which has a lower alkylenedioxy group as a substituent on the phenyl ring, or an imidazolyl lower alkanoyl group, may be produced from the corresponding compound, wherein R^{13} represents a lower alkanoyl group which may have a halogen atom as a substituent, as shown in the following reaction formula 11.

[Reaction formula 11]

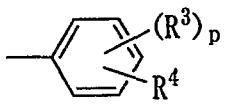


wherein R^1, R^2, X_1, Y, R^{13a}, B_{21} and X_2 are the same as described above, and $R^{47'}$ is a morpholino group, a piperazinyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, or an imidazolyl group, provided that the a and b of A_{10} are bound to Y and the piperidinyl group, respectively.

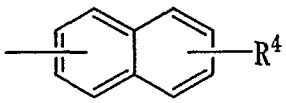
The reaction of the compound (1t-1) with the compound (17) and the reaction of the compound (1t-2) with the compound (17) are carried out under the

condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

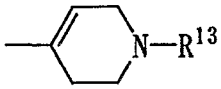
The compound (1), wherein A represents a group of the formula:



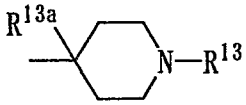
or



wherein R^4 represents a group of the formula:

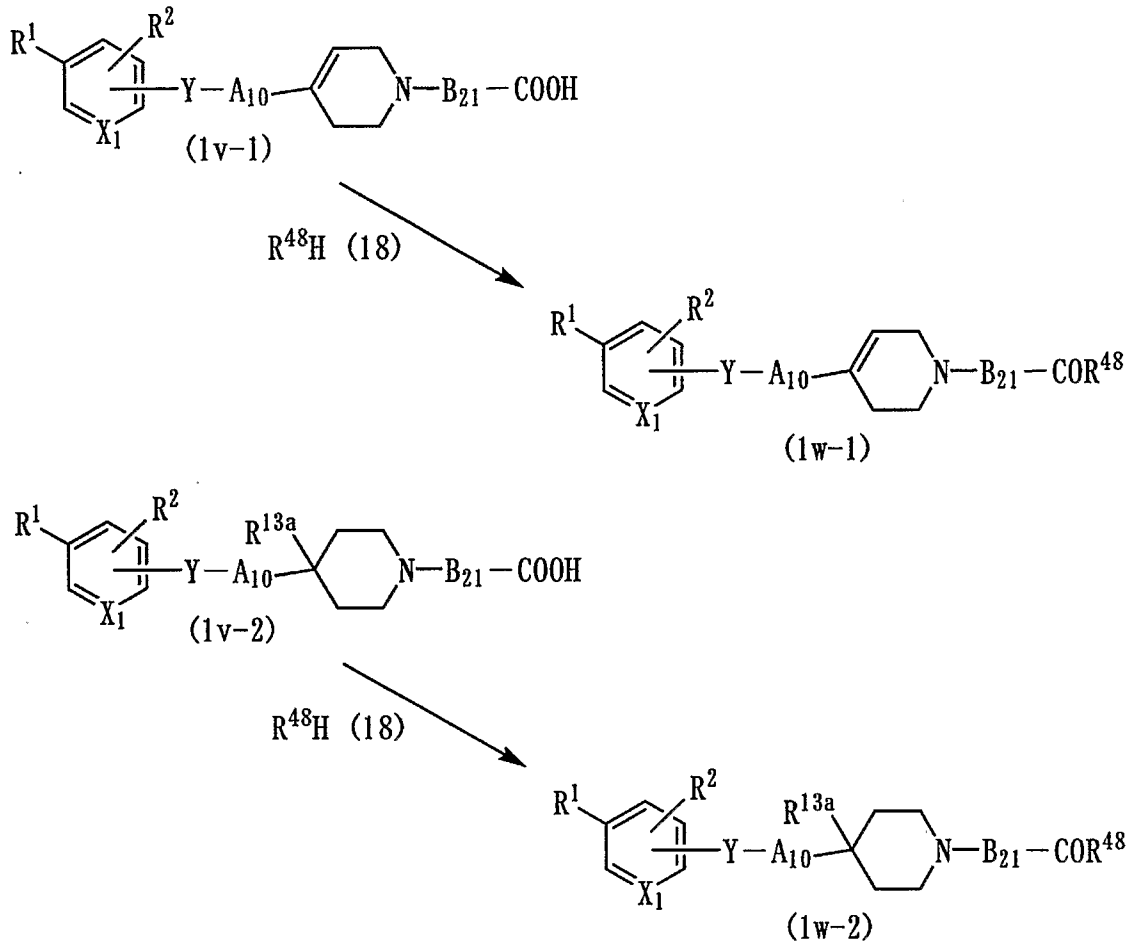


or



wherein R^{13} represents a piperazinylcarbonyl lower alkyl group which is substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, or a morpholinocarbonyl substituted lower alkyl group, is produced from the corresponding compound, wherein R^{13} is a carboxy group, as shown in the following reaction formula 12.

[Reaction formula 12]

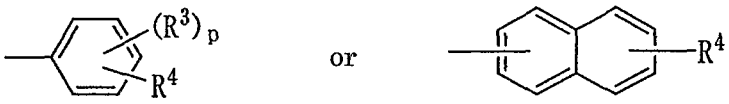


wherein R^1, R^2, X_1, Y, A_{10}, R^{13a}, and B_{21} are the same as described above, R^{48} is a piperazinyl group which may be substituted on the piperazine ring with a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, or a morpholino group, provided that the a and b of A_{10} are bound to Y and the piperidinyl group, respectively.

The reaction of the compound (1v-1) with the compound (18) and the reaction of the compound (1v-2) with the compound (18) are carried out under the condition similar to that of the reaction of the

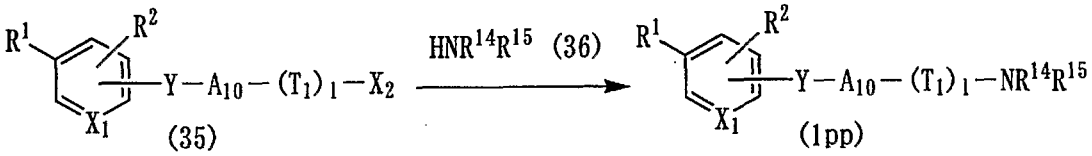
compound (1b) with the compound (6) of the above described reaction formula 2.

The compound (1), wherein A represents a group of the formula:



wherein R^4 represents $-(T)_l-NR^{14}R^{15}$, is produced as shown in the reaction formulas 13 and 14.

[Reaction formula 13]



In the formula, R^1, R^2, X_1, Y, A_{10}, X_2, l, R^{14} and R^{15} are the same as described above, T_1 is a lower alkylene group, $-COB_8-$, $-SO_2-$ or a $-CH(OH)-B_9-$, and B^8 and B^9 are the same as described above, provided that, in the compounds (35) and (1pp), the a and b of A_{10} are bound to Y and $-(T_1)_l$, respectively.

The reaction of the compound (35) with the compound (36) is carried out in the reaction condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The compound (35), wherein l is 0, may also be produced by reacting the corresponding compound (35)

with the compound (36) in an appropriate solvent in the presence of a basic compound and a catalyst.

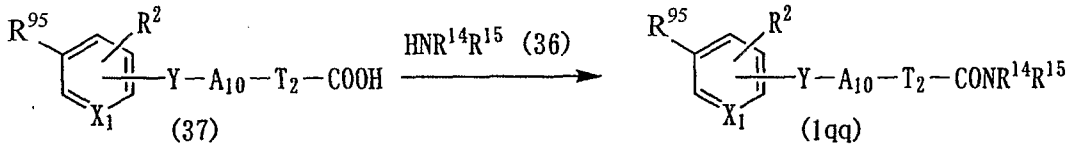
Any of the solvents and basic compounds which are used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used here.

Examples of the catalyst to be used include various metal complexes as well as various combinations of a metal complex with ligand. Examples of the metal complex include, for instance, palladium acetate (II), tetrakis(triphenylphosphine)palladium (0), tris(dibenzylideneacetone)dipalladium (0) and the like. Examples of the ligand include, for instance, R-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (R-BINAP), S-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (S-BINAP), RAC-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (RAC-BINAP), t-butylphosphine, 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene and the like.

The catalyst is appropriately used in an amount typically at least equimolar to the compound (35), and preferably 1 to 5 times of the compound (35) on a molar basis.

This reaction is carried out at typically about 0 to 200°C, and preferably about 0 to 150°C, and is completed in general in about 1 to 60 hours. This reaction is called "reaction C" hereinafter.

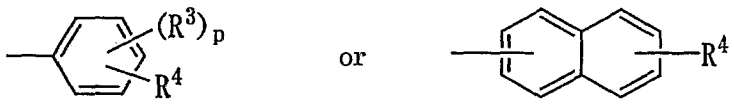
[Reaction formula 14]



In the formula, R^2, X_1, Y, A_{10}, T_2, R^{14} and R^{15} are the same as described above, provided that, in the compounds (37) and (1qq), the a and b of A_{10} are bound to Y and T_2, respectively, and R^{95} represents R^1 or a halogen atom.

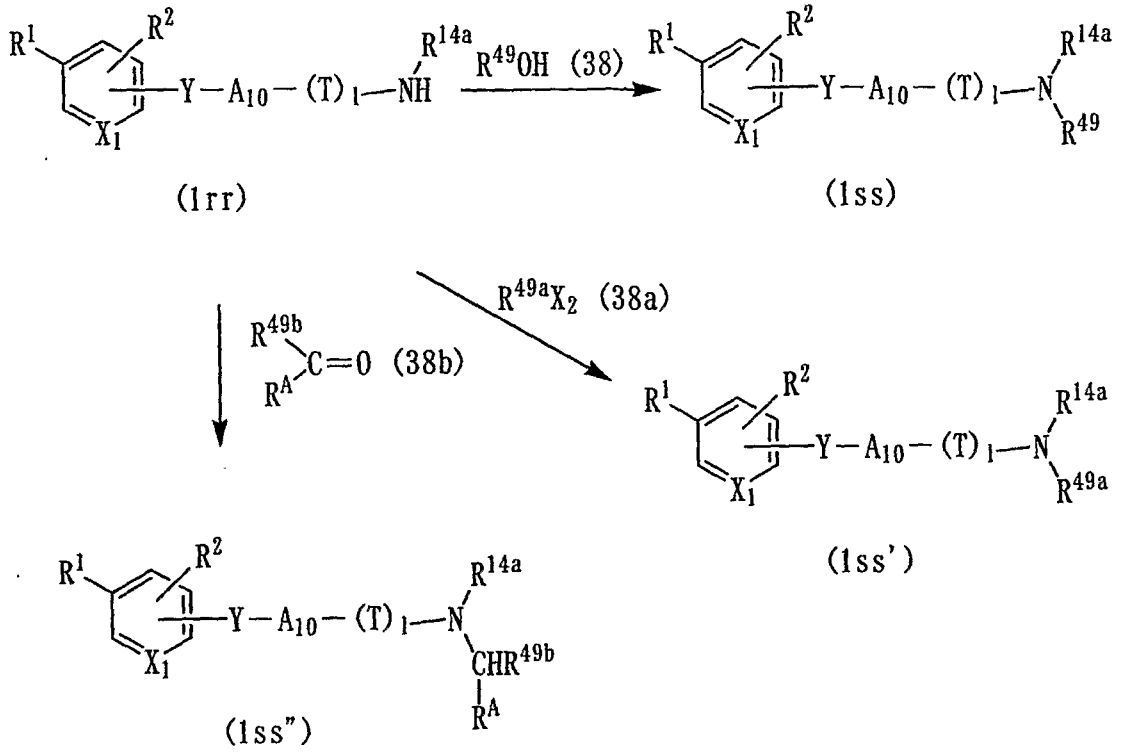
The reaction of the compound (37) with the compound (36) is carried out in the reaction condition similar to that of the reaction of the compound (1b) with the compound (6) in the above described reaction formula 2.

The compound (1), wherein A represents a group of the formula:



wherein R^4 represents $-(T)_l-NR^{14}R^{15}$, and l represents 0, may also be produced by the method shown in the reaction formula 15.

[Reaction formula 15]



wherein R^1, R^2, X_1, Y, R^A, X_2, T, l, and A_{10}, are the same as described above, R^{49} is the same group as R^{15} defined in (15), (22), (23), (27) and (36a), R^{49a} is R^{15} defined in (2) to (5), (7), (8), (10), (11), (13), (14), (16) to (21), (24), (25), (26), (26a), (27a), (28a), (29a), (30a), (31a), (32a), (33a), (34a), (35a), or (37a), a phenoxycarbonyl group and a lower alkylsulfonyl group, R^{49b} represents a hydrogen atom, an alkyl group which may have a hydroxyl group as a substituent, a phenoxy lower alkyl group, a phenyl lower alkyl group which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a halogen atom, a lower alkoxy group which may have a

halogen atom as a substituent, and a lower alkyl group, a phenyl group which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a halogen atom, a lower alkoxy group which may have a halogen atom as a substituent, and a lower alkyl group, a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, a phenyl group which may have a lower alkylenedioxy group on the phenyl ring, a lower alkoxycarbonyl substituted lower alkyl group, a carboxy substituted lower alkyl group, a cycloalkyl lower alkyl group, a cycloalkyl group, a pyridyl lower alkyl group, a pyridyl group, an amino group substituted lower alkyl group which may have a substituent selected from the group consisting of a lower alkyl group and a lower alkanoyl group, a lower alkoxy lower alkyl group, an imidazolyl group, an imidazolyl lower alkyl group, a 1,2,3,4-tetrahydroisoquinolylcarbonyl substituted lower alkyl group, an A group-substituted carbonyl lower alkyl group, a pyrrolidinyl group, a pyrrolidinyl lower alkyl group, a morpholino group, a morpholino lower alkyl group, an anilinocarbonyl lower alkyl group which may have a lower alkyl group as a substituent on the phenyl ring, a piperazinyl group which may have, on the piperazine ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, a piperazinyl

lower alkyl group which may have, on the piperazine ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group which may have a lower alkylenedioxy group as a substituent on the phenyl ring, an amidino group which may have a lower alkyl group as a substituent, an amidino lower alkyl group which may have a lower alkyl group as a substituent, a B group substituted carbonyl lower alkyl group, or a cyano substituted lower alkyl group,

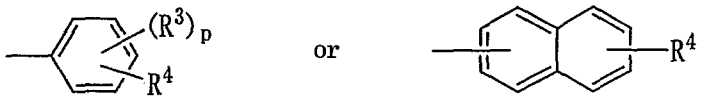
R^{14a} represents a hydrogen atom or a lower alkyl group which may have a hydroxyl group as a substituent, and R^{34}, d, R^{36}, R^{37} and B_{20} are the same as described above, provided that, in the compounds (1rr), (1ss), (1ss′) and (1ss″), the a and b of A_{10} are bound to Y and N, respectively, and, in the compound (1ss″), the $CHR^{A}R^{49b}$ moiety of the side chain, $(-Y-A_{10}N(R^{14a})(CHR^{A}R^{49b})$, has not more than 6 carbon atoms.

The reaction of the compound (1rr) with the compound (38a) is carried out under the condition to similar that of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1rr) with the compound (38) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

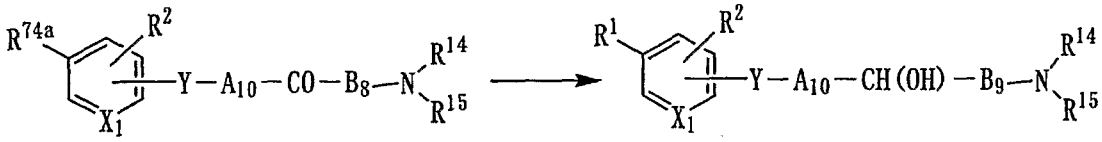
The reaction of the compound (1rr) with the compound (38b) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2 described above.

The compound (1), wherein A represents a group of the formula:



wherein R^4 represents a $-(T)_l-NR^{14}R^{15}$ group, l represents 1, and T represents a $-CH(OH)-B_9-$ group, may also be produced by the method shown in the following reaction formula 16.

[Reaction formula 16]



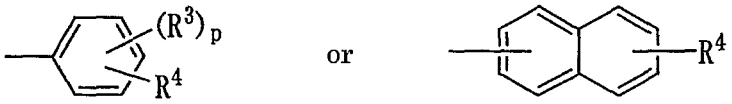
(1tt) (1uu)

wherein R^1, R^2, X_1, A_{10}, Y, B_8, B_9, R^{14}, and R^{15} are the same as described above, provided that, in the compounds (1tt) and (1uu), the a and b of A_{10} are bound to Y and B_8 or B_9, respectively.

The reaction which converts the compound (1tt) into the compound (1uu) is carried out under the similar condition similar to that of the reaction which converts the compound (1f) into the compound (1g) of

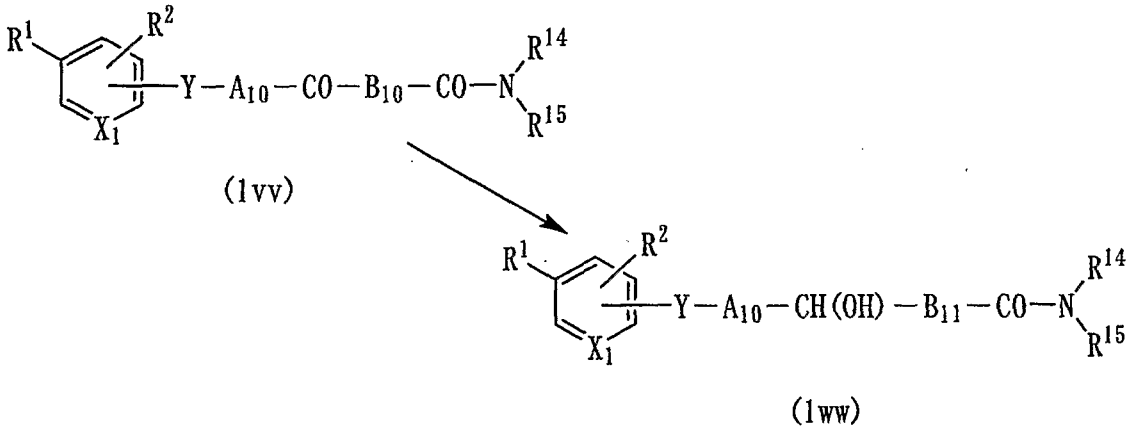
the above described reaction formula 3.

The compound (1), wherein A represents a group of the formula:



wherein R^4 represents a $-(T)_l-NR^{14}R^{15}$ group, l represents 1, and T represents a $-CH(OH)-B_{11}-CO-$ group, may also be produced by the method shown in the following reaction formula 17.

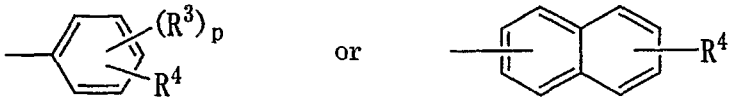
[Reaction formula 17]



wherein R^1, R^2, X_1, A_{10}, Y, B_{10}, B_{11}, R^{14} and R^{15} are the same as described above, provided that, in the compounds (1vv) and (1ww), the a and b of A_{10} are bound to Y and a $-COB_{10}$ or $-CH(OH)B_{11}-$ group, respectively.

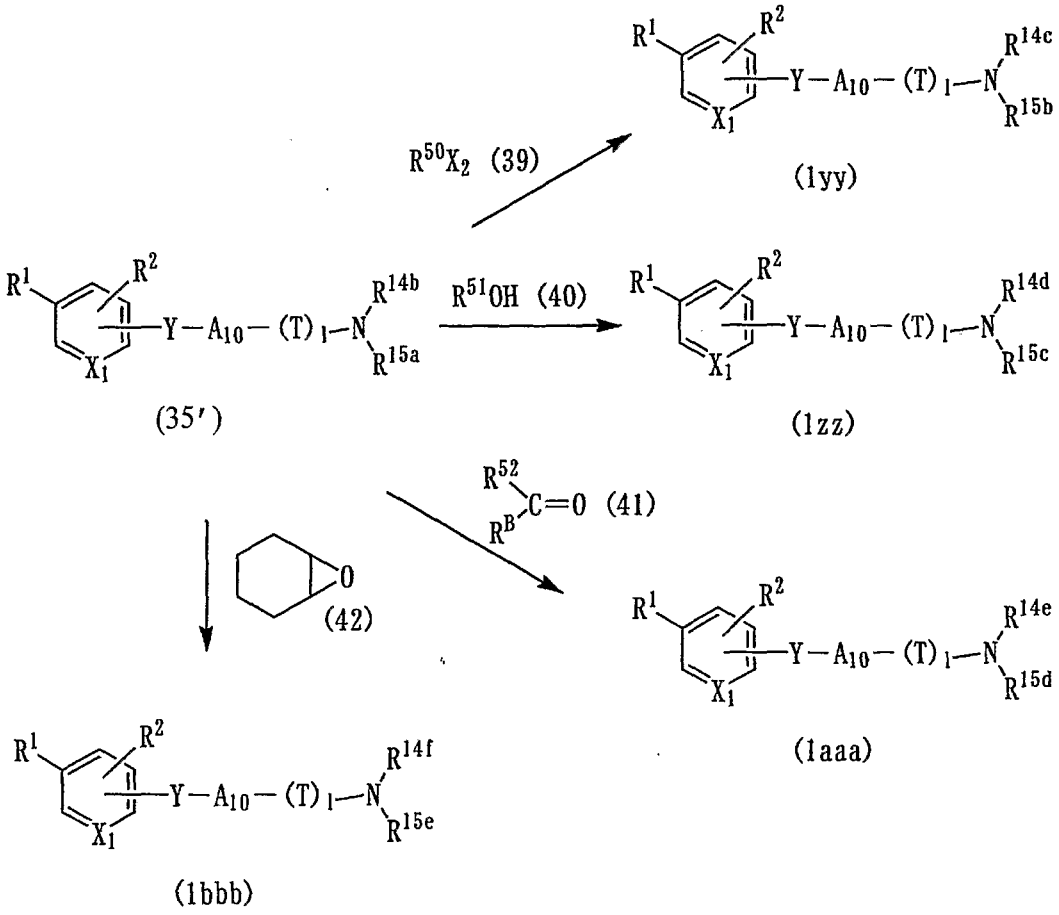
The reaction which converts the compound (1vv) into the compound (1ww) is carried out under the condition similar to that of the reaction which converts the compound (1f) into the compound (1g) of the above described reaction formula 3.

The compound (1), wherein A represents a group of the formula:



wherein R^4 is a $-(T)_1NR^{14}R^{15}$ group, and R^{14} and R^{15} are bound with each other to form a 5- to 10-membered saturated or unsaturated heterocyclic group which has various substituents thereon, may be produced as shown in the following reaction formulas 18 to 20, 22, 24 to 31, and 34 to 36.

[Reaction formula 18]



In the formula, R^1, R^2, R^B, X_1, Y, T, l, A_{10} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14b} and R^{15a} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one secondary amine thereon;

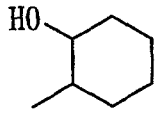
R^{14c} and R^{15b} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one tertiary amine thereon substituted with R^{50};

R^{14d} and R^{15c} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one tertiary amine thereon substituted with R^{51};

R^{14e} and R^{15d} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one tertiary amine thereon substituted with a $R^{52}(R^B)CH$- group;

R^{14f} and R^{15e} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one tertiary amine

thereon substituted with a group of the formula:



R^{50} is the same substituent of the heterocyclic ring, which is formed by R^{14} and R^{15} bound each other, as the above described (28), (30), (31), (32), (33), (34), (36), (37), (38), (41), (43), (44), (45), (47), (49) (provided that t is 1), (50) (provided that o is 0), (51), (52), (53), (54), (55), (56), (57), (58), (59), (60), (62), (63), (64), (65), (66), (70), (77), (79), (82), (83), (87), (88a), or (90a);

R^{51} is the same substituent of the heterocyclic group, which is formed by R^{14} and R^{15} bound each other, as the above described (35), (39), (40), (42), (50) (provided that o is 1), (67), (75), (76), (77), (78), (80), (81) or (84) (provided that s is 0);

R^{52} is a hydrogen atom, a lower alkyl group which has 1 or 2 phenyls which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a lower alkanoyl group, an amino group which may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy group and which may

have a pyridyl group on the lower alkyl group, a phenyl group which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a lower alkanoyl group, an amino group which have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxy group, and a lower alkylenedioxy group, a pyridyl lower alkyl group which may be substituted on the pyridine ring with 1 to 3 substituents selected from the group consisting of a hydroxyl group and a lower alkyl group which may have a hydroxyl groups as a substituent, a pyridyl group which may be substituted on the pyridine ring with 1 to 3 substituents selected from the group consisting of a hydroxyl group and a lower alkyl group which may have a hydroxyl group as a substituent, a pyrrolyl lower alkyl group which may have 1 to 3 lower alkyl groups as substituents on the pyrrole ring, a pyrrolyl group which may have 1 to 3 lower alkyl groups as substituents on the pyrrole ring, a benzoxazolyl lower alkyl group, a benzoxazolyl group, a benzthiazolyl lower alkyl group, a benzothiazolyl group, a furyl lower alkyl group, a furyl group, a lower alkyl group which may have a substituent selected from the group consisting of a hydroxyl group and a

halogen atom, a naphtyl lower alkyl group, a naphthyl group, a phenoxy lower alkyl group, a $-B_{12}CO-NR^{20}R^{21}$ group; a $-B_{13}NR^{22}R^{23}$ group, a 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a 1,2,3,4-tetrahydronaphthyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a quinolyl lower alkyl group, a quinolyl group, a 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a 1,2,3,4-tetrazolyl group which may have, on the tetrazole ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a thiazolyl lower alkyl group which may have a phenyl group as a substituent on the thiazole ring, a thiazolyl group wherein may have a phenyl group as a substituent on the thiazole ring, a benzoyl lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxy group and a halogen atom, a piperidinyl lower alkyl group which may have a lower alkoxy group as a substituent on the piperidine ring, a benzoyl lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxy group and a halogen atom, a piperidinyl

group which may have a lower alkyl group on the piperidine ring, a 1,2,3,4-tetrahydroquinolyl lower alkyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring, a 1,2,3,4-tetrahydroquinolyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring, a 1,3,4-oxadiazolyl lower alkyl group which may have an oxo group as a substituent on the 1,3,4-oxadiazole ring, a 1,3,4-oxadiazolyl group which may have an oxo group as a substituent on the 1,3,4-oxadiazole ring, a cycloalkyl lower alkyl group, a cycloalkyl group, a thienyl lower alkyl group, a thienyl group, a lower alkoxy lower alkyl group, a carboxy lower alkyl group, a lower alkoxycarbonyl lower alkyl group, an imidazolyl lower alkyl group, or an imidazolyl group; and

R^B and R^{52}, together with carbon atoms to which they bind, may form a cycloalkyl group or a tetrahydro-4H-pyranyl group;

provided that the alkyl moiety of the $R^{52}(R^B)CH$- group in the compound (1aaa) has not more than six carbon atoms.

The reaction of the compound (35′) with the compound (39) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (35′) with the compound (40) is carried out under the condition

similar to that of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

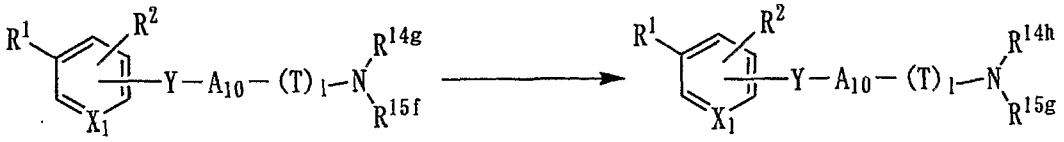
The reaction of the compound (35′) with the compound (41) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

When the reaction is carried out using the compound (41) as a starting material, wherein R^B and R^{52} together with carbon atoms bound to them form a cycloalkyl ring or a tetrahydro-4H-pyran ring using a hydride reducing agent, a cycloalkyloxytrialkylsilane such as [(1-ethoxycyclopropyl)oxy]trimethylsilane may be used as a starting material in place of the compound (41) to generate the above described compound (41) in the reaction system.

The reaction of the compound (35′) with the compound (42) is carried out under the condition to similar that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The compound (35′) may also be produced from the compound (1yy), (1zz) or (1aaa) under the reaction condition similar to that of the reaction which converts the compound (1iii′) into the compound (1hhh′) of the later described reaction formula 24.

[Reaction formula 19]



(1ccc) (1ddd)

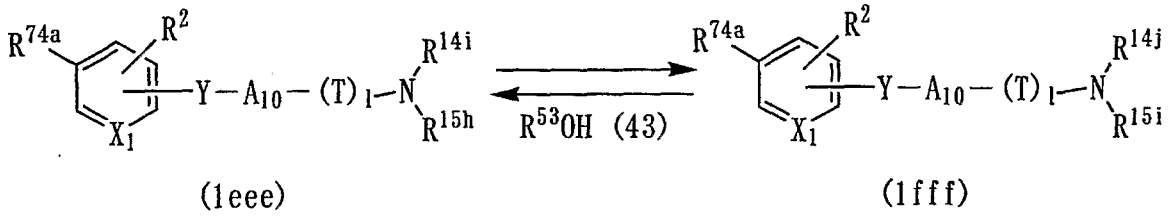
In the formula, R^1, R^2, X_1, Y, T, l, A_{10} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14g} and R^{15f} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one tertiary amine thereon substituted with a lower alkoxycarbonyl group; and

R^{14h} and R^{15g} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one secondary amine thereon.

The reaction which converts the compound (1ccc) into the compound (1ddd) may be carried out under the reaction condition similar to that of the hydrolysis B described for the above described reaction formula 9.

[Reaction formula 20]



In the formula, R^{74a} represents a nitro group or a $-R^1$ group, and R^1, R^2, X_1, Y, T, l and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14i} and R^{15h} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one lower alkoxycarbonyl lower alkoxy group, lower alkoxycarbonyl group, lower alkoxycarbonyl lower alkyl group, or $-(B_{12}CO)t-N(R^{20a})R^{51'}$ group thereon;

R^{14j} and R^{15i} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one carboxy lower alkoxy group, carboxy group, carboxy lower alkyl group, or $-(B_{12}CO)t-N(R^{20a})R^{52'}$ group thereon;

B_{12} and t are the same as described above;

R^{20a} represents a hydrogen atom, a cycloalkyl group, an amino group which have a lower alkoxycarbonyl group as a substituent, a benzoyl group which may have 1 to 3 alkoxy groups as substituents on the phenyl ring, a

lower alkyl group, a lower alkyl group which has 1 or 2 phenyls which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of an lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, and a lower alkylthio group, a phenyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a lower alkoxy group which may have a halogen atom as a substituent and a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a cycloalkyl lower alkyl group, a pyrrolidinyl lower alkyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent, an amino substituted lower alkyl group which may have a substituent selected from the group consisting of a phenyl group and a lower alkyl group, a 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a naphthyl lower alkyl group, a pyridyl lower alkyl group, a quinolyl lower alkyl group, a 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a

1,2,4-triazolyl lower alkyl group, a tetrahydrofuryl lower alkyl group which may have a hydroxyl group as a substituent on the lower alkyl group, a phenoxy lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a nitro group, a phenyl lower alkanoyl group, a lower alkanoyl group which may have a halogen atom as a substituent, an imidazolyl lower alkanoyl group, a lower alkoxycarbonyl lower alkyl group, a pyridyl group, or a carboxy lower alkyl group;

$R^{51'}$ is a lower alkoxycarbonyl group or a lower alkoxycarbonyl lower alkyl group;

$R^{52'}$ is a hydrogen atom or a carboxy lower alkyl group; and

R^{53} is a lower alkyl group.

The reaction which converts the compound (1eee) into the compound (1fff) may be carried out under the reaction condition similar to that of the hydrolysis B as described in the above described reaction formula 9.

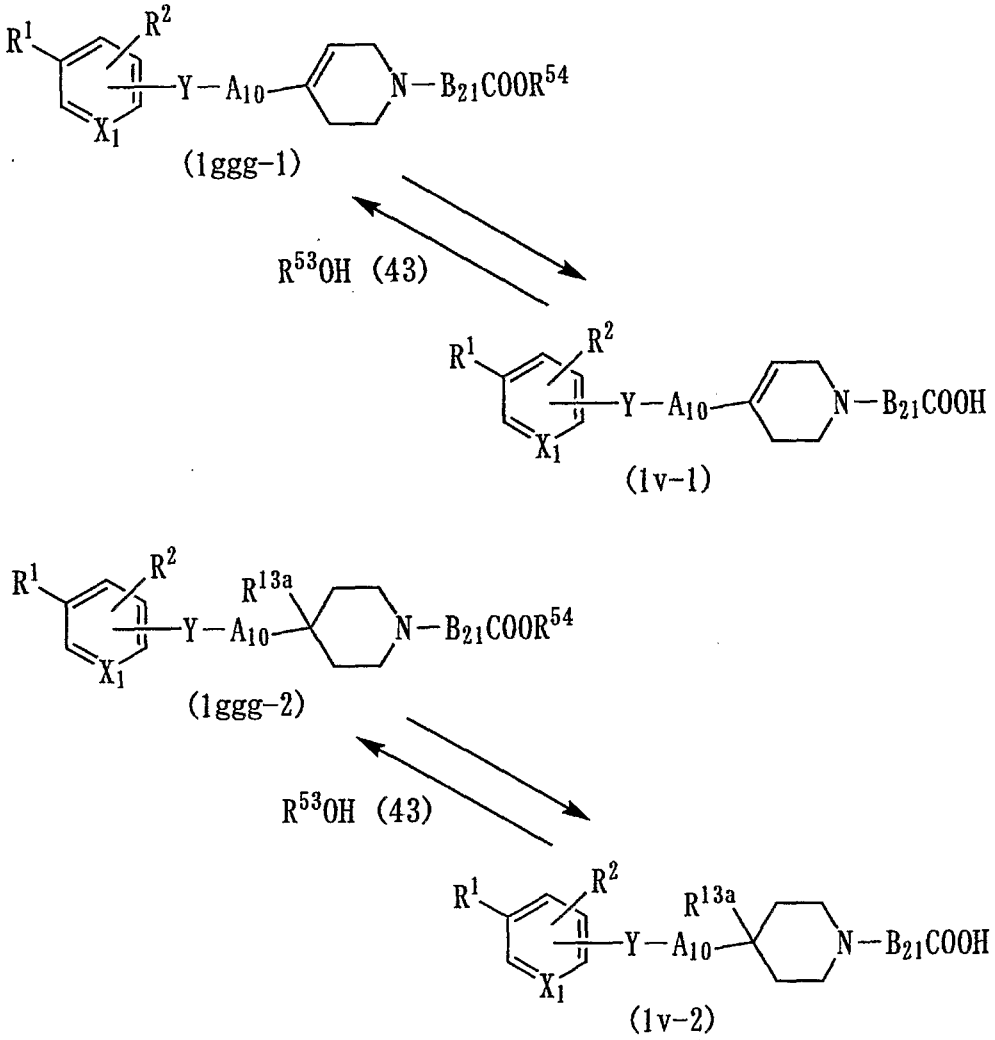
Any of the reaction conditions for typical esterification reaction may be used for the reaction of the compound (1fff) with the compound (43). For example, the above described reaction is carried out in the presence of a mineral acid such as hydrochloric acid or sulfuric acid, and a halogenation agent such as thionylchloride, phosphorus oxychloride, phosphorus pentachloride, or phosphorus trichloride. The compound

(43) is used in large excess over the compound (1fff). The above described reaction favorably proceeds at typically about 0 to 150°C, preferably about 50 to 100°C, and is completed in general in about 1 to 10 hours. The esterification described above may be carried out using a condensation agent such as carbodiimide in the presence of a basic compound such as dimethylaminopyridine. A typical reaction condition for generating an amide bond, which is used in the reaction of the compound (1b) with the compound (6) in the reaction formula 2, may also be used.

The reaction of the compound (1fff) with compound (43) may also be carried out in the presence of the same basic compound and the solvent as those used in the reaction of the compound (2) with the compound (3) of the reaction formula 1. The reaction is carried out at typically about 0 to 100°C, and preferably about 0 to 70°C, and is completed in general in about 1 to 30 hours.

The compound (1eee) may also be produced using a halogenated lower alkyl such as methyl iodide in place of the compound (43) under the condition similar to that of the reaction of the compound (2) with the compound (3) of the reaction formula 1.

[Reaction formula 21]



In the formula, R^1, R^2, X_1, Y, A_{10}, R^{13a}, B_{21} and R^{53} are the same as described above, and R^{54} is a lower alkyl group, provided that the a and b of A_{10} are bound to Y and the piperidinyl group, respectively.

The reaction which converts the compound (1ggg-1) into the compound (1v-1) and the reaction which converts the compound (1ggg-2) into the compound (1v-2) may be carried out under the reaction condition similar to that of the hydrolysis B described for the

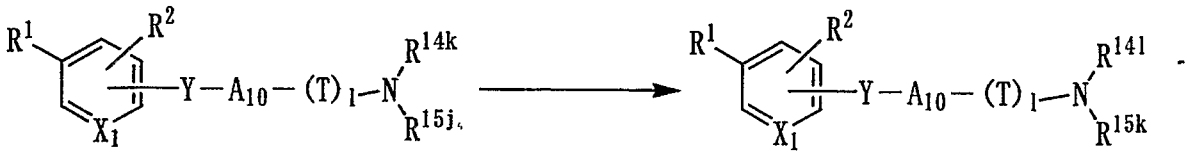
above described reaction formula -9, respectively.

The reaction of the compound (1v-1) with the compound (43) and the reaction of the compound (1v-2) with the compound (43) is carried out under the reaction condition similar to that of the reaction of the compound (1fff) with the compound (43) of the above described reaction formula 20.

The compound (1ggg-1) may also be produced using a halogenated lower alkyl such as methyl iodide in place of the compound (43) under the condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

Similarly, the compound (1ggg-2) may also be produced using a halogenated lower alkyl such as methyl iodide in place of the compound (43) under the condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

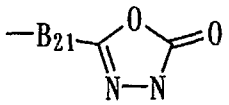
[Reaction formula 22]



(1hhh) (1iii)

In the formula, R^1, R^2, X_1, Y, T, l and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

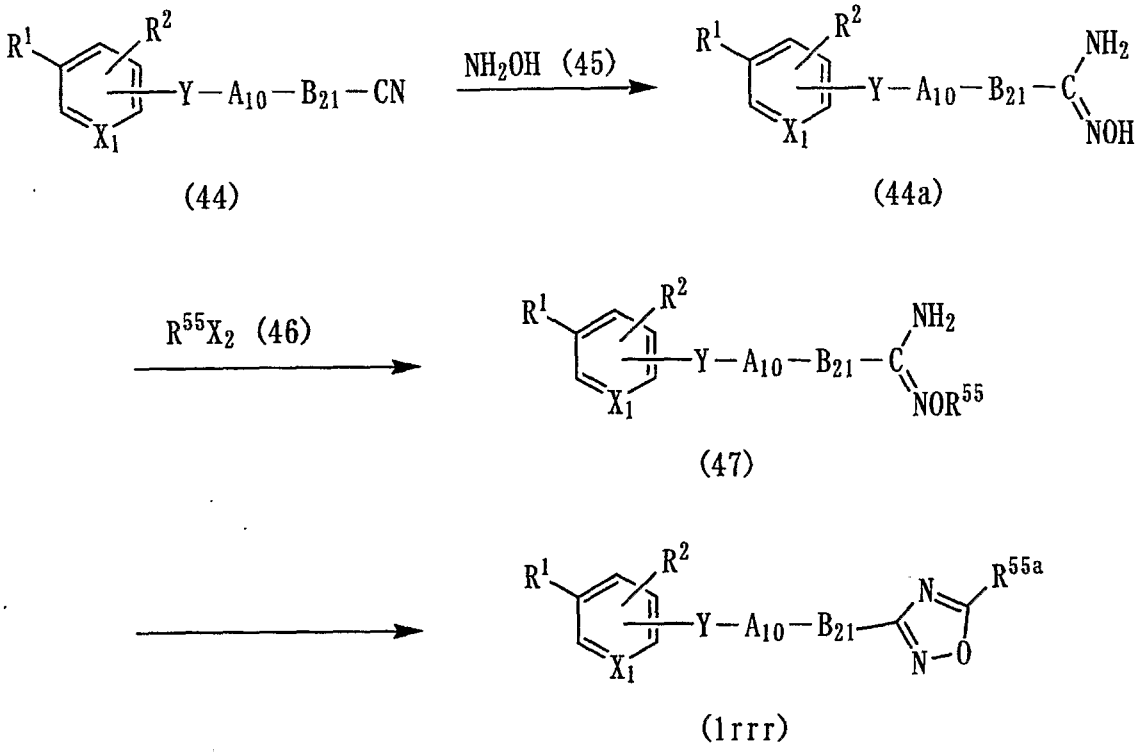
R^{14k} and R^{15j} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one $-B_{21}CONHNH_2$ group, wherein B^{21} is the same as described above, thereon; and R^{14l} and R^{15k} are a 5- to 10- membered saturated or unsaturated heterocyclic ring the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one group of the formula:



thereon.

The reaction which converts the compound (1hhh) into compound (1iii) is carried out under the condition similar to that of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 23]



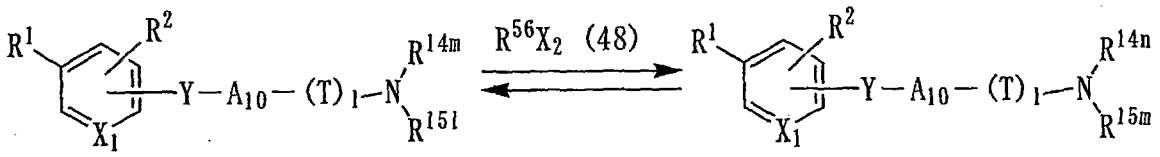
In the formula, R^1, R^2, X_1, Y, A_{10}, B_{21} and X_2 are the same as described above, the a and b of A_{10} are bound to Y and (T)l, respectively, R^{55} is a lower alkanoyl group, and R^{55a} is a lower alkyl group.

The reaction of the compound (44) with the compound (45) is carried out under the condition to similar that of the reaction which converts the compound (1f) into the compound (1h) of the above described reaction formula 3.

The reaction of the compound (44a) with the compound (46) is carried out under the condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction which converts the compound (47) into the compound (1rrr) is carried out under the condition similar to that of the reaction which converts the compound (1f) into the compound (1h) of the above described reaction formula 3.

[Reaction formula 24]



(1hhh') (1iii')

In the formula, R^1, R^2, X_1, Y, T, l, A_{10} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively; R^{14m} and R^{15l} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one hydroxyl group or hydroxyl group substituted lower alkyl group thereon; R^{14n} and R^{15m} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one $-OR^{56}$ group thereon; R^{56} represents a phenyl group which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a cyano group, a lower alkyl group which may have a halogen atom as a

substituent, and a lower alkoxy group which may have a halogen atom as a substituent, a phenyl lower alkyl group which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, and a lower alkoxy group which may have a halogen atom as a substituent, a pyridyl lower alkyl group, a lower alkyl group, a lower alkoxy lower alkyl group, a benzoyl group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group; or a $-B_{15}-CO-NR^{26}R^{27}$ group, wherein B_{15}, R^{26} and R^{27} are the same as described above,

provided that, the R^{56} of the compound (48), which reacts with the above described heterocyclic group substituted with at least one hydroxyl group substituted lower alkyl group of the compound (1hhh'), is an unsubstituted phenyl group or a lower alkyl group.

The reaction of the compound (1hhh') with the compound (48) is carried out under the condition similar to that of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction which converts the compound (1iii') into the compound (1hhh') may be carried out under the condition to similar that of the hydrolysis B described in the above described reaction formula 9.

The compound (1iii') may be converted into

the compound (1hhh') by a reduction reaction. This reduction reaction is, for example, carried out in an appropriate solvent in the presence of a catalytic hydrogen reducing agent.

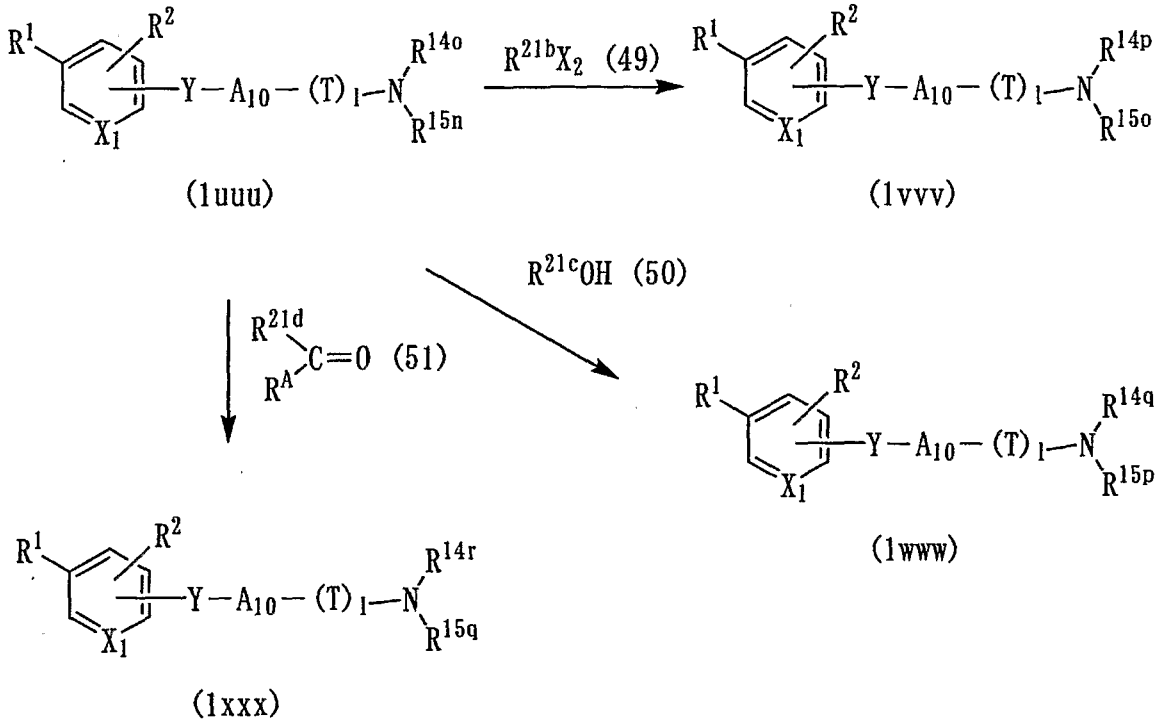
Examples of the solvent used include water, fatty acids such as acetic acid, alcohols such as methanol, ethanol, and isopropanol, aliphatic hydrocarbons such as hexane and cyclohexane, ethers such as dioxane, tetrahydrofuran, diethyl ether, monoglyme, and diglyme, esters such as ethyl acetate and methyl acetate, aprotic polar solvents such as N,N-dimethylformamide, and a mixture thereof.

Examples of the catalytic hydrogen reducing agent used include palladium, palladium black, palladium-carbon, platinum, platinum oxide, copper chromite, and Raney nickel. These reducing agents may be used singly or as a mixture of two or more.

The catalytic hydrogen reducing agent is favorably used generally in an amount of 0.02 to 1 time of the compound (1iii') on a weight basis.

The reaction temperature is typically at about -20 to 100°C, and preferably at about 0 to about 80°C. The reaction is preferably carried out at a hydrogen pressure of typically 1-10 atm, and is completed in general in about 0.5 to 20 hours.

[Reaction formula 25]



In the formula R^1, R^2, X_1, Y, T, l, A_{10}, R^A and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14o} and R^{15n} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one $-(B_{12}CO)tNHR^{20a}$ group thereon;

R^{14p} and R^{15o} are a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one $-(B_{12}CO)tN(R^{20a})R^{21b}$ group thereon; and

R^{14q} and R^{15p} are a 5- to 10- membered saturated or

unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic group has at least one $-(B_{12}CO)tN(R^{20a})R^{21c}$ group thereon;

R^{14r} and R^{15q} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15} except that the heterocyclic ring has at least one $-(B_{12}CO)tN(R^{20a})(CHR^{A}R^{21d})$ group thereon, wherein B_{12}, t and R^{20a} are the same as described above;

R^{21b} represents a lower alkyl group, a cycloalkyl group, a lower alkyl group which have 1 or 2 phenyls which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent and a lower alkylthio group, a phenyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a lower alkoxy group which may have a halogen atom as a substituent and a lower alkyl group which may have a halogen atom as a substituent, a cycloalkyl lower alkyl group, a pyrrolidinyl lower alkyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent, an amino substituted lower alkyl group which may have a

substituent selected from the group consisting of a phenyl group and a lower alkyl group, a 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a naphthyl lower alkyl group, a pyridyl lower alkyl group, a quinolyl lower alkyl group, a 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a tetrahydrofuryl lower alkyl group which may have a hydroxyl group as a substituent on the lower alkyl group, a phenoxy lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a nitro group, a lower alkoxycarbonyl lower alkyl group, a pyridyl group, or a carboxy lower alkyl group;

R^{21c} represents a benzoyl group which may have 1 to 3 lower alkoxy groups as substituents on the phenyl ring, a lower alkoxycarbonyl group, a phenyl lower alkanoyl group, a lower alkanoyl group which may have a halogen atom as a substituent or an imidazolyl lower alkanoyl group; and

R^{21d} represents a hydrogen atom, a lower alkyl group, a lower alkyl group which have 1 or 2 phenyl groups which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower

alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent and a lower alkylthio group, a phenyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may be substituted with a halogen atom, a lower alkoxy group which may be substituted with a halogen atom and a lower alkylthio group, a cycloalkyl lower alkyl group, a cycloalkyl group, a pyrrolidinyl lower alkyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent, a pyrrolidinyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent, an amino substituted lower alkyl group which may have a group selected from the group consisting of a phenyl group and a lower alkyl group, a 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a 1,2,3,4-tetrahydronaphthyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a naphthyl lower alkyl group, a naphthyl group, a pyridyl lower alkyl group, a

pyridyl group, a quinolyl lower alkyl group, a quinolyl group, a 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a 1,2,3,4-tetrazolyl group which may have, on the tetrazole ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,4-triazolyl group, a tetrahydrofuryl lower alkyl group which may have a hydroxyl group as a substituent on the lower alkyl group, a tetrahydrofuryl group which may have a hydroxyl group as a substituent on the lower alkyl group, a phenoxy lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a nitro group, a lower alkoxycarbonyl lower alkyl group or a carboxy lower alkyl group;

provided that the alkyl moiety of $CHR^{A}R^{21d}$ in the side chain $(-(B_{21}CO)tN(R^{20a})(CHR^{A}R^{21d}))$ has not more than 6 carbon atoms.

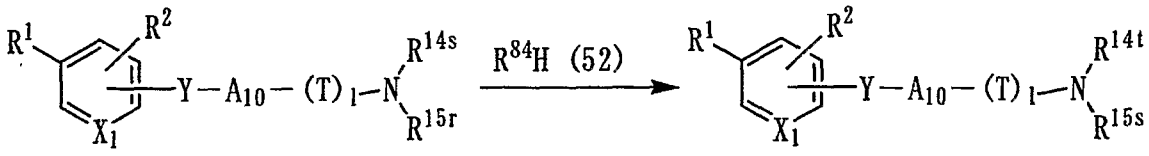
The reaction of the compound (1uuu) with the compound (49) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1uuu) with the compound (51) is carried out under reaction conditions

similar to those of the reaction of the compound (1b) and the compound (5) of the above described reaction formula 2.

The reaction of the compound (1uuu) with the compound (50) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 26]



(1yyy) (1zzz)

In the formula, R^1, R^2, X_1, Y, T, l, and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14s} and R^{15r} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)oB_{13}X_2$ group thereon;

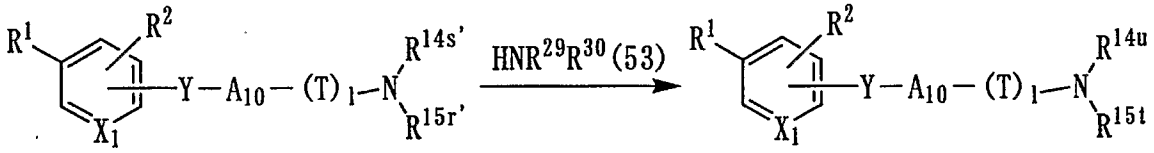
R^{14t} and R^{15s} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)o\ B_{13}R^{84}$ group thereon; and

R^{84} is an $-NR^{22}R^{23}$ group or an imidazolyl group;

wherein B_{13}, o, X_2, R^{22} and R^{23} are the same as described above.

The reaction of the compound (1yyy) with the compound (52) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 27]



(1aaaa) (1bbbb)

In the formula, R^1, R^2, X_1, Y, T, l, and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

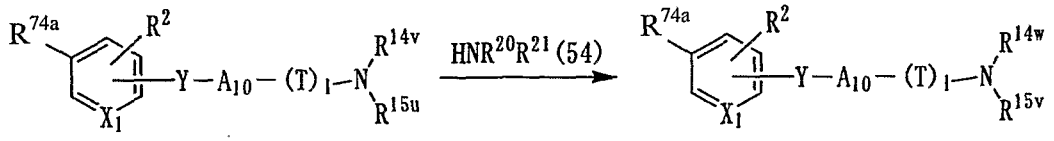
$R^{14s'}$ and $R^{15r'}$ represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-N(R^{28})-CO-B_{16}X_2$ group thereon; and

R^{14u} and R^{15t} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-N(R^{28})-CO-B_{16}NR^{29}R^{30}$ group thereon;

wherein R^{28}, B_{16}, X_2, R^{29} and R^{30} represent the same as described above.

The reaction of the compound (1aaaa) with the compound (53) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 28]



(1cccc) (1dddd)

In the formula, R^{74a}, R^2, X_1, Y, T, l, and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14v} and R^{15u} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one- $B_{12}COOH$ group thereon; and

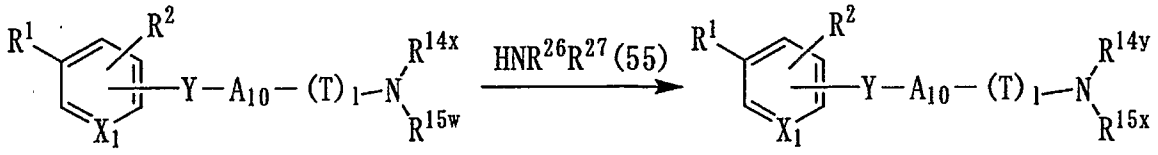
R^{14w} and R^{15v} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-B_{12}CONR^{20}R^{21}$ group thereon;

wherein B_{12}, R^{20} and R^{21} are the same as described above.

The reaction of the compound (1cccc) with the compound (54) is carried out under reaction conditions similar to those of the reaction of the compound (1b)

with the compound (6) of the above described reaction formula 2.

[Reaction formula 29]



(1eeee) (1ffff)

In the formula, R^1, R^2, X_1, Y, T, l, and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

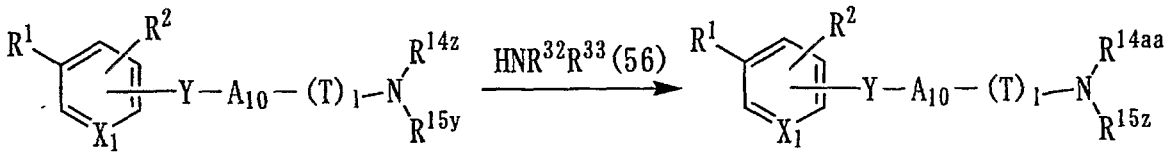
R^{14x} and R^{15w} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-O-B_{15}COOH$ group thereon; and

R^{14y} and R^{15x} represent a 5- to 10-membered saturated or unsaturated heterocyclic group as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-O-B_{15}CONR^{26}R^{27}$ group thereon;

wherein B_{15}, R^{26} and R^{27} are the same as described above.

The reaction of the compound (1eeee) with the compound (55) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 30]



(1gggg) (1hhhh)

are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

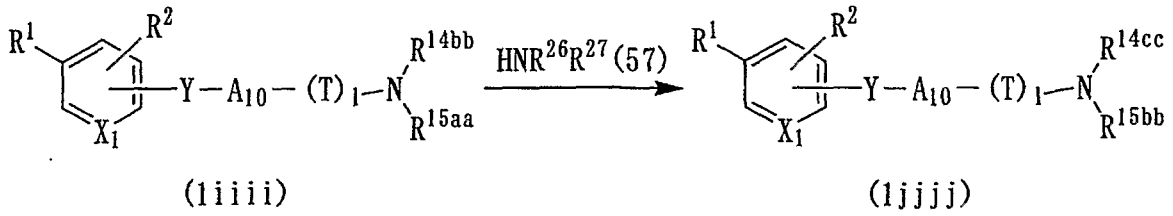
R^{14z} and R^{15y} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-N(R^{31})-B_{17}-COOH$ group thereon; and

R^{14aa} and R^{15z} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-N(R^{31})-B_{17}CONR^{32}R^{33}$ group thereon;

wherein R^{31}, B_{17}, and R^{32}, R^{33} are the same as described above.

The reaction of the compound (1gggg) with the compound (56) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 31]



In the formula, R^1, R^2, X_1, Y, T, l, and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

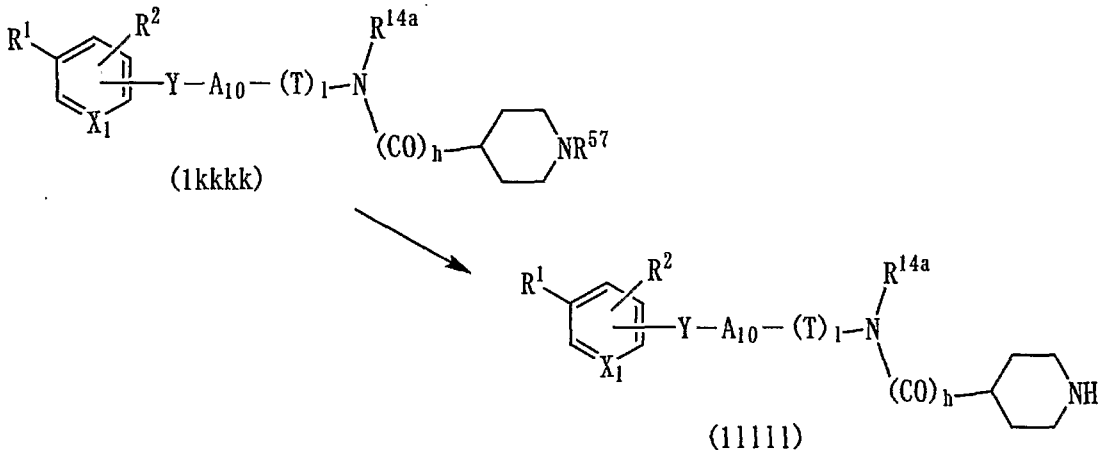
R^{14bb} and R^{15aa} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one -COOH group thereon; and

R^{14cc} and R^{15bb} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-CONR^{26}R^{27}$ group thereon;

wherein R^{26} and R^{27} are the same as described above.

The reaction of the compound (1iiii) with the compound (57) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 32]



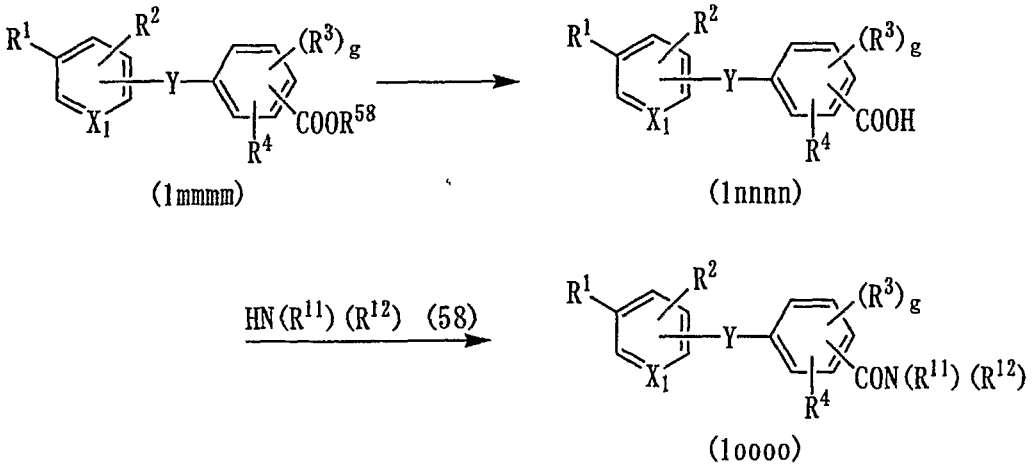
In the formula, R^1, R^2, X_1, Y, T, l, R^{14a} and A_{10} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

h represents 0 or 1; and

R^{57} represents a lower alkoxycarbonyl group.

The reaction which converts the compound (1kkkk) into the compound (11111) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

[Reaction formula 33]

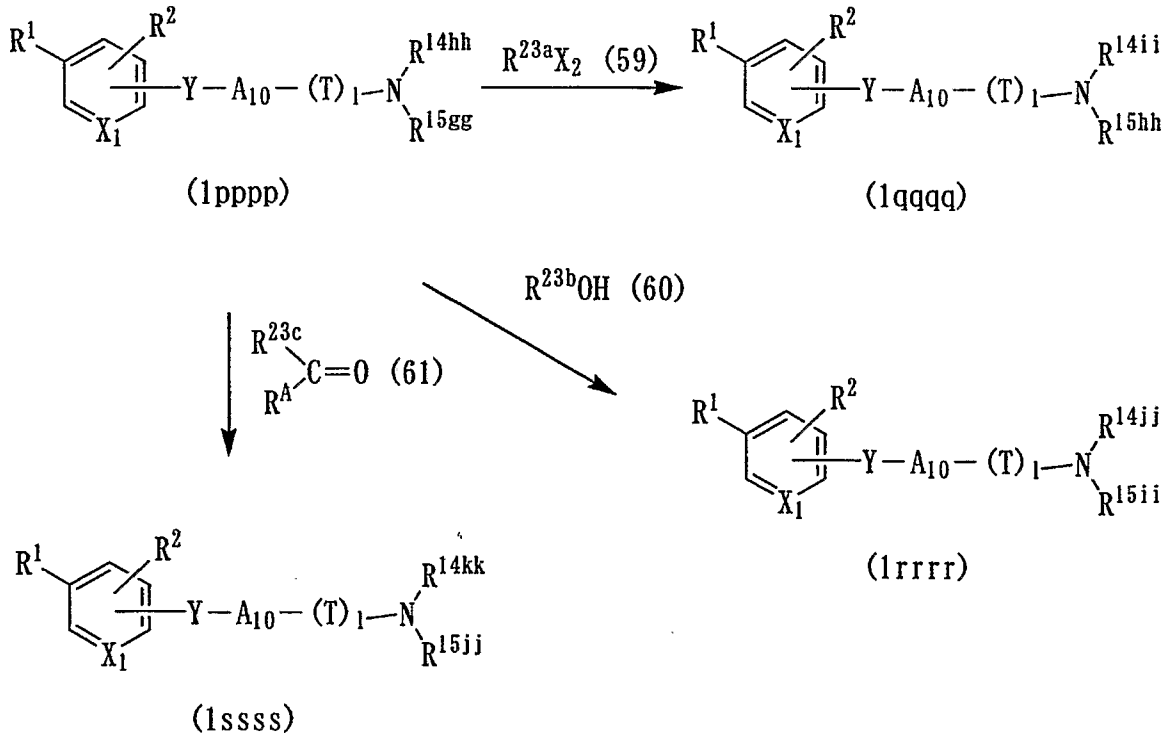


In the formula, R^1, R^2, X_1, R^3, R^4, Y, R^{11} and R^{12} are the same as described above, R^{58} represents a lower alkyl group, and g represents 0 or 1.

The reaction which converts the compound (1mmmm) into the compound (1nnnn) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (1nnnn) with the compound (58) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 34]



In the formula, R^1, R^2, X_1, Y, T, l, A_{10} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{14hh} and R^{15gg} represent a 5- to-10 membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)o-B_{13}NH(R^{22a})$ group thereon;

R^{14ii} and R^{15hh} represent a 5- to 10- membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)o-B_{13}N(R^{22a})R^{23a}$ group thereon;

R^{14jj} and R^{15ii} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)o-B_{13}N(R^{22a})R^{23b}$ group thereon;

R^{14kk} and R^{15jj} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(CO)o-B_{13}N(R^{22a})(CHR^AR^{23c})$ group thereon,

wherein R^A, B_{13} and o are the same as described above;

R^{22a} is a hydrogen atom, a lower alkyl group, a benzoyl group which may have 1 to 3 lower alkoxy groups as substituents on the phenyl ring, a phenoxy lower alkyl group which may have a lower alkyl group as a

substituent on the phenyl ring, a phenyl lower alkyl group or a phenyl group;

R^{23a} represents a lower alkyl group, a phenoxy lower alkyl group which may have a lower alkyl group as a substituent on the phenyl ring, a phenyl lower alkyl group or a phenyl group;

R^{23b} represents a benzoyl group which may have 1 to 3 lower alkoxy groups as substituents on the phenyl ring; and

R^{23c} represents a hydrogen atom, a lower alkyl group, a phenoxy lower alkyl group which may have a lower alkyl group as a substituent on the phenyl ring, a phenyl lower alkyl group or a phenyl group; provided that the alkyl moiety of the $-CHR^{A}R^{23c}$ group in the side chain ($-(CO)o-B_{13}-N(R^{22a})(CHR^{A}R^{23c})$) of the compound (1ssss) has not more than 6 carbon atoms.

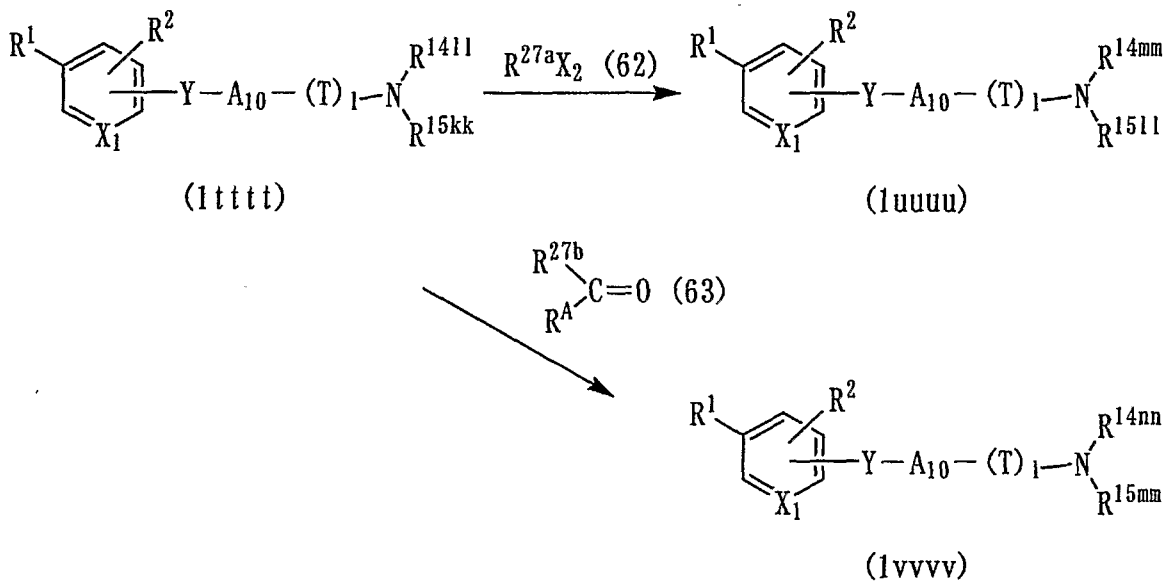
The reaction of the compound (1pppp) with the compound (59) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1pppp) with the compound (61) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

The reaction of the compound (1pppp) with the compound (60) is carried out under reaction conditions

similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 35]



In the formula, R^1, R^2, X_1, Y, T, l, A_{10} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{1411} and R^{15kk} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(O-B_{15})s-CONH(R^{26a})$ group thereon;

R^{14mm} and R^{1511} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(O-B_{15})s-CON(R^{26a})(R^{27a})$ group thereon;

R^{14nn} and R^{15mm} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(O-B_{15})s-CON(R^{26a})(CHR^{A}R^{27b})$ group,

wherein B_{15}, s and R^{A} are the same as described above;

R^{26a} represents a hydrogen atom, a lower alkyl group, a phenyl lower alkyl group or an imidazolyl lower alkyl group;

R^{27a} represents a lower alkyl group, a phenyl lower alkyl group or an imidazolyl lower alkyl group; and

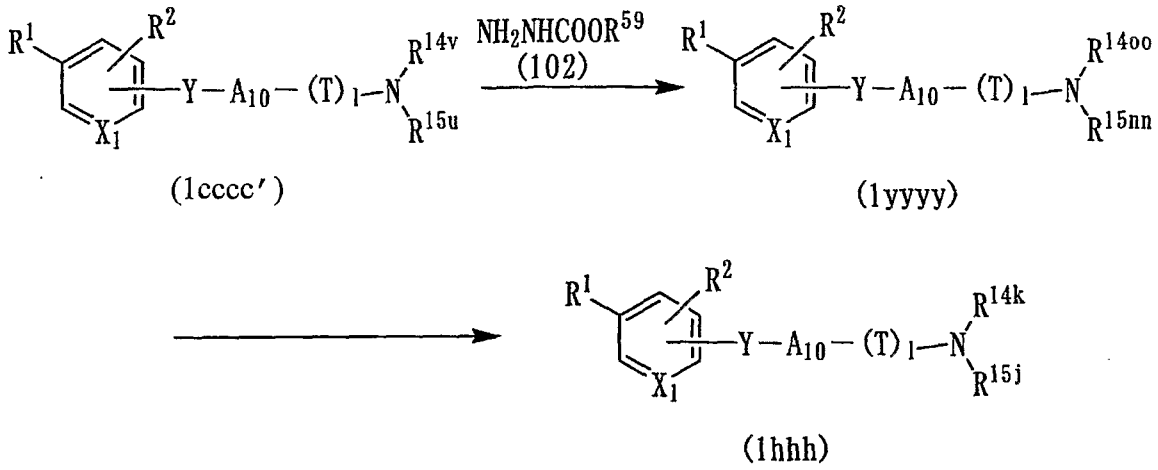
R^{27b} represents a hydrogen atom, a lower alkyl group, a phenyl lower alkyl group, a phenyl group, an imidazolyl group or an imidazolyl lower alkyl group;

provided that the alkyl moiety of the $-CHR^{A}R^{27b}$ group in the side chain $(-(O-B_{15})s-CO(R^{26a})(CHR^{A}R^{27b}))$ of the compound (1vvvv) has not more than 6 carbon atoms.

The reaction of the compound (1tttt) with the compound (62) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1tttt) with the compound (63) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 36]



In the formula, R^1, R^2, X_1, Y, T, l, A_{10}, R^{14v}, R^{15u}, R^{14k} and R^{14j} are the same as described above, provided that the a and b of A_{10} are bound to Y and (T)l, respectively;

R^{59} represents a lower alkyl group; and

R^{14oo} and R^{15nn} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-B_{21}CONHNHCOOR^{59}$ group,

wherein B_{21} is the same as described above.

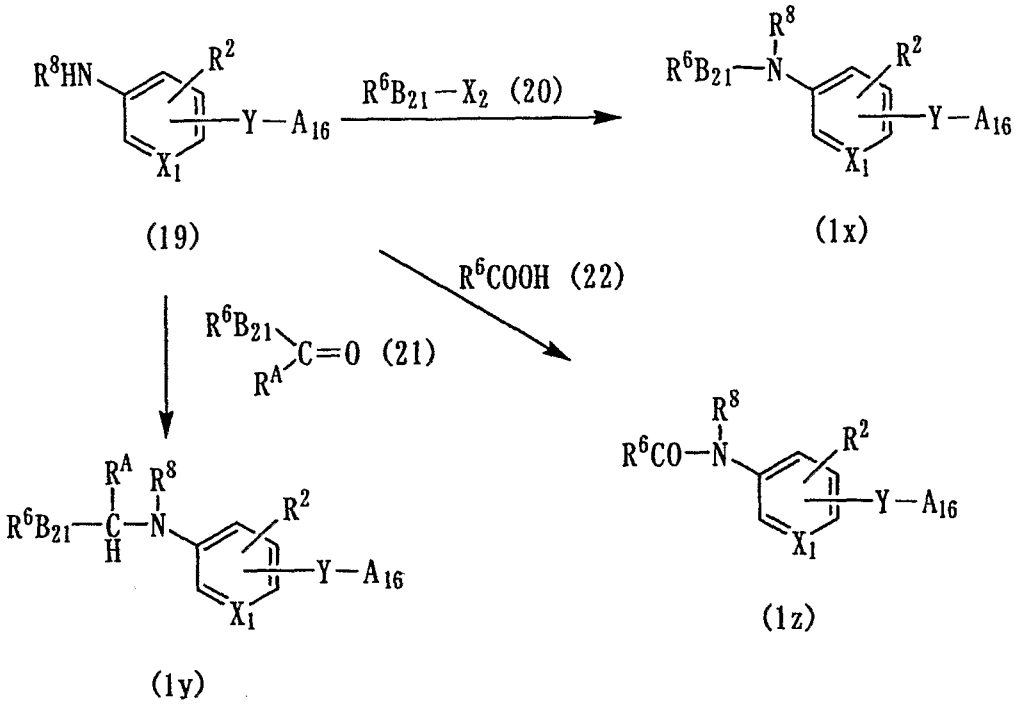
The reaction of the compound (1cccc') with the compound (102) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction which converts the compound (1yyyy) into the compound (1hhh) may be carried out under reaction conditions similar to those of the

hydrolysis B described for the above described reaction formula 9.

The compound of the present invention of the general formula (1) having various R^1s is produced, for example, as shown by the following reaction formulas 37 to 46.

[Reaction formula 37]



In the formula, R^2, X_1, Y, A_{16}, R^6, R^8, B_{21}, R^A and X_2 are the same as described above, provided that the $B_{21}CHR^A$ moiety of the (R^6-$B_{21}CHR^A$-) group of the compound (1y) has not more than 6 carbon atoms.

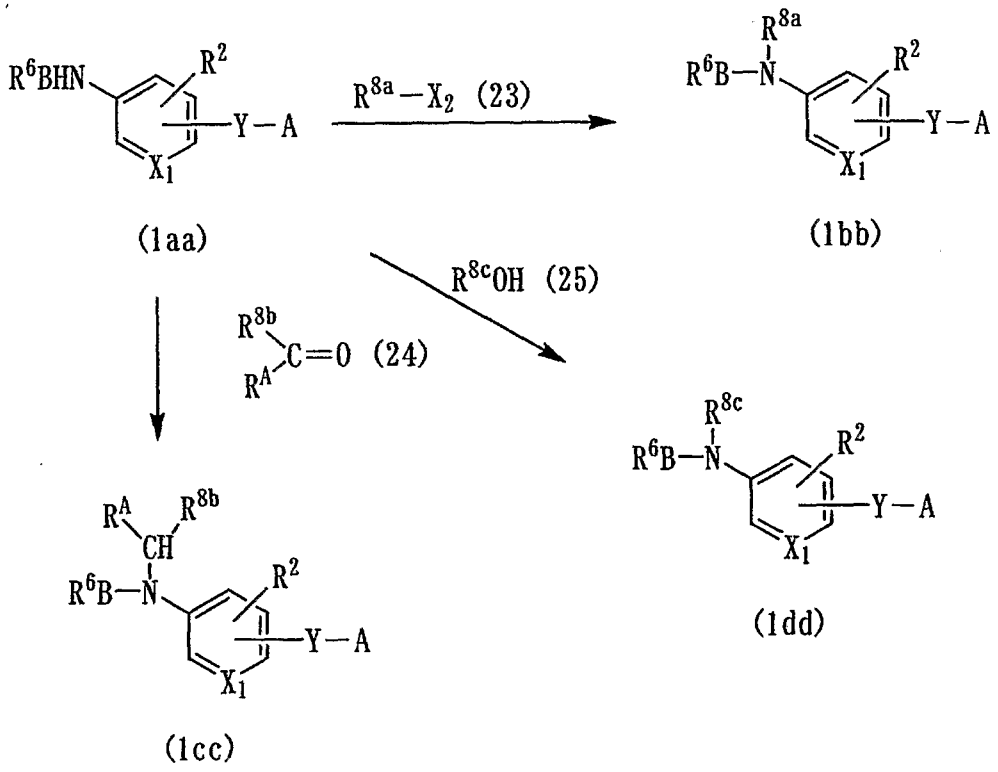
The reaction of the compound (19) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (19) with the

compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

The reaction of the compound (19) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 38]



In the formula, R^2, X_1, Y, A, R^6, B, R^A and X_2 are the same as described above, R^{8a} represents a lower alkyl group which may have a lower alkoxy group as a substituent, a lower alkylsulfonyl group or a phenyl

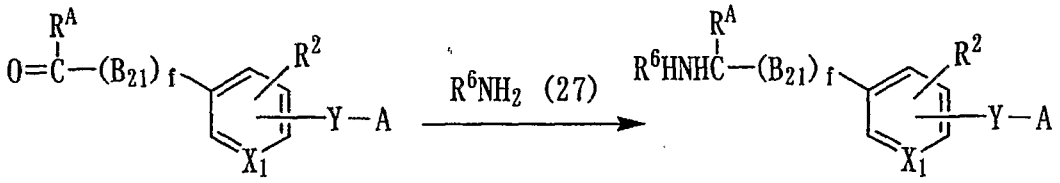
lower alkyl group, R^{8b} represents a hydrogen atom, a phenyl group, phenyl lower alkyl group or a lower alkyl group which may have a lower alkoxy group as a substituent, and R^{8c} represents a lower alkanoyl group, provided that the alkyl moiety of the $-CHR^{A}R^{8b}$ group of the compound (1cc) has not more than 6 carbon atoms.

The reaction of the compound (1aa) with the compound (23) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1aa) with the compound (24) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

The reaction of the compound (1aa) with the compound (25) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 39]



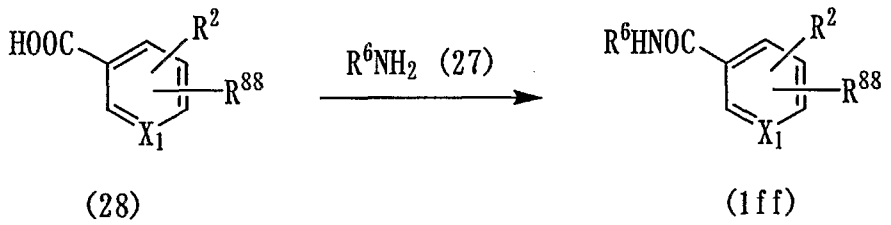
(26) (1ee)

In the formula, R^2, X_1, Y, A, B_{21}, f, R^A and R^6

are the same as described above, provided that the $(B_{21})fCHR^A$ moiety of the $(-(B_{21})fCHR^ANH\ R^6)$ group of the compound (1ee) has not more than 6 carbon atoms.

The reaction of the compound (26) with the compound (27) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

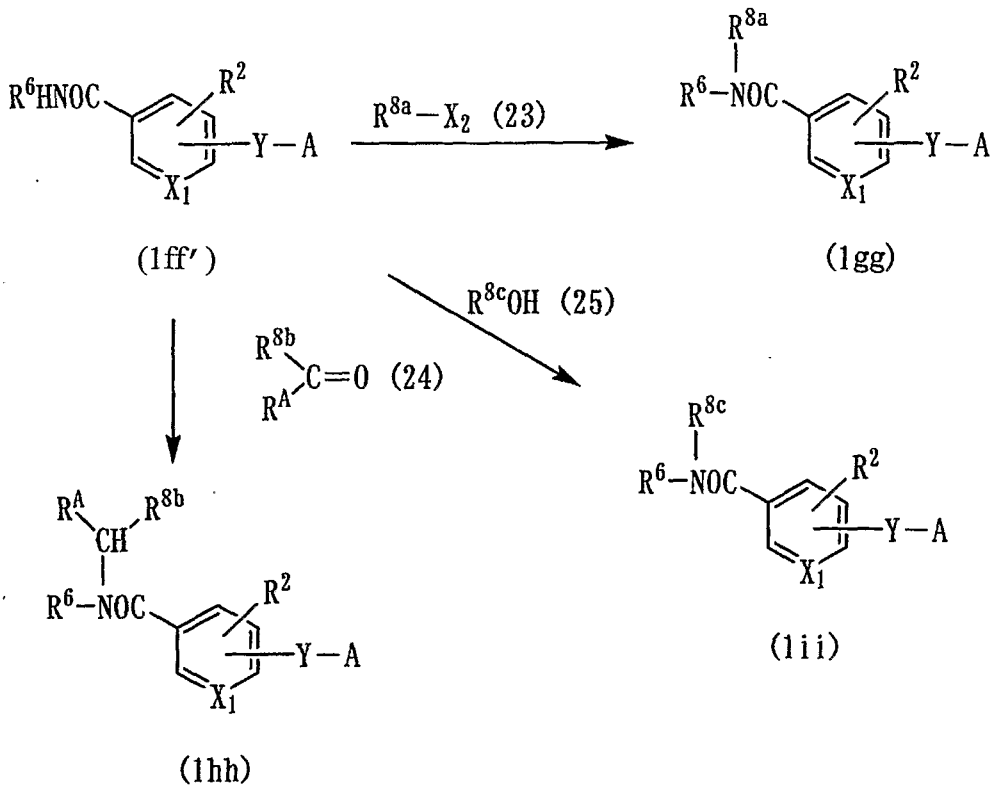
[Reaction formula 40]



In the formula, R^{88} represents a -Y-A group or a halogen atom, and R^2, X_1, Y, A, and R^6, are the same as described above.

The reaction of the compound (28) with the compound (27) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 41]



In the formula, R^2, X_1, Y, A, R^6, R^{8a}, R^{8b}, R^{8c}, R^A and X_2 are the same as described above, provided that the alkyl moiety of the $-CHR^AR^{8b}$ group of the compound (1hh) has not more than 6 carbon atoms.

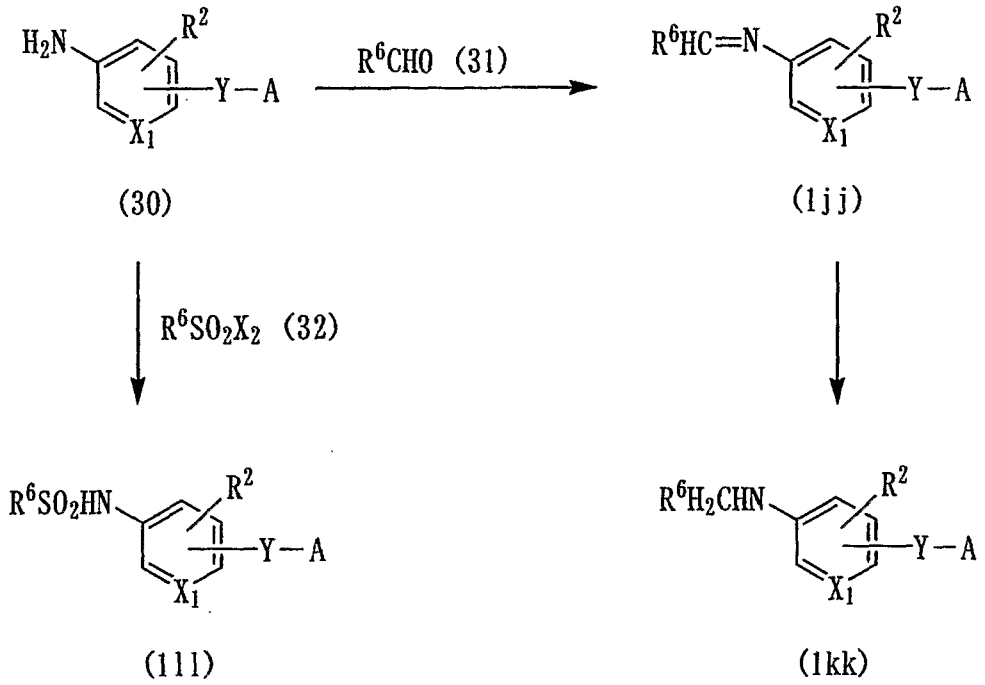
The reaction of the compound (1ff') with the compound (23) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1ff') with the compound (24) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction

formula 2.

The reaction of the compound (1ff') with the compound (25) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 42]



In the formula, R^2, X_1, Y, A, R^6 and X_2 are the same as described above.

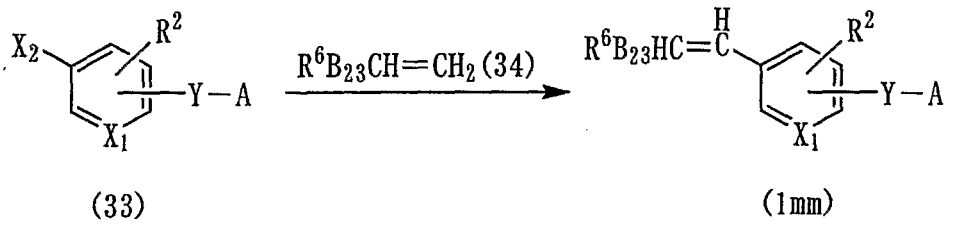
The reaction which converts the compound (30) into the compound (1jj) may be carried out under reaction conditions similar to those of the reaction which converts the compound (1f) into the compound (1h) of the above described reaction formula 3.

The reaction which converts the compound (1jj) into the compound (1kk) may be carried out under

reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

The reaction of the compound (30) with the compound (32) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 43]



In the formula, R^2, X_1, Y, A, X_2 and R^6 are the same as described above, B_{23} represents a lower alkylene group or a lower alkenylene group, and the B_{23}-HC=CH- moiety in the side chain (R^6B_{23}-HC=CH-) in the compound (1mm) has 1 to 3 double bonds and has not more than 6 carbon atoms.

The reaction of the compound (33) with the compound (34) is carried out in an appropriate inert solvent and in the presence of a condensation agent.

Examples of the inert solvent used in the above described reaction include aromatic hydrocarbons such as benzene, toluene, and xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, monoglyme, and diglyme, halogenated hydrocarbons such as

dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, lower alcohols such as methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, fatty acids such as α-dimethylaminoacetic acid and acetic acid, esters such as ethyl acetate and methyl acetate, ketones such as acetone and methyl ethyl ketone, acetonitrile, 1-methyl-2-pyrrolidone, pyridine, dimethyl sulfoxide, dimethylformamide, and hexamethylphosphoric acid triamide, and a mixture thereof.

Examples of the condensation agent include palladium complexes such as bis(benzonitrile)dichloropalladium (II).

The condensation agent is appropriately used in an amount typically 0.01 to 1 times, and preferably 0.01 to 0.5 times of the compound (33) on a molar basis.

The above described reaction favorably proceeds typically at 0 to 200°C, and preferably at about room temperature to about 150°C and is, in general, completed in about 10 minutes to 20 hours.

The above described reaction proceeds advantageously by adding a alkali metal salt of fatty acid such as sodium acetate to the reaction system.

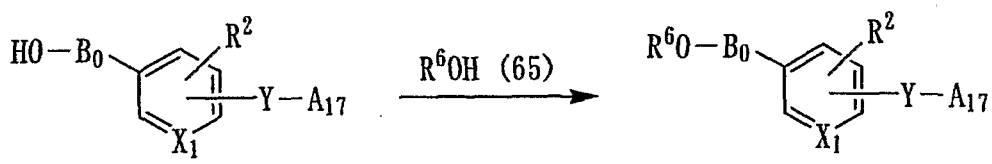
[Reaction formula 44]

(1nn) (1oo)

In the formula, R^2, X_1, Y, A and R^6 are the same as described above.

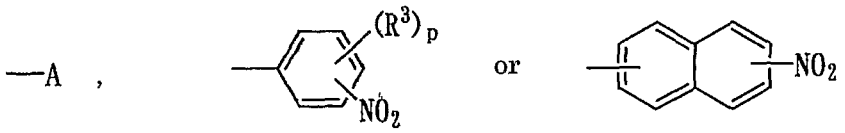
The reaction which converts the compound (1nn) into the compound (1oo) may be carried out under reaction conditions similar to those of the reaction which converts the compound (1f) into the compound (1g) of the above described reaction formula 3.

[Reaction formula 45]



(64) (1wwww)

In the formula, A_{17} represents a group of the formula:



wherein R^2, R^3, p, X_1, Y, A, Bo and R^6 are the same as described above.

The reaction of the compound (64) with the

compound (65) is carried out in an appropriate solvent in the presence of a condensation agent.

Any of the solvents, which are used in the reaction of carboxylic acid halide with amine (1b) by the method (d) of the formula 2 for reacting the compound (1b) with the compound (6) (reaction which produces an amide bond), may be used in this reaction.

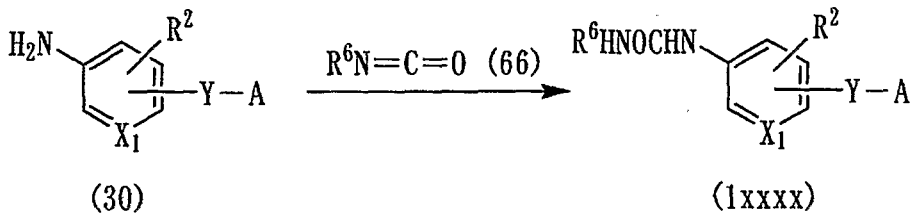
Examples of the condensation agent used include a mixture of an azocarboxylate (such as diethyl azodicarboxylate) with a phosphorus compound (such as triphenylphosphine).

The condensation agent is appropriately used in an amount typically at least equimolar to the compound (64), and preferably 1 to 2 times of the compound (64) on a molar basis.

The compound (65) is appropriately used in an amount typically at least equimolar to the compound (64), and preferably 1 to 2 times of the compound (64) on a molar basis.

The above described reaction favorably proceeds typically at 0 to 200°C, preferably at around 0 to 150°C and is, in general, completed in around 1 to 10 hours.

[Reaction formula 46]



In the formula, R^2, X_1, Y, A, and R^6 are the same as described above.

The reaction of the compound (30) with the compound (66) is carried out in the presence or absence of a basic compound, and preferably in the absence of the basic compound in an appropriate solvent or without a solvent.

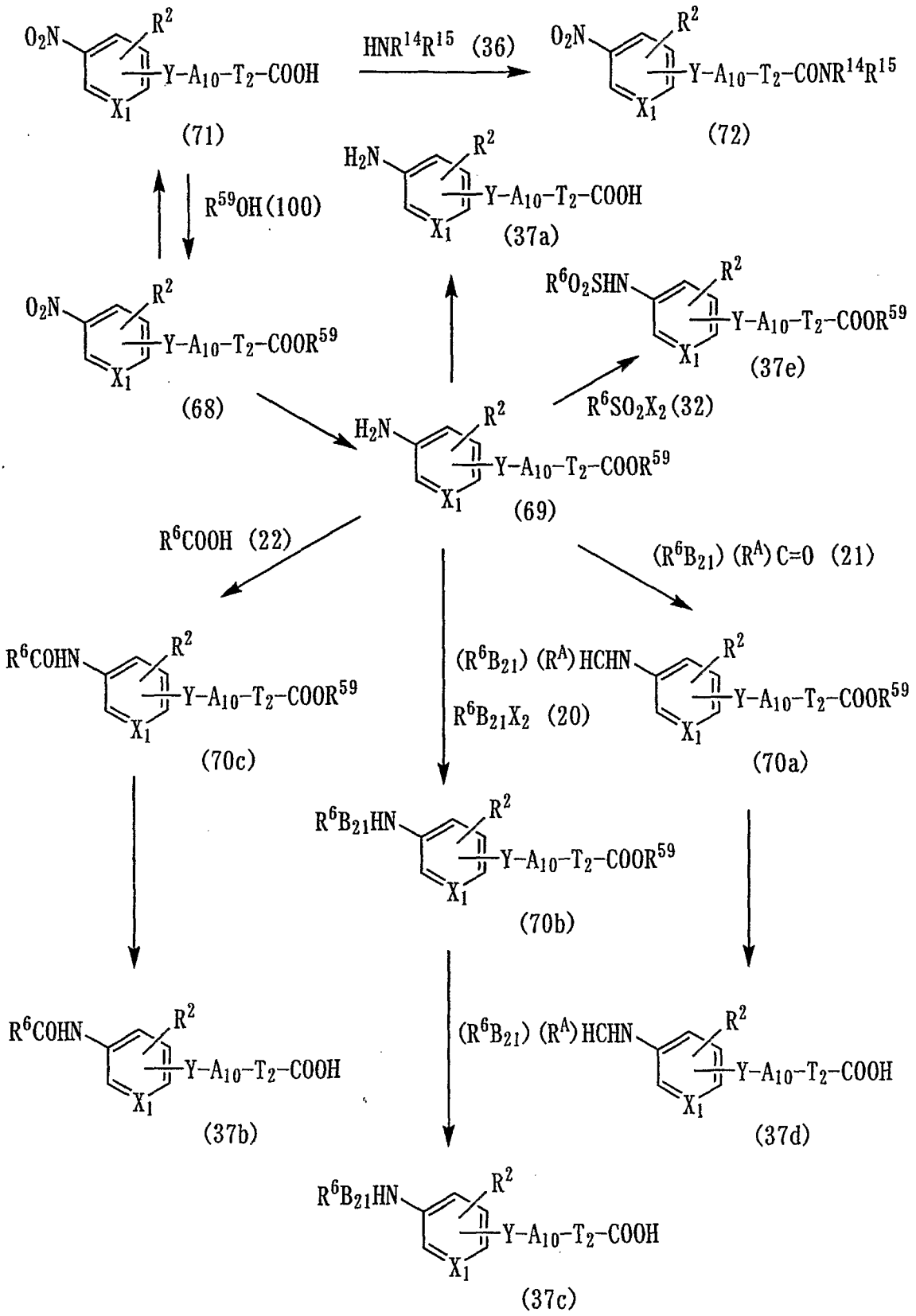
Any of the inert solvents and the basic compounds, which are used in the reaction of carboxylic acid halide with amine (1b) by the method (d) of the formula 2 for reacting the compound (1b) with the compound (6) (reaction which produces an amide bond), may be used in this reaction.

The compound (66) may be used in an amount typically at least about 1 to 5 times, and preferably about 1 to 3 times of the compound (30) on a molar basis.

The above described reaction is carried out typically at 0 to 200°C, and preferably at around room temperature to 150°C and is, in general, completed in around 5 minutes to 50 hours.

A boron compound such as a boron trifluoride-diethyl ether complex may be added to the system of the above described reaction.

[Reaction formula 47]



In the formula, R^2, X_1, Y, T_2, A_{10}, R^{14}, R^{15}, B_{21}, R^A, X_2, R^6 and R^{59} are the same as described above, provided that the a and b of A_{10} are bound to Y and T_2, respectively.

The reaction which converts the compound (68) into the compound (71) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (71) with the compound (100) is carried out under reaction conditions similar to those of the reaction of the compound (1fff) with the compound (43) in formula 20 as described above.

The compound (68) may also be produced using a halogenated lower alkyl group such as methyl iodide in place of the compound (100) in a reaction similar to the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction which converts the compound (68) into the compound (69) may be carried out, for example, (1) by reducing the compound (68) with a catalytic hydride reducing agent in an appropriate solvent, or (2) by reducing the compound (68) with a reducing agent such as a mixture of a metal or a metal salt with an acid, or a mixture of a metal or a metal salt with an alkali metal hydroxide, a sulfide, an ammonium salt or the like, in an appropriate inert solvent.

Examples of the solvent in using the method

(1) include water, acetic acid, alcohols such as methanol, ethanol, and isopropanol, hydrocarbons such as n-hexane and cyclohexane, ethers such as dioxane, tetrahydrofuran, diethyl ether, and diethylene glycol dimethyl ether, esters such as ethyl acetate and methyl acetate, and aprotic polar solvents such as N,N-dimethylformamide, and a mixture thereof. Examples of the catalytic hydride reducing agent used include palladium, palladium black, palladium-carbon, platinum-carbon, platinum, platinum oxide, copper chromite, and Raney nickel. These reducing agents may be used singly or in a mixture of two or more. In general, the reducing agent may be used in an amount 0.02 to 1 times of the compound (68) on a weight basis. The reaction temperature is typically about -20 to 150°C, and preferably about 0 to 100°C, and the hydrogen pressure is typically at 1 to 10 atm. In general, the above described reaction is completed in about 0.5 to 100 hours. An acid such as hydrochloric acid may be added to the above described reaction system.

The reducing agent which may be used in using the method (2) is a mixture of iron, zinc, tin or stannous chloride with a mineral acid such as hydrochloric acid or sulfuric acid; or a mixture of iron, ferrous sulfate, zinc or tin with an alkali metal hydroxide such as sodium hydroxide, a sulfate such as ammonium sulfate or an ammonium salt such as ammonium hydroxide or ammonium chloride. Examples of the inert

solvent include water, acetic acid, alcohols such as methanol and ethanol, and ethers such as dioxane, and a mixture thereof. The reaction conditions may be chosen appropriately depending on the reducing agent used. For example, when stannous chloride or hydrochloric acid is used as the reducing agent, the reaction is appropriately carried out advantageously at about 0 to 150°C, and for around 0.5 to 10 hours. The above described reducing agent is used in an amount at least equal molar to the compound (68), and typically 1 to 5 times of the compound (68) on a molar basis.

The reaction of the compound (69) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (69) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (69) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

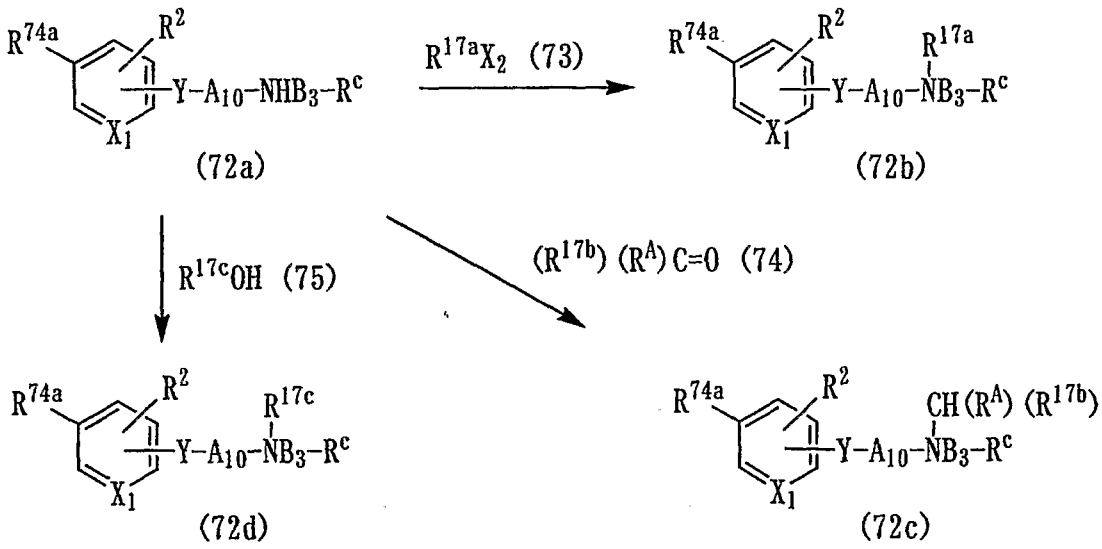
The reaction which converts the compound (69) into the compound (37a), the reaction which converts

the compound (70a) into the compound (37d), the reaction which converts the compound (70b) into the compound (37c) and the reaction which converts the compound (70c) into the compound (37b) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (71) with the compound (36) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (69) with the compound (32) is carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (32) in the reaction formula 42 as described above.

[Reaction formula 48]



In the formula, R^2, X_1, Y, A_{10}, B_3, R^{14}, R^{15}, R^A, R^{74a} and X_2 are the same as described above;

R^c represents a $-CONR^{14}R^{15}$ group or $-COOR^{59b}$ group, R^{59b} represents a lower alkyl group or a phenyl lower alkyl group;

R^{17a} represents a lower alkyl group, a cycloalkyl group, a lower alkyl sulfonyl group or a lower alkenyl group;

R^{17b} represents a hydrogen atom or a lower alkyl group; and

R^{17c} represents a cycloalkylcarbonyl group, a lower alkanoyl group which may have a halogen atom as a substituent or an amino substituted lower alkanoyl group which may have a lower alkyl group as a substituent; wherein the a of A_{10} is bound to the Y group and the b is bound to an $-NHB_3-Rc$ group, $-N(R^{17a})B_3-Rc$ group, $-N(CH(R^A)(R^{17b}))B_3-Rc$ group or $-N(R^{17c})B_3-Rc$ group.

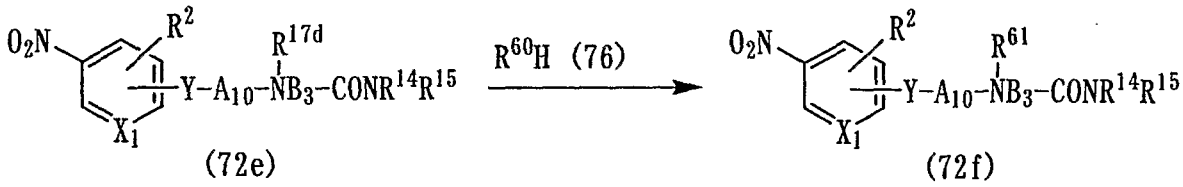
The reaction of the compound (72a) with the compound (73) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (72a) with the compound (75) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (72a) with the

compound (74) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

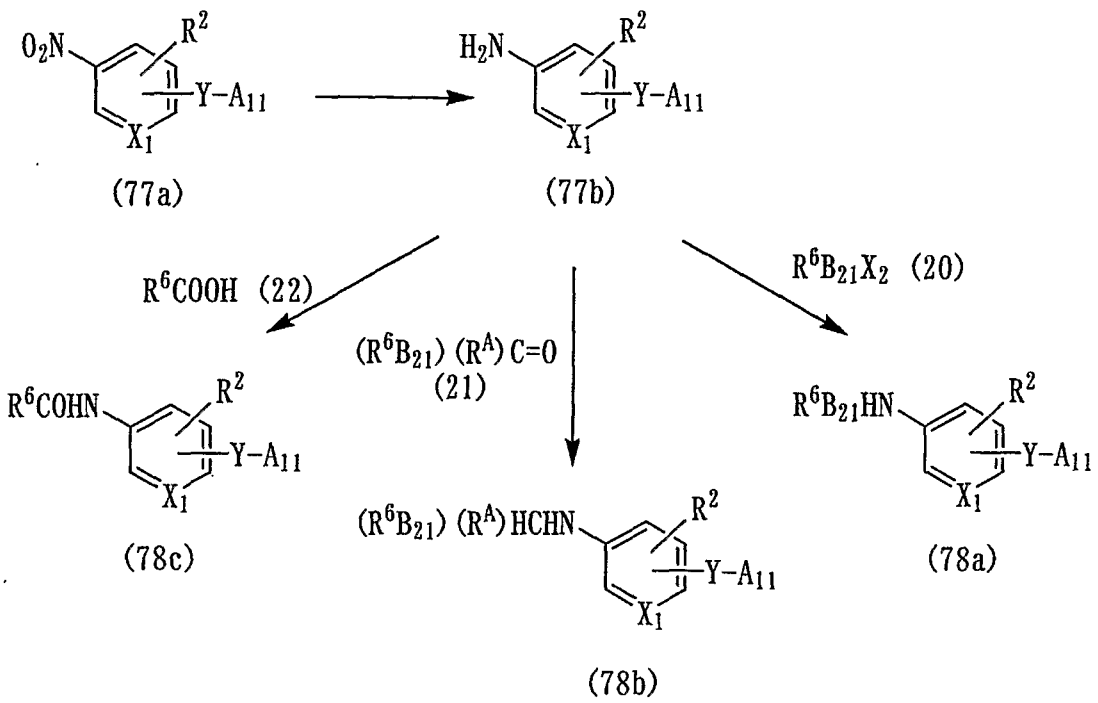
[Reaction formula 49]



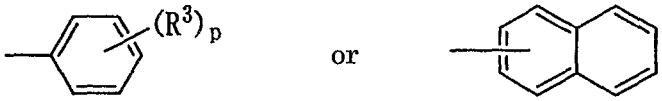
In the formula, R^2, X_1, Y, A_{10}, B_3, R^{14} and R^{15} are the same as described above, R^{17d} represents a lower alkanoyl group which is substituted with a halogen atom, R^{60} represents an amino group which may be substituted with a lower alkyl group, and R^{61} represents an amino substituted lower alkanoyl group which may be substituted with a lower alkyl group, wherein the a of A_{10} is bound to the Y group and the b is bound to an $-N(R^{17d})B_3-CONR^{14}R^{15}$ group or $-NR^{61}B_3-CONR^{14}R^{15}$ group.

The reaction of the compound (72e) with the compound (76) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) in the reaction formula 1 as described above.

[Reaction formula 50]



In the formula, R^2, X_1, Y, R^6, B_{21}, R^A and X_2 are the same as described above, and A_{11} represents a group of the formula:



wherein R^3 and p are the same as described above, provided that the alkyl moiety in the side chain (-NHCH(R^A)($B_{21}R^6$) group) of the compound (78b) has not more than 6 carbon atoms.

The reaction which converts the compound (77a) into the compound (77b) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69)

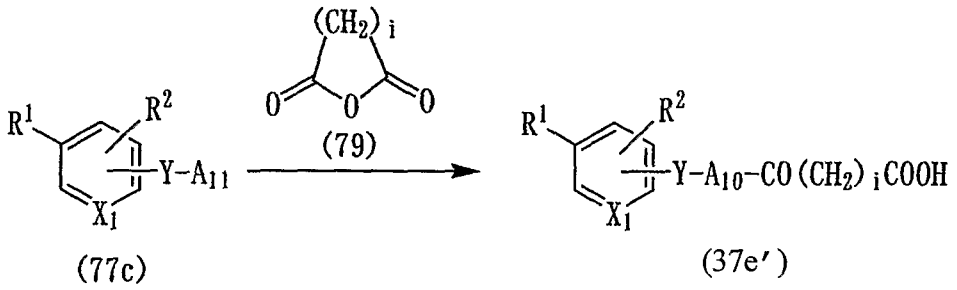
of the above described reaction formula 47.

The reaction of the compound (77b) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (77b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (77b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 51]



In the formula, R^1, R^2, X_1, Y and A_{11} are the same as described above, and i represents an integer of 2 to 4.

In general, the reaction of the compound (77c) with the compound (79) is called Friedel-Crafts

reaction and is carried out in an appropriate solvent in the presence of a Lewis acid.

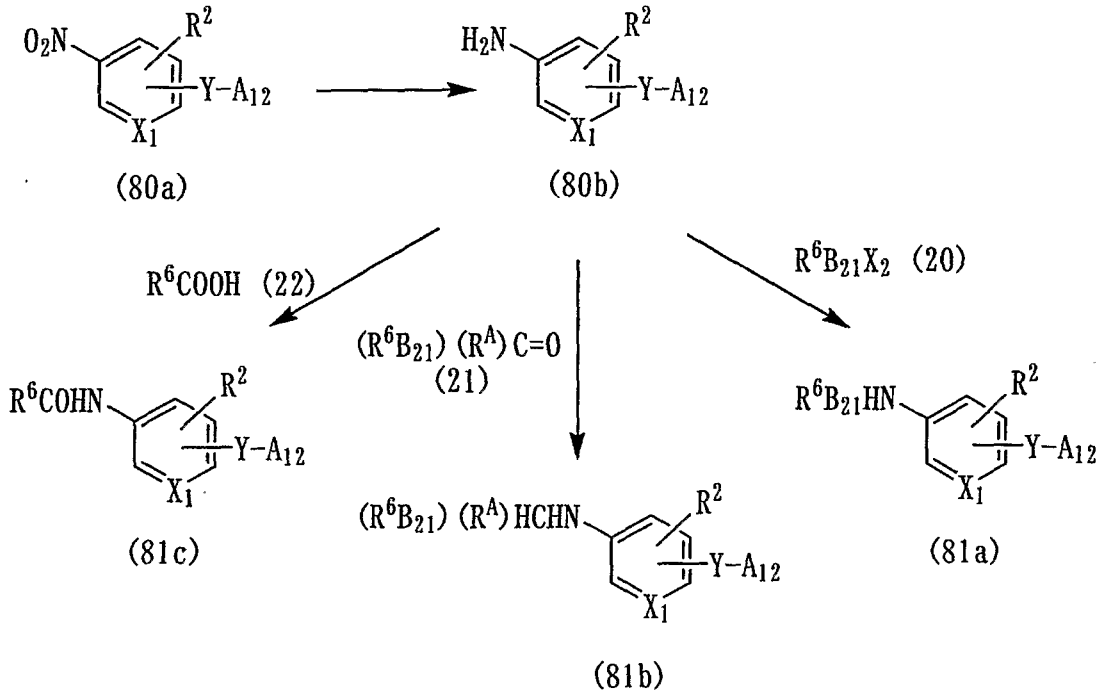
Any of the Lewis acids typically used in the Friedel-Crafts reaction may be used here. Examples of these Lewis acids include aluminum chloride, zinc chloride, iron chloride, tin chloride, boron tribromide, and concentrated sulfuric acid. These Lewis acids are used singly or in a mixture of two or more. The Lewis acid is used typically in an amount 2 to 6 times of the compound (77c) on a molar basis.

Examples of the solvent used here include aromatic hydrocarbons such as carbon disulfide, nitrobenzene, and chlorobenzene, and halogenated hydrocarbons such as dichloromethane, dichloroethane, carbon tetrachloride, and tetrachloroethane, and a mixture thereof.

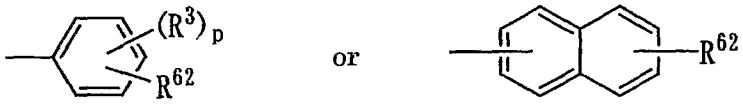
The compound (79) is typically used in an amount at least equimolar to the compound (77c), and preferably 1 to 5 times of the compound (77c) on a molar basis.

Typically the above described reaction proceeds favorably at 0 to 120°C, and preferably about 0 to 70°C, and is generally completed in about 0.5 to 24 hours.

[Reaction formula 52]



In the formula, R^2, X_1, Y, R^6, X_2, B_{21} and R^A are the same as described above. A_{12} represents a group of the formula:



R^3 and p are the same as defined above, and R^{62} represents a lower alkanoyl group or a hydroxyl group substituted lower alkyl group, provided that the alkyl moiety in the side chain ($NHCH(R^A)(B_{21}R^6)$ group) of the compound (81b) has not more than 6 carbon atoms.

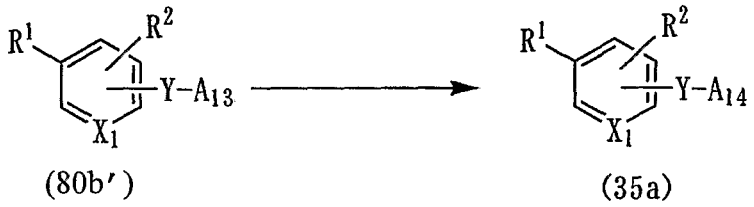
The reaction which converts the compound (80a) into the compound (80b) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

The reaction of the compound (80b) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (80b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

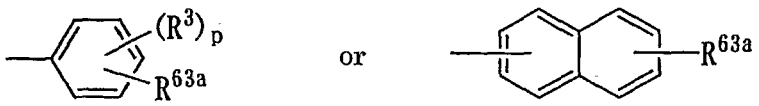
The reaction of the compound (80b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 53]



In the formula, R^1, R^2, X_1, and Y are the same as above,

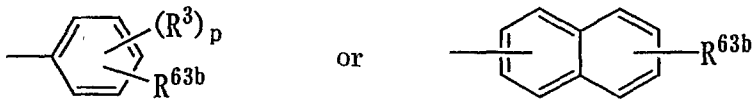
A_{13} represents a group of the formula:



wherein R^3 and p are the same as described above, and R^{63a} represents a lower alkanoyl group or a lower alkyl

group, and

A_{14} represents a group of the formula:



wherein R^{63b} represents a lower alkanoyl group which is substituted with a halogen atom at the α-position or a lower alkyl group which is substituted with a halogen atom at the 2 position.

The reaction which converts the compound (80b') into the compound (35a) is carried out in the presence of a halogenating agent in an appropriate solvent.

Examples of the halogenating agent include halogen atoms such as bromine and chlorine, iodine chloride, sulfuryl chloride, copper compounds such as cupric bromide, and N-halogenated succinic acid imides such as N-bromosuccinic acid imide and N-chlorosuccinic acid imide.

Examples of the solvent used include halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, fatty acids such as acetic acid and propionic acid, and carbon disulfide.

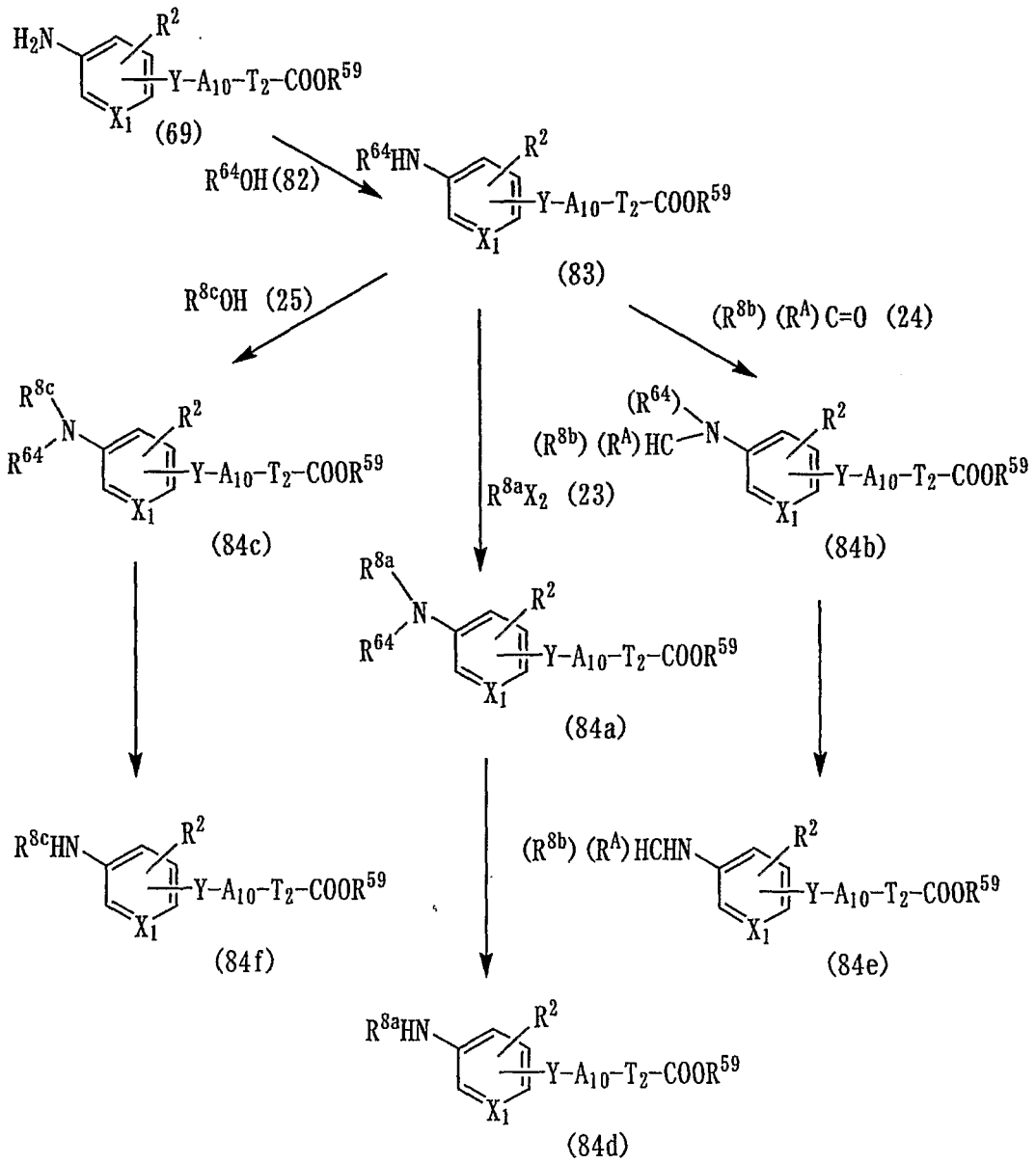
The halogenated agent is appropriately used in an amount typically 1 to 10 times, and preferably 1 to 5 times of the compound (80b') on a molar basis.

The above described reaction is carried out

typically at 0°C to the boiling point of the solvent, and preferably at about 0 to 100°C, and is completed typically in about 5 minutes to 30 hours.

When an N-halogenated succinic acid imide is used as a halogenated agent, a peroxide such as benzoyl peroxide may be added to the reaction system as a initiator for the radical reaction.

[Reaction formula 54]



In the formula, R^2, X_1, Y, A_{10}, T_2, R^{59}, R^{8a}, R^{8b}, R^{8c}, X_2 and R^A are the same as described above, and R^{64} represents a phenyl lower alkoxycarbonyl group, provided that the alkyl moieties in the side chain (-N(CH$R^A R^{8b}$)(R^{64}) group) of the compound (84b) and the side chain (-NH(CH$R^A R^{8b}$) group) of the compound (84e) have not more than 6 carbon atoms, respectively, and the a and b of A_{10} are bound to the Y group and the T_2 group, respectively.

The reaction of the compound (83) with the compound (23) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (69) with the compound (82), and the reaction of the compound (83) with the compound (25) are carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (83) with the compound (24) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

The reactions which respectively convert the compound (84a) into the compound (84d), the compound (84b) into the compound (84e), and the compound (84c)

into the compound (84f) are carried out under reaction conditions similar to those of the reaction which converts the compound (1iii′) into the compound (1hhh′) by reduction as described for the above described reaction formula 24.

[Reaction formula 55]

In the formula, R^2, X_1, Y, A_{10}, B_{21}, R^{74a} and X_2 are the same as described above, provided that the a and b of A_{10} are bound to the Y group and the B_{21} group, respectively.

The reaction which converts the compound (85) into the compound (7′) is carried out by reacting compound (85) to a halogenating agent in an appropriate solvent or without solvent.

Examples of the halogenating agent include mineral acids such as hydrochloric acid and hydrobromic acid, N,N-diethyl-1,2,2-trichlorovinyl azide, phosphorus pentachloride, phosphorus pentabromide, phosphorus oxychloride, sulfonyl halide compounds such as thionyl chloride, mesyl chloride, and tosyl chloride, and a mixture of carbon tetra bromide with triphenylphosphine. The sulfonyl halide compound is used together with a basic compound.

Any of the basic compounds used in the

reaction of the compound (2) with the compound (3) of the reaction formula 1 may be used.

Examples of the solvent used include ethers such as dioxane, tetrahydrofuran, and diethyl ether, halogenated hydrocarbons such as chloroform, methylene chloride, and carbon tetrachloride, and dimethylformamide, and a mixture thereof.

When a sulfonyl halide compound is used together with a basic compound as a halogenating agent, the sulfonyl halide compound is appropriately used in an amount typically at least equimolar to the compound (85), and preferably 1 to 2 times of the compound (85) on a molar basis. The basic compound is used typically in a catalytic amount of the compound (85), and preferably in a catalytic amount to an amount equimolar to the compound (85). When another halogenating agent is used, such a halogenaing agent is used at least equimolar to the compound (85), and typically used in a large excess amount.

The above described reaction proceeds favorably typically at room temperature to 200°C, and preferably at room temperature to 150°C, and in general is completed in about 1 to 80 hours.

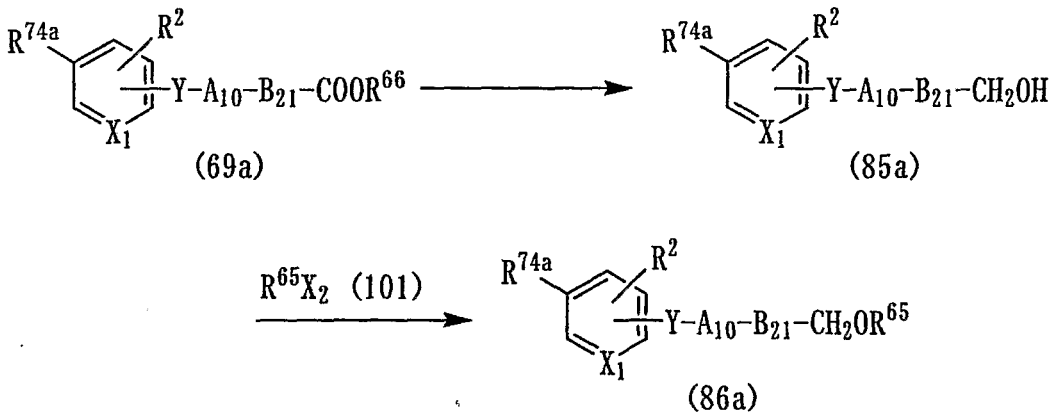
[Reaction formula 56]

In the formula, R^{74a}, R^2, X_1, Y, A_{10} and B_{21} are the same as described above, and R^{65} represents a tri-lower alkyl silyl group, provided that the a and b of A_{10} are bound to the Y group and the B_{21} group, respectively.

Here, examples of the tri-lower alkyl silyl group include trialkylsilyl groups of which the alkyl moiety is a linear or branched alkyl group having 1 to 6 carbon atoms such as a tert-butyldimethylsilyl group, trimethylsilyl group, and diethylmethylsilyl group.

The reaction which converts the compound (86) into the compound (85) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

[Reaction formula 57]



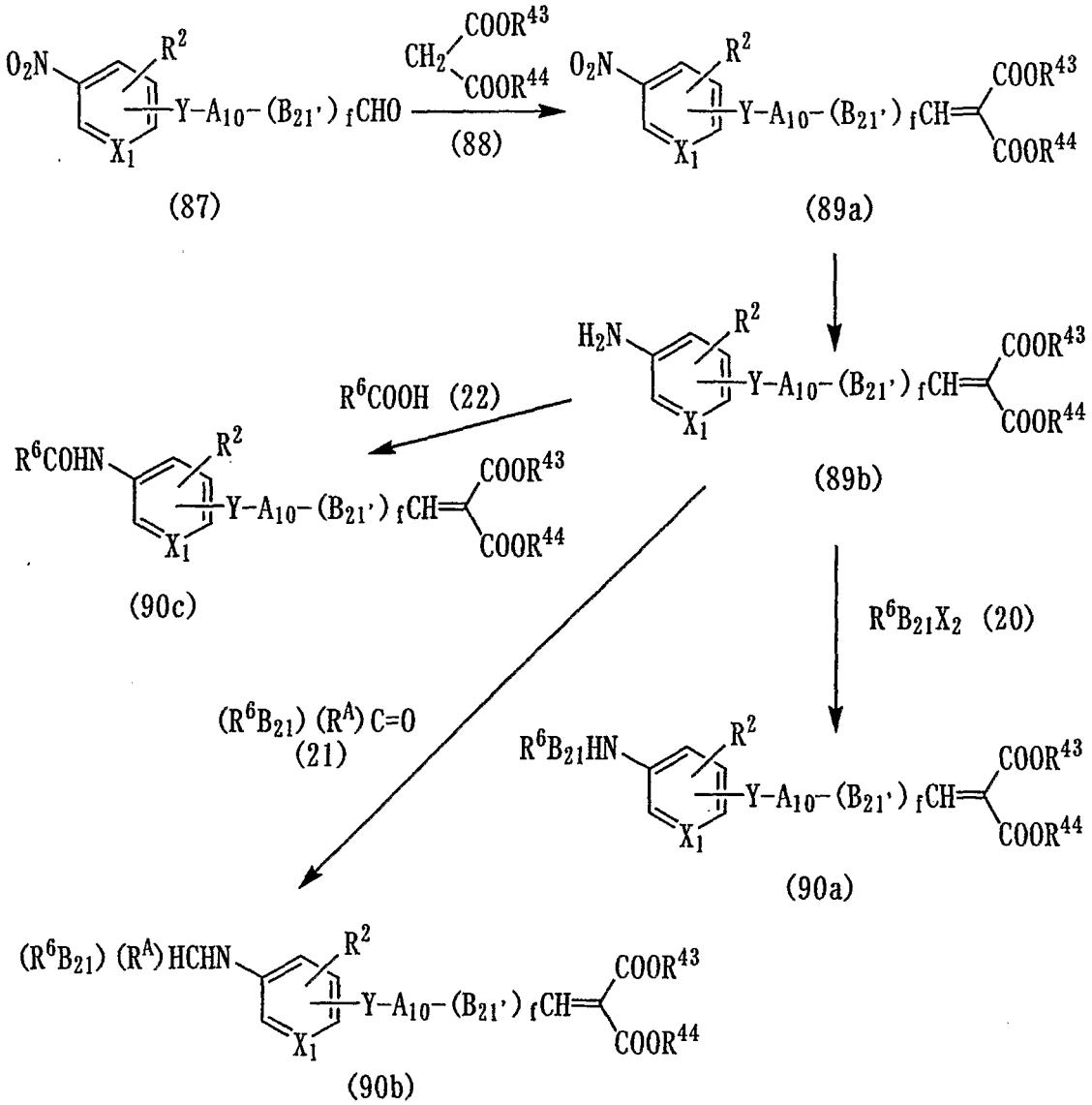
In the formula, R^{74a}, R^2, X_1, Y, A_{10}, B_{21}, R^{65} and X_2 are the same as described above, and R^{66} represents a hydrogen atom, a lower alkyl group or a lower alkoxycarbonyl group, provided that the a and b

of A_{10} are bound to Y and B_{21}, respectively, and the alkyl moieties in the side chain ($-Y-A_{10}-B_{21}CH_2OH$) of the compound (85a) and the side chain ($-Y-A_{10}-B_{21}CH_2OR^{65}$) of the compound (86a) have not more than 6 carbon atoms.

The reaction which converts the compound (69a) into the compound (85a) is carried out under the similar reaction conditions as the reaction which converts the compound (1f) into the compound (1g) of the above described reaction formula 3.

The reaction of the compound (85a) with the compound (101) is carried out under reaction conditions similar to those of the reaction which converts the compound (2) into the compound (3) of the above described reaction formula 1.

[Reaction formula 58]



In the formula, R^2, X_1, Y, A_{10}, B_{21}, R^6, R^A, f, R^{43}, R^{44} and X_2 are the same as described above, and $B_{21'}$ represents a lower alkylene group, provided that the a and b of A_{10} are bound to Y and $B_{21'}$, respectively, and the $(B_{21'})f$-CH=C moiety in the side chain $(-Y-A_{10}-(B_{21'})f-CH=C(COOR^{43})(COOR^{44}))$ of the compound (90c) and the alkyl moiety in the side chain $(-NHCH(R^A)(B_{21}R^6))$ of the

compound (90b) have not more than 6 carbon atoms, respectively.

The reaction of the compound (87) with the compound (88) is carried out under reaction conditions similar to those of the reaction of the compound (1f) and hydroxylamine of the above described reaction formula 3.

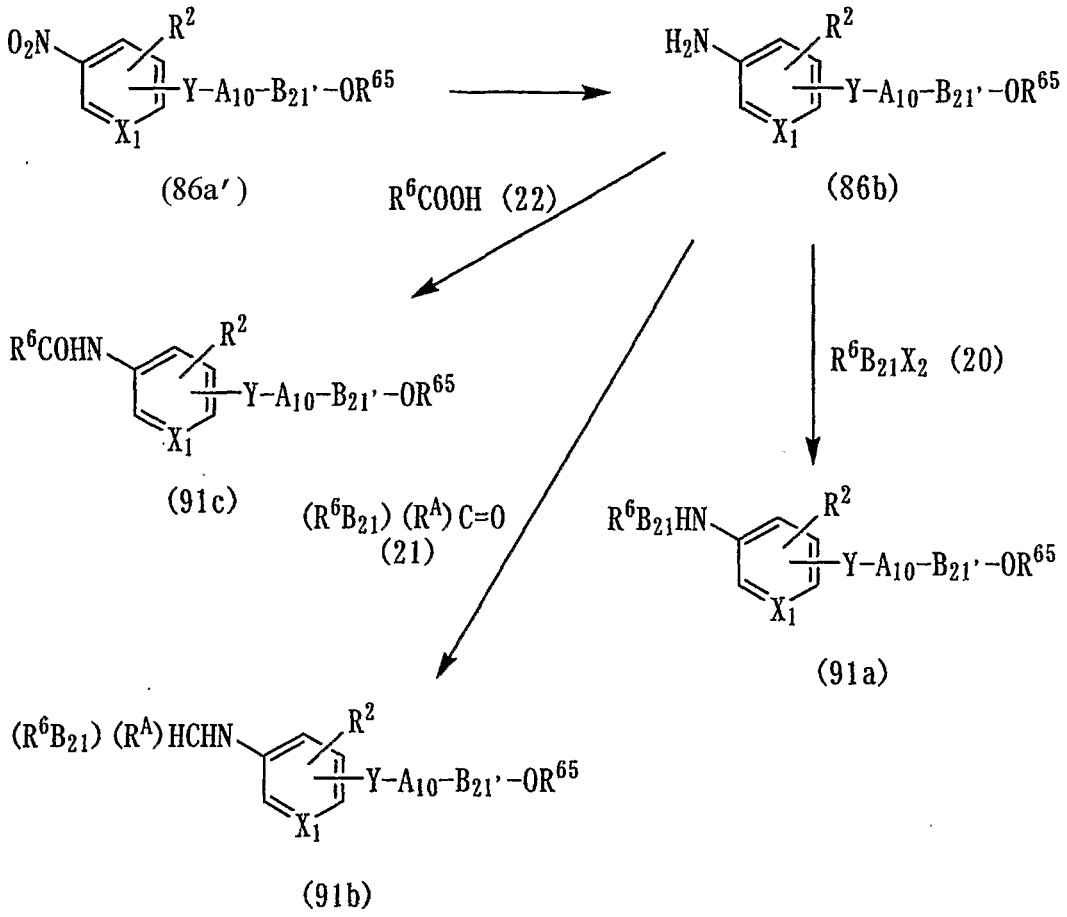
The reaction which converts the compound (89a) into the compound (89b) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

The reaction of the compound (89b) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (89b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (89b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 59]



In the formula, R^2, X_1, Y, A_{10}, $B_{21'}$, R^{65}, R^6, B_{21}, R^A and X_2 are the same as defined above, provided that the a and b of A_{10} are bound to the Y group and the $B_{21'}$ group, respectively, and the alkyl moiety in the side chain ($-NHCH(R^A)(B_{21}R^6)$) of the compound (91b) has not more than 6 carbon atoms.

The reaction which converts the compound (86a') into the compound (86b) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

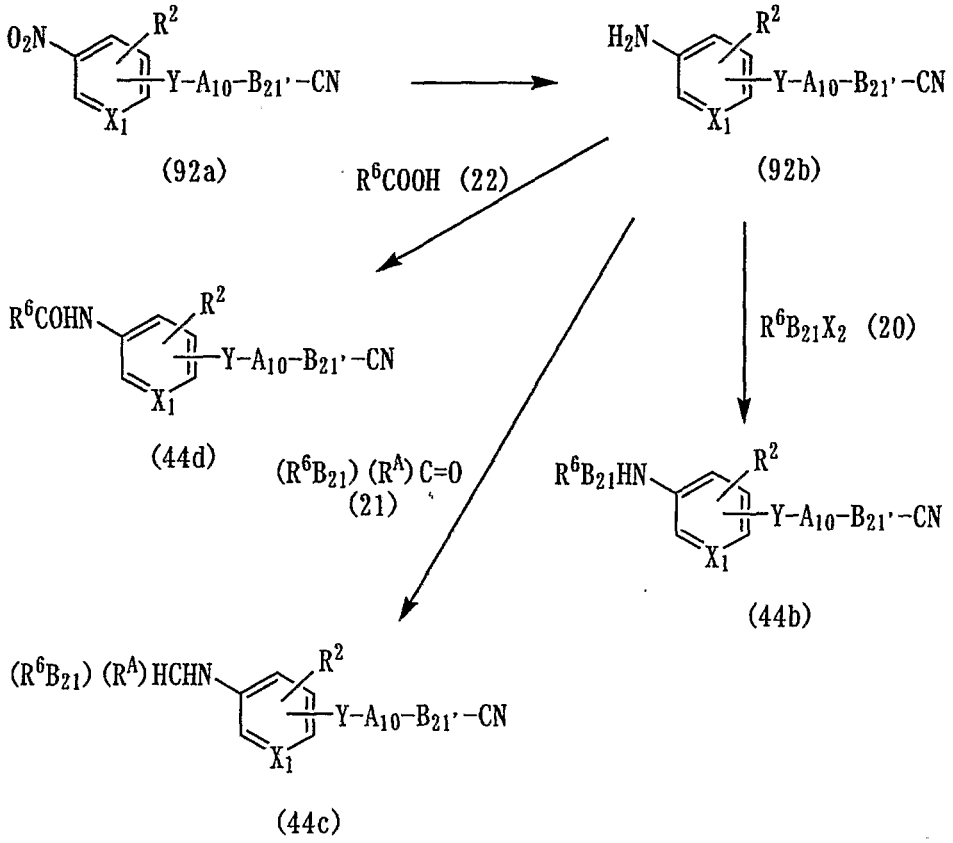
The reaction of the compound (86b) with the

compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (86b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (86b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 60]



In the formula, R^2, X_1, Y, A_{10}, B_{21}, $B_{21'}$, R^6, R^A and X_2 are the same as described above, provided that the a and b of A_{10} are bound to the Y group and the $B_{21'}$ group, respectively, and the alkyl moiety in the side chain ($-NHCH(R^A)(B_{21}R^6)$) of the compound (44c) has not more than 6 carbon atoms.

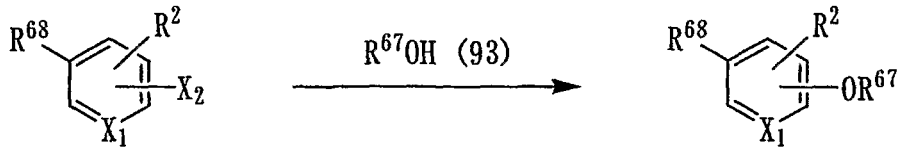
The reaction which converts the compound (92a) into the compound (92b) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

The reaction of the compound (92b) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (92b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (92b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 61]



(94) (95)

In the formula, R^2, X_1, and X_2 are the same as described above, R^{67} represents an $-A_{10}B_{21}CN$ group, $-A_{10}-R^{59d}$ group, $-A_{10}-T_2-COOR^{59a}$ group or -A group, R^{59d} represents a lower alkyl group, A_{10}, B_{21}, T_2 and R^{59a} are the same as described above, and R^{68} represents a nitro group or a halogen atom.

The reaction of the compound (93) with the compound (94) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

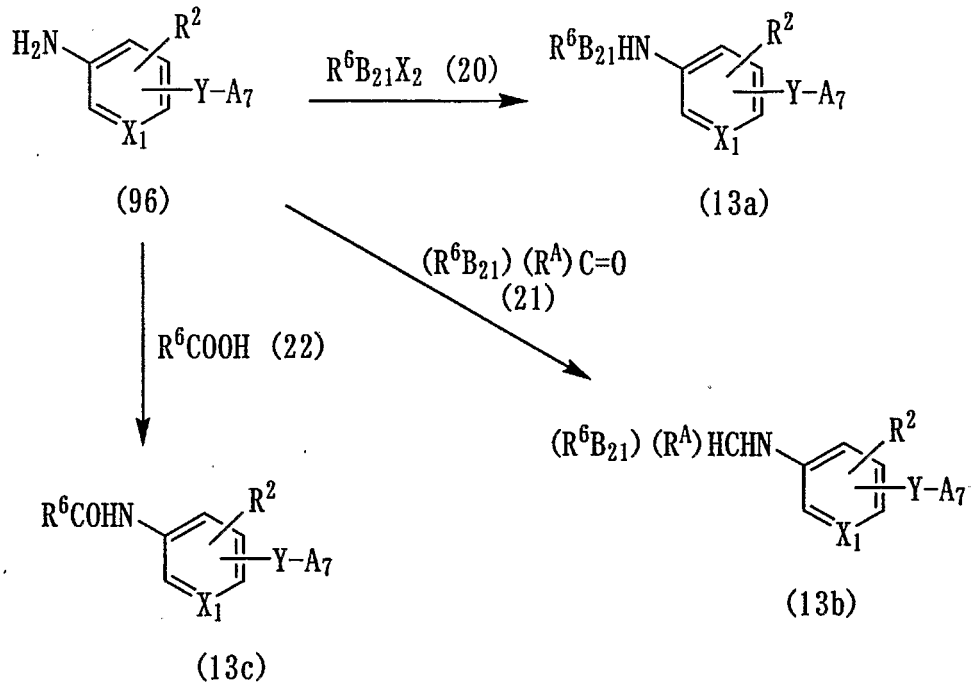
[Reaction formula 62]

(95a) (95b)

In the formula, R^2, R^{67}, and X_1 are the same as described above.

The reaction which converts the compound (95a) into the compound (95b) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

[Reaction formula 63]



In the formula, R^2, X_1, Y, A_7, R^6, B_{21}, R^A and X_2 are the same as described above, provided that the alkyl moiety in the side chain (-NHCH(R^A)($B_{21}R^6$)) of the compound (13b) has not more than 6 carbon atoms.

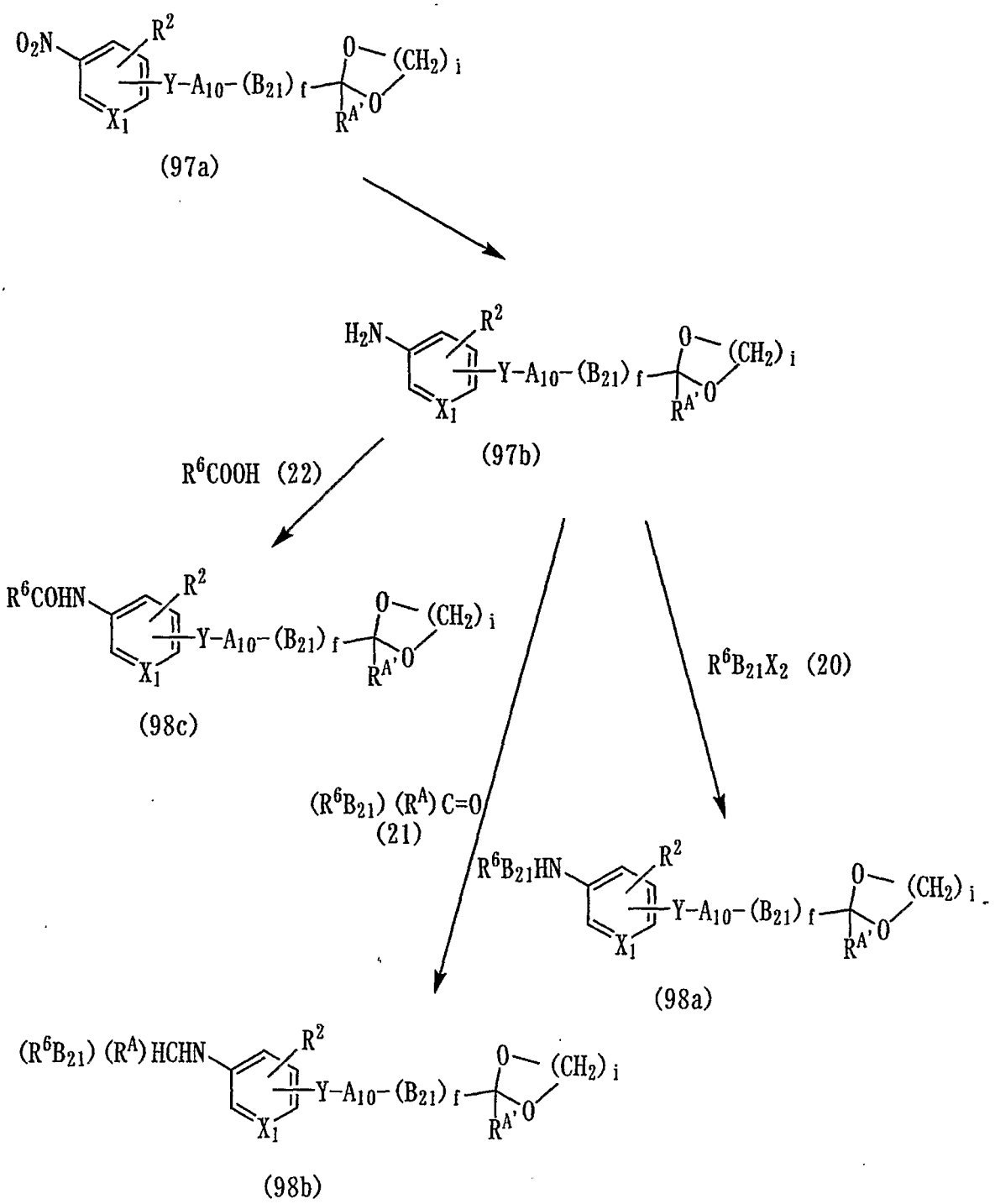
The reaction of the compound (96) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (96) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (96) with the

compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 64]



In the formula, R^2, X_1, Y, B_{21}, f, i, R^6, B_{21}, A_{10}, R^A and X_2 are the same as described above, and $R^{A'}$ represents a hydrogen atom or a lower alkyl group, provided that the alkyl moiety in the side chain (-NHCH(R^A)($B_{21}R^6$)) in compound (98b) has not more than 6 carbon atoms, and the a and b of A_{10} are bound to the Y group and the (B_{21})f group, respectively.

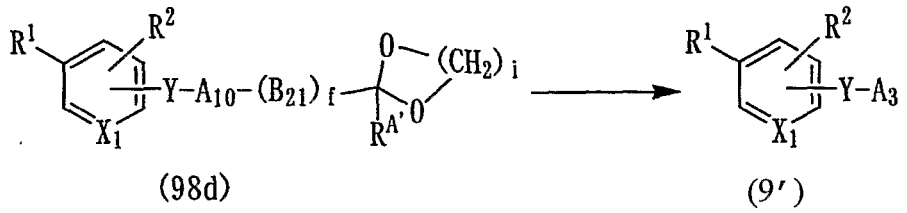
The reaction which converts the compound (97a) into the compound (97b) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

The reaction of the compound (97b) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (97b) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (97b) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 65]

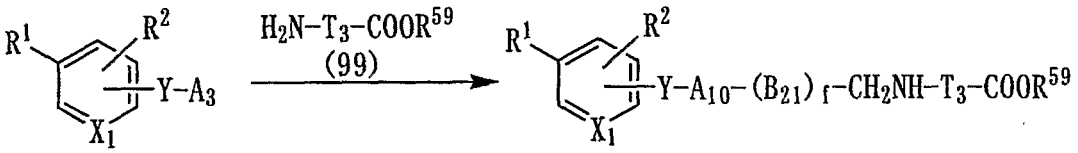


(98d) (9′)

In the formula, R^1, R^2, X_1, Y, A_{10}, B_{21}, f, $R^{A'}$ and A_3 are the same as described above, provided that the a and b of A_{10} are bound to the Y group and the $(B_{21})f$ group, respectively.

The reaction which converts the compound (98d) into the compound (9′) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

[Reaction formula 66]



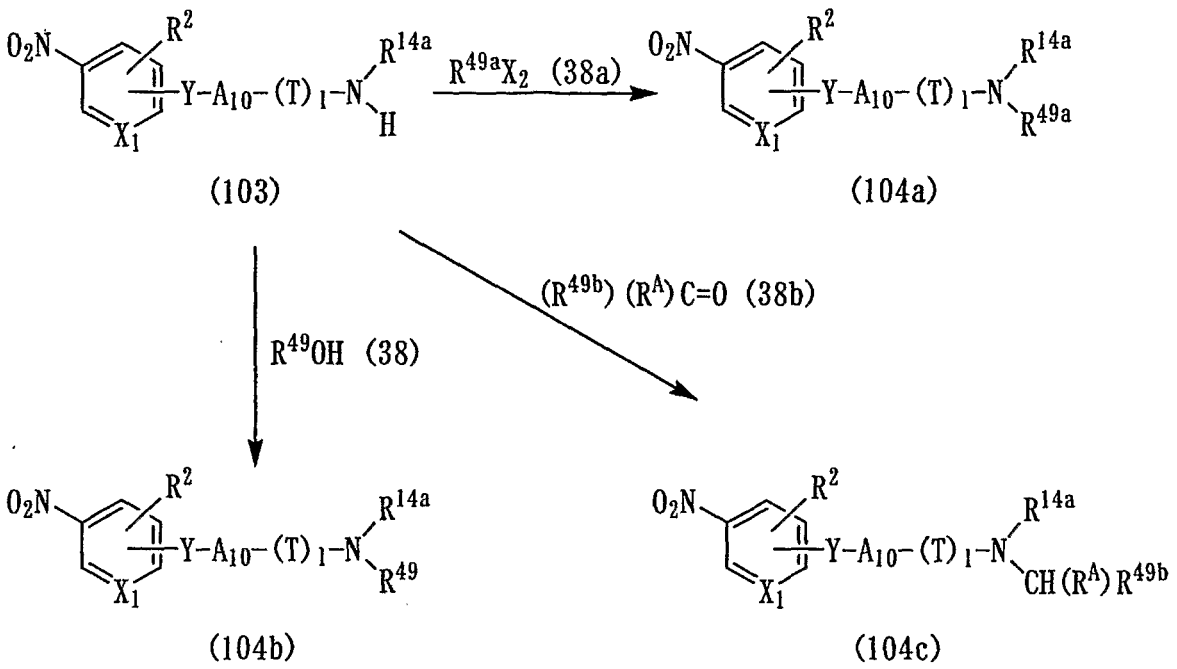
(9′) (69b)

In the formula, R^1, R^2, X_1, Y, A_3, R^{59}, A_{10}, B_{21} and f are the same as described above, T_3 represents a direct bond or B_7 group, and B_7 represents the same as described above, provided that The a and b of A_{10} are bound to the Y group and the $(B_{21})f$ group, respectively.

The reaction of the compound (9′) with the compound (99) is carried out under reaction conditions similar to those of the reaction of the compound (1b)

with the compound (5) of the above described reaction formula 2.

[Reaction formula 67]



In the formula, R^2, X_1, Y, A_{10}, R^{14a}, R^{49a}, R^{49}, R^{49b}, T, l, R^A and X_2 are the same as described above, provided that the CHR^A moiety in the side chain ($-N(R^{14a})(CHR^AR^{49b})$) of the compound (104c) has not more than 6, the a of A_{10} is bound to the Y group, and the b of A_{10} is bound to a $-NR^{14a}H$ group, $-NR^{14a}R^{49a}$ group, $-NR^{14a}R^{49}$ group, or $-NR^{14a}(CHR^AR^{49b})$ group.

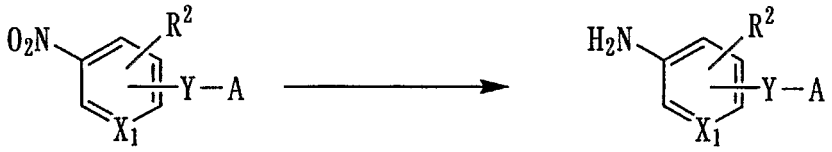
The reaction of the compound (103) with the compound (38a) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (103) with the

compound (38) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (103) with the compound (38b) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 68]

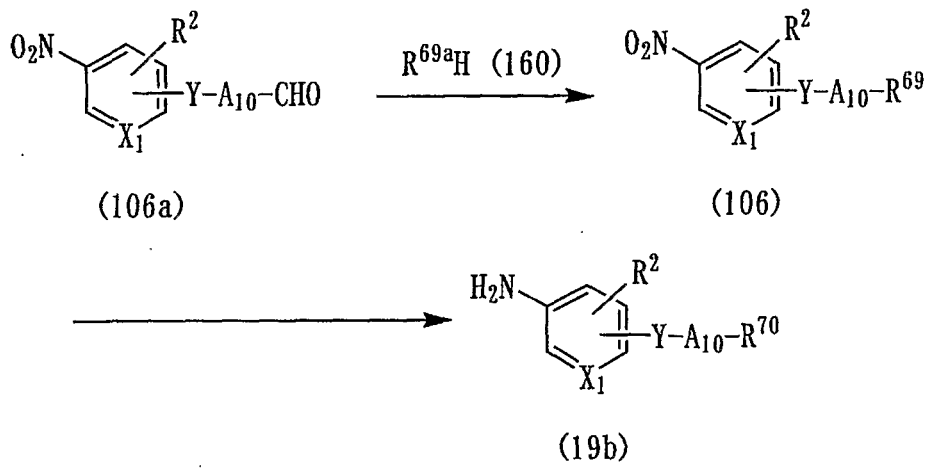


(105) (19a)

In the formula, R^2, X_1, Y and A are the same as described above.

The reaction which converts the compound (105) into the compound (19a) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47. The compound (19a) may be used in the following reaction without isolation.

[Reaction formula 69]



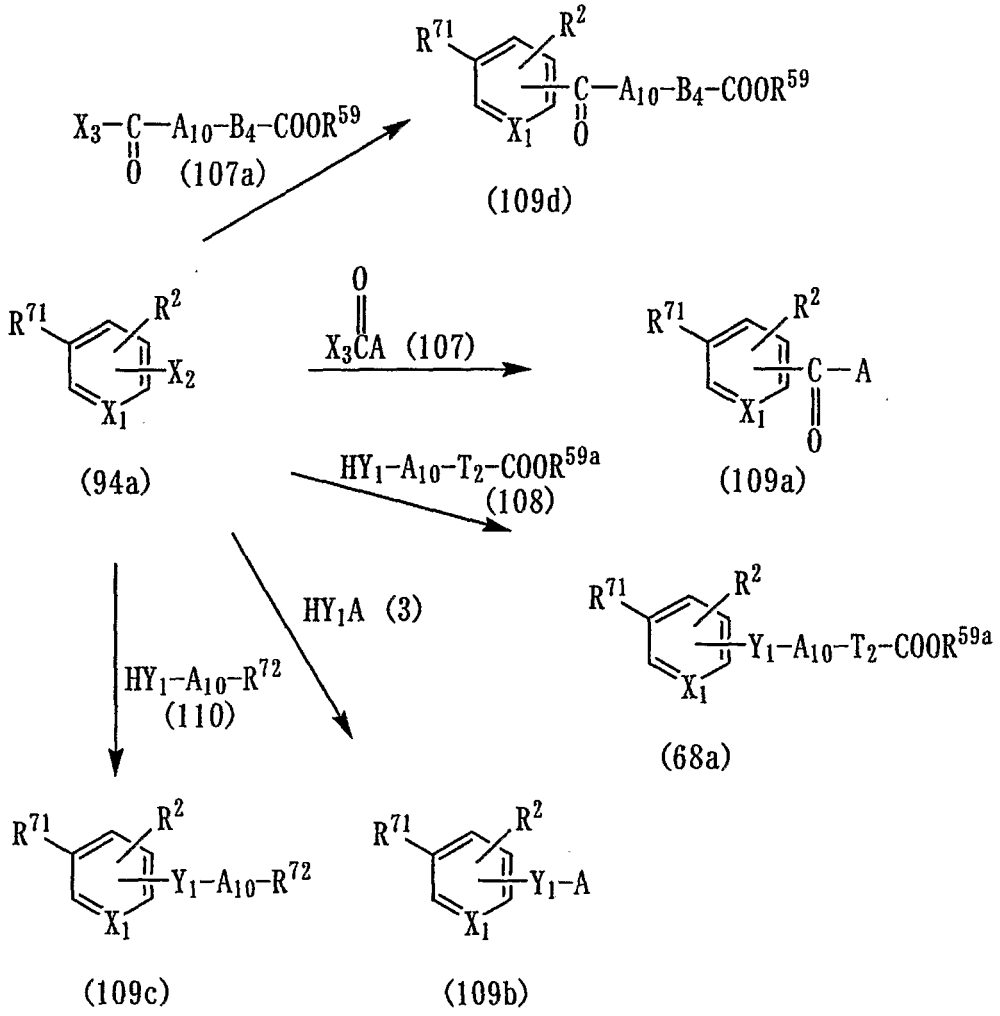
In the formula, R^2, X_1, Y and A_{10} is the same as described above, R^{69a} represents a thiazolidinyl group which may have an oxo group as a substituent on the thiazolidine ring, R^{69} represents a thiazolidinylidene lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring, and R^{70} represents a thiazolidinyl lower alkyl group which may have an oxo group as a substituent on the thiazolidine ring, provided that the a of A_{10} are bound to the Y group and the b of A_{10} is bound to an $-R^{69}$ group or $-R^{70}$ group.

The reaction of the compound (106a) with the compound (160) is carried out under reaction conditions similar to those of the reaction of the compound (87) with the compound (88) of the above described reaction formula 58.

The reaction which converts the compound (106) into the compound (19b) may be carried out under

reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

[Reaction formula 70]



In the formula, R^2, X_1, X_2, A, Y_1, A_{10}, T_2, R^{59} and R^{59a} are the same as described above, X_3 represents a halogen atom, R^{71} represents an $-R^1$ group (wherein R^1 is the same as described above), a nitro group or a lower alkoxycarbonyl group, and R^{72} represents a lower alkyl group which may be substituted

with a hydroxyl group, a nitro group, an amino group which may be substituted with a lower alkanoyl group, a carboxy lower alkyl group, a $-(B_{21})fC(=O)R^A$ group (wherein B_{21}, f and R^A are the same as described above), a lower alkanoyl group, a lower alkoxy group or a hydrogen atom, provided that the a of A_{10} are bound to the Y_1 group and the b of A_{10} is bound to a $-T_2$ group or $-R^{72}$ group.

The reaction of the compound (94a) with the compound (107), and the reaction of the compound (94a) with the compound (107a) are carried out in an appropriate solvent and in the presence of a catalyst.

Any of the solvents used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used in this reaction.

Examples of the catalyst to be used include various metal complexes as well as various combinations of a metal complex with ligand. Examples of the metal complex include, for instance, palladium acetate (II), tetrakis(triphenylphosphine)palladium (0), tris(dibenzylideneacetone)dipalladium (0) and the like. Examples of the ligand include, for instance, R-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (R-BINAP), S-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (S-BINAP), RAC-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (RAC-BINAP), t-butylphosphine, 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene and the like.

The above described catalyst is appropriately used in an amount typically equimolar to the compound (94a), and preferably 1 to 5 times of the compound (94a) on a molar basis.

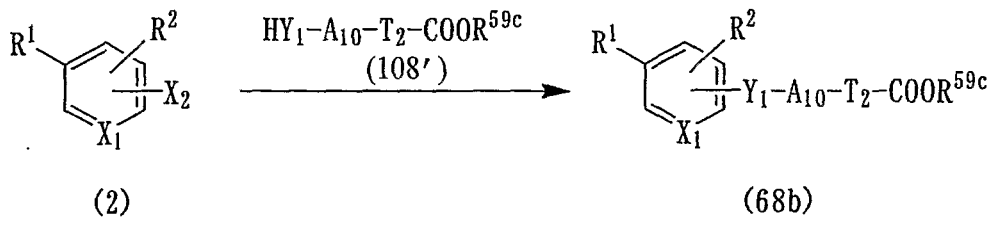
The above described reaction is carried out typically at about 0 to 200°C, preferably at about 0 to 150°C, and, in general, is completed in around 30 minutes to 10 hours.

Addition of molecular sieves such as Molecular Sieves 3A (MS3A) or Molecular Sieves 4A (MS4A) or a phophorus compound such as triphenylphosphine or tri(2-furyl)phosphine makes the reaction proceed advantageously.

The reaction of the compound (94a) with the compound (108), compound (3) or compound (110) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The compound (109c), wherein R^{71} represents a lower alkoxycarbonyl group, may be converted into the corresponding compound (109c), wherein R^{71} represents a carboxy group, by hydrolyzing under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

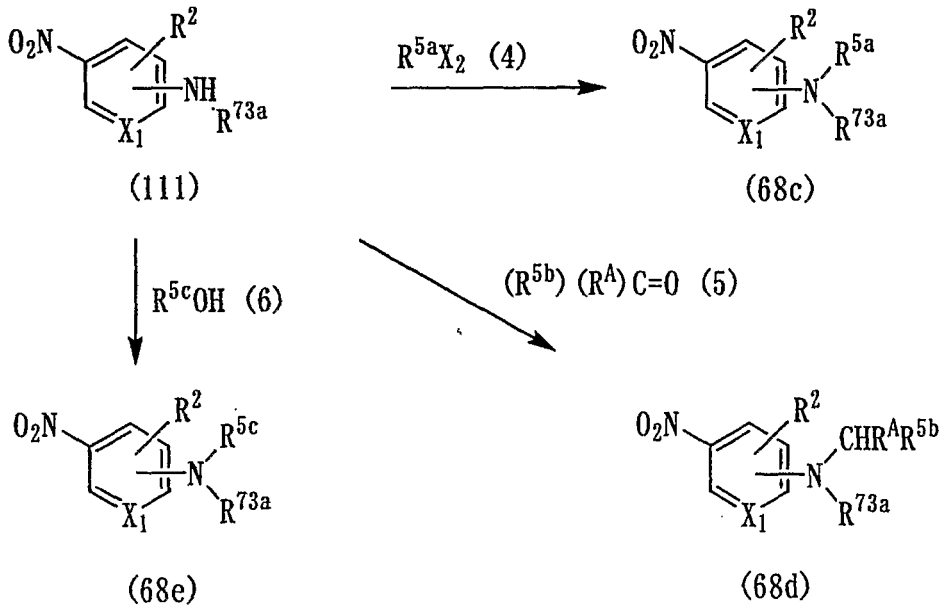
[Reaction formula 71]



In the formula, R^1, R^2, X_1, X_2, Y_1, A_{10} and T_2 are the same as described above, and R^{59c} represents a hydrogen atom, a lower alkyl or a phenyl lower alkyl group, provided that the a and b of A_{10} are bound to a $-Y_1$ group and a $-T_2$ group, respectively.

The reaction of the compound (2) with the compound (108′) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 72]



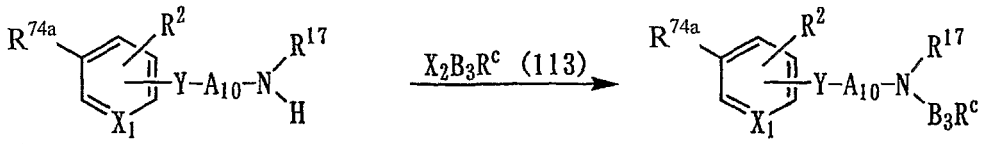
In the formula, R^2, X_1, R^{5a}, R^{5b}, R^A, R^{5c} and X_2 are the same as described above, and R^{73a} represents a $-A_{10}-T_2-COOR^{59}$ group (wherein A_{10}, T_2 and R^{59} are the same as described above) or an -A group (wherein A is the same as described above), provided that the a of A_{10} is bound to an -NH- group, NR^{5a}- group, $-N(CHR^AR^{5b})$ group or $-NR^{5c}$- group, and the b of A_{10} is bound to a $-T_2$ group, and the alkyl moiety in the side chain ($-N(R^{73a})(CHR^AR^{5b})$) of the compound (68d) has not more than 6 carbon atoms.

The reaction of the compound (111) with the compound (4) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (111) with the compound (6) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (111) with the compound (5) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 73]

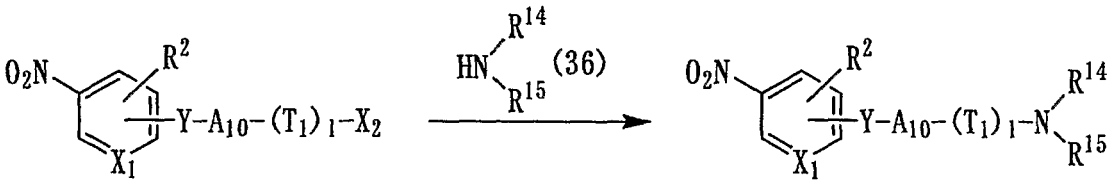


(112) (109′)

In the formula, R^2, X_1, Y, A_{10}, X_2, R^{17}, B_3, R^{74a} and R^c are the same as described above, provided that the a of A_{10} is bound to a -Y group and the b of A_{10} is bound to an $-NHR^{17}$ group or $-NR^{17}B_3R^c$ group.

The reaction of the compound (112) with the compound (113) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 74]



(114) (109e)

In the formula, R^2, X_1, Y, A_{10}, T_1, l, R^{14}, and R^{15} are the same as described above, provided that the a and b of A_{10} are bound to an -Y group and a $-(T_1)l$ group, respectively.

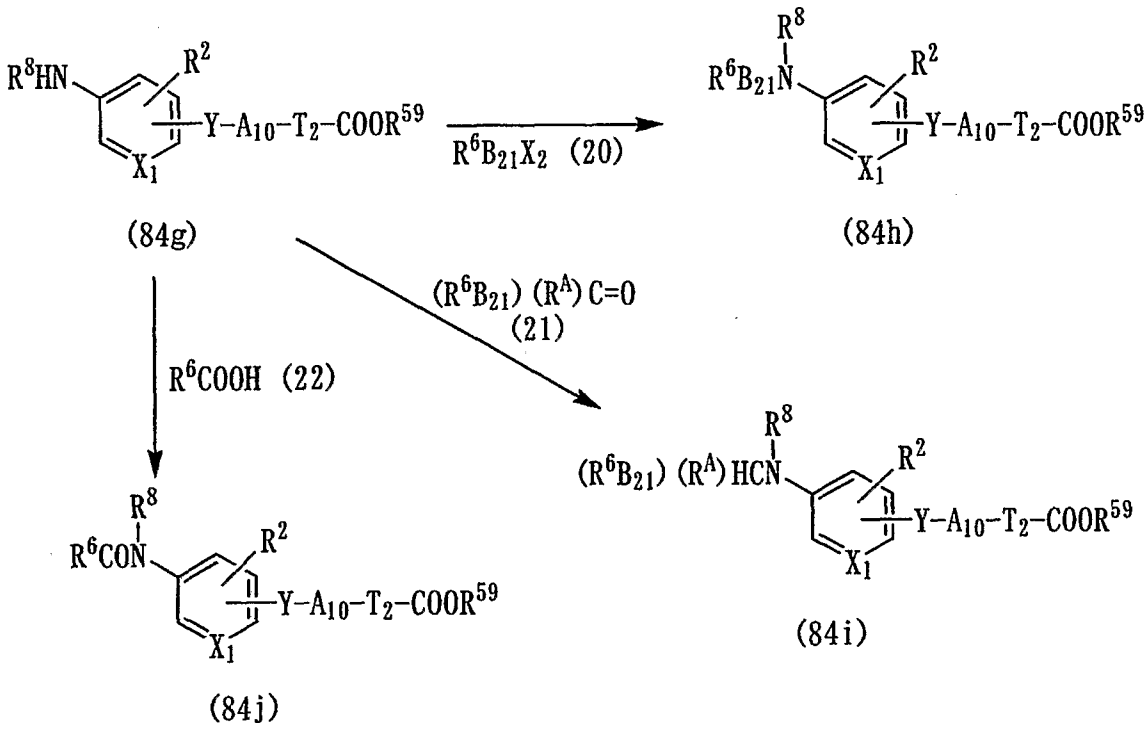
The reaction of the compound (114) with the compound (36) is carried out under reaction conditions similar to those of the reaction of the compound (1b)

with the compound (5) of the above described reaction formula 2.

The compound (109e), in which l is 0, may also be produced by reacting the corresponding compound (114) with the compound (36) in an appropriate solvent in the presence of a basic compound and a catalyst.

The above described reaction is carried out under reaction conditions similar to those of the reaction C described for the above described reaction formula 13.

[Reaction formula 75]



In the formula, R^2, X_1, Y, R^8, B_{21}, R^6, A_{10}, T_2, R^{59}, R^A and X_2 are the same as described above, provided that the CHR^AB_{21} moiety in the side chain ($-N(R^8)(CH(R^A)B_{21}R^6)$) of the compound (84i) has not more than 6 carbon atoms, and the a and b of A_{10} are bound to a -Y group

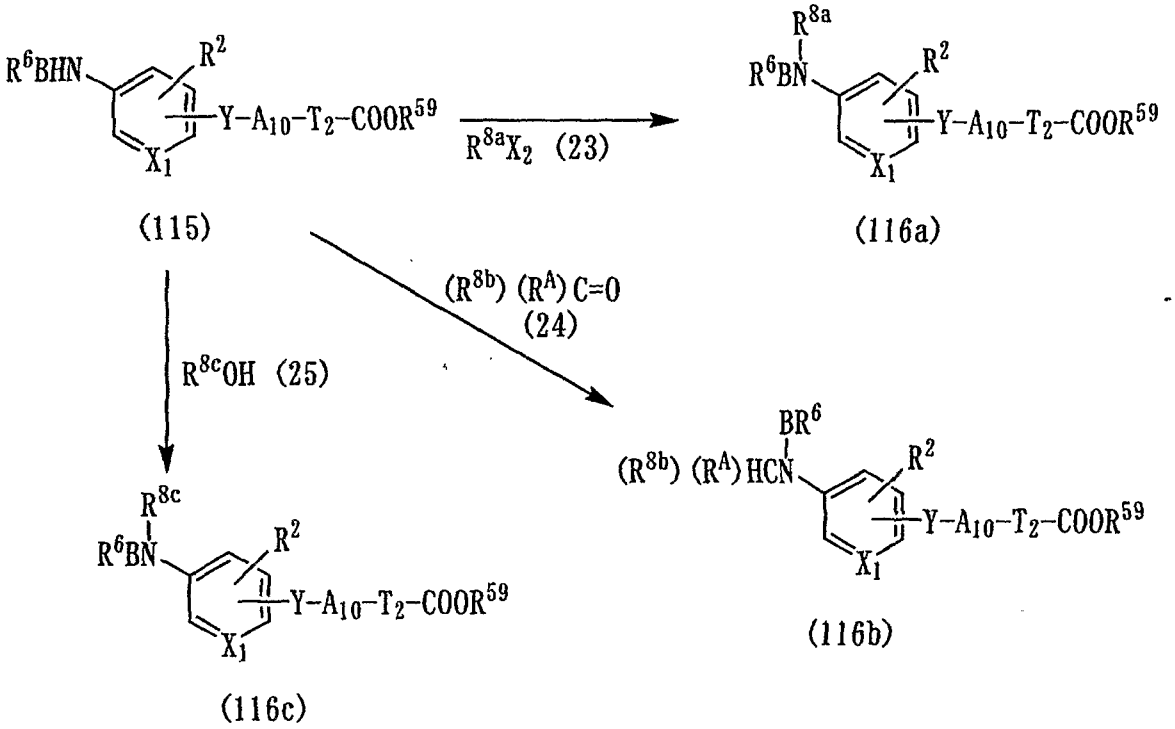
and a $-T_2$ group, respectively.

The reaction of the compound (84g) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (84g) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (84g) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 76]



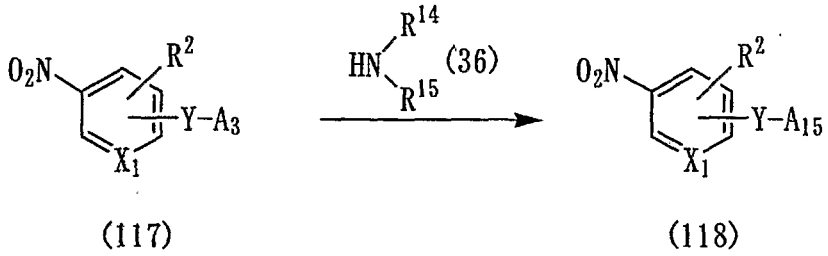
In the formula, R^2, X_1, Y, R^{8a}, R^{8b}, R^{8c}, B, R^6, A_{10}, T_2, R^{59}, R^A and X_2 are the same as described above, provided that the CHR^A moiety in the side chain ($-NB(R^6)(CH(R^A)R^{8b})$) of the compound (116b) has not more than 6 carbon atoms, and the a and b of A_{10} are bound to a -Y group and a $-T_2$ group, respectively.

The reaction of the compound (115) with the compound (23) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (115) with the compound (25) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

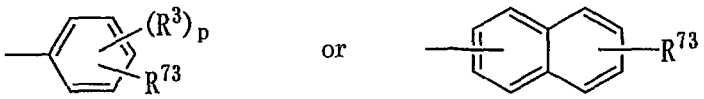
The reaction of the compound (115) with the compound (24) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 77]



In the formula, R^2, X_1, Y, A_3, R^{14} and R^{15} are

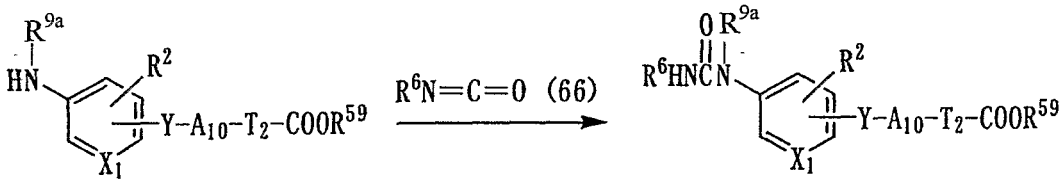
the same as described above, and A_{15} represents a group of the formula:



wherein R^{73} represents a $-(B_{21})fCH(R^A)(NR^{14}R^{15})$ group, and B_{21}, f and R^A are the same as described above, provided that the $(B_{21})fCH(R^A)$ moiety has not more than 6 carbon atoms.

The reaction of the compound (117) with the compound (36) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 78]

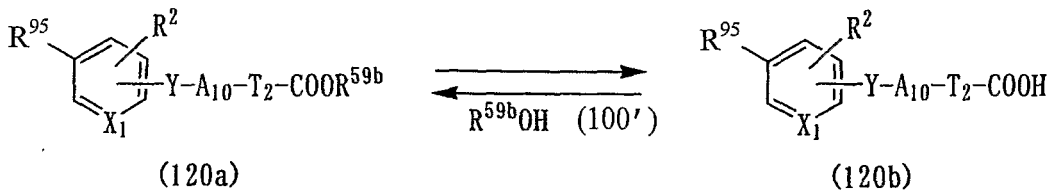


(69′) (119)

In the formula, R^2, X_1, Y, A_{10}, T_2, R^6, R^{9a} and R^{59} are the same as described above, provided that the a and b of A_{10} are bound to a -Y group and a $-T_2$ group, respectively.

The reaction of the compound (69′) with the compound (66) is carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (66) of the above described reaction formula 46.

[Reaction formula 79]



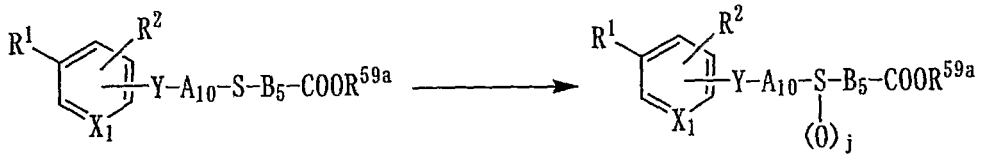
In the formula, R^2, X_1, Y, A_{10}, T_2, R^{95} and R^{59b} are the same as described above, provided that the a and b of A_{10} are bound to a -Y group and a $-T_2$ group, respectively.

The reaction which converts the compound (120a) into the compound (120b) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (120b) with the compound (100′) is carried out under reaction conditions similar to those of the reaction of the compound (1fff) with the compound (43) in the reaction formula 20 described above.

The compound (120a) may also be produced using a lower alkyl halide such as methyl iodide in place of the compound (100′) under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 80]

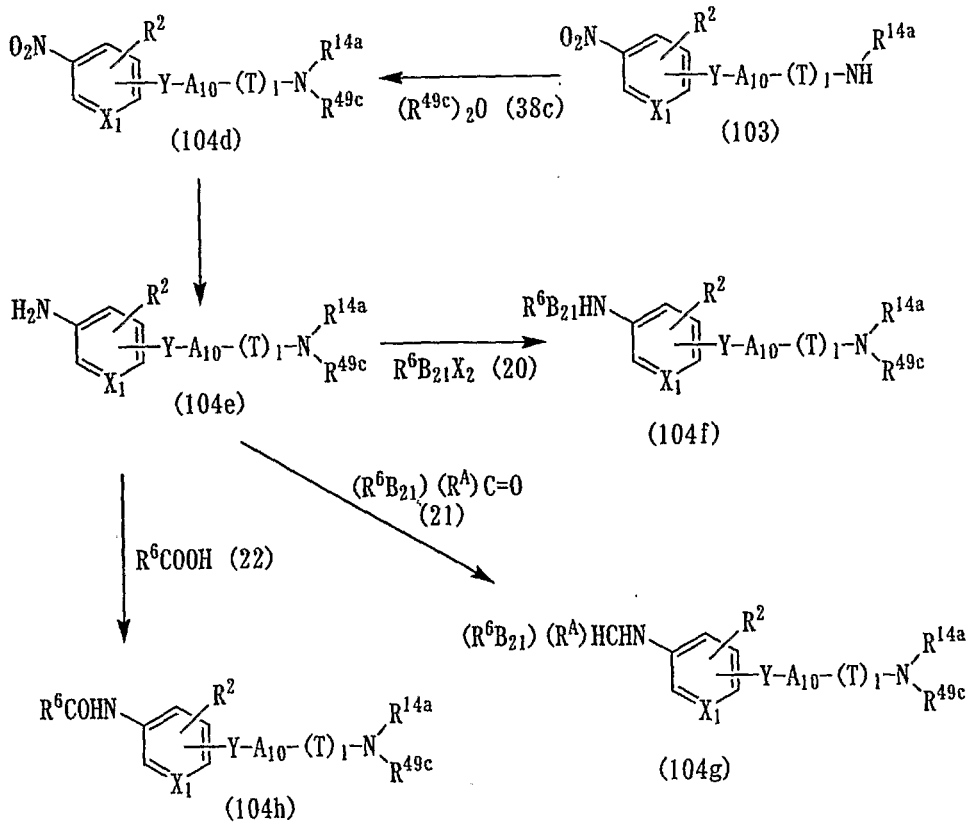


(120c) (120d)

In the formula, R^1, R^2, X_1, Y, A_{10}, B_5, R^{59a} and j are the same as described above, provided that the a and b of A_{10} are bound to a -Y group and a -S group, respectively.

The reaction which converts the compound (120c) into the compound (120d) may be carried out under reaction conditions similar to those of the reaction which converts the compound (1zzzz) into the compound (1aaaaa) in formula 4 described above.

[Reaction formula 81]



(104d) (103) (104e) (104f) (104g) (104h)

In the formula, R^2, X_1, Y, A_{10}, T, l, R^6, X_2, R^A, B_{21} and R^{14a} are the same as described above, and R^{49c} represents a lower alkoxycarbonyl group, provided that the a and b of A_{10} are bound to a -Y group and a -(T)l group, respectively.

The reaction of the compound (103) with the compound (38c) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction which converts the compound (104d) into the compound (104e) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

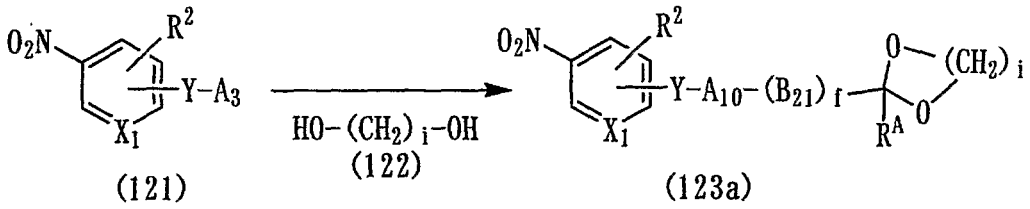
The reaction of the compound (104e) with the compound (20) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (104e) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (104e) with the compound (21) is carried out under reaction conditions similar to those of the reaction of the compound (1b)

with the compound (5) of the above described reaction formula 2.

[Reaction formula 82]



In the formula, R^2, X_1, Y, A_3, A_{10}, B_{21}, f, R^A and i are the same as described above, provided that the a and b of A_{10} are bound to a -Y group and a $-(B_{21})f$ group, respectively, and $(B_{21})fC(R^A)$ in the side chain of the compound (123a) has not more than 6 carbon atoms in total.

The reaction of the compound (121) with the compound (122) may be carried out in an appropriate solvent in the presence of an acid.

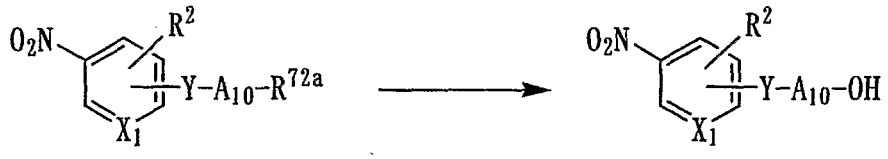
Any of the solvents, which are used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1, may be used in this reaction.

Examples of the acid used include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, and organic acids such as acetic acid, trifluoroacetic acid, and sulfonic acids including p-toluenesulfonic acid. These acids may be used singly or in a mixture of two or more. The acid is appropriately used in an amount typically at least

0.01 to 5 times, and preferably 0.01 to 2 times of the compound (121) on a molar basis. The compound (122) is appropriately used in an amount typically at least equimolar to the compound (121), and preferably 1 to 10 times of the compound (121) on a molar basis.

The above described reaction is carried out typically at 0 to 200°C, and preferably at around 0 to 150°C and, in general, is completed in around 30 minutes to 10 hours.

[Reaction formula 83]



(109f) (124)

In the formula, R^2, X_1, Y and A_{10} are the same as described above, and R^{72a} represents a lower alkoxy group, provided that the a of A_{10} is bound to a -Y group and the b of A_{10} is bound to a $-R^{72a}$ group or a hydroxyl group.

The reaction which converts the compound (109f) into the compound (124) may be carried out in an appropriate solvent in the presence of an acid.

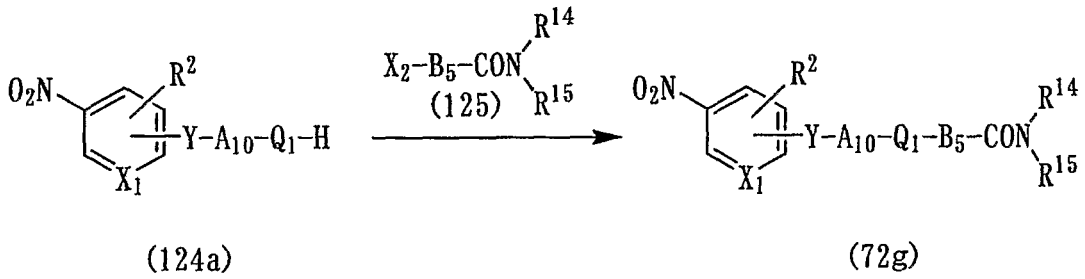
In addition to water, any solvents which are used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used in this reaction.

Examples of the acid used include mineral

acids such as hydrobromic acid, hydrochloric acid, and concentrated sulfuric acid, fatty acids such as formic acid and acetic acid, organic acids such as p-toluenesulfonic acid, Lewis acids such as aluminum chloride, zinc chloride, iron chloride, tin chloride, boron trifluoride, and boron tribromide, iodides such as sodium iodide and potassium iodide, a mixture of the above described Lewis acid with the above described iodide. The acid is appropriately used in an amount typically 0.1 to 5 times, and preferably 0.5 to 3 times of the compound (109f) on a molar basis.

The above described reaction is typically carried out at 0 to 150°C, and preferably at about 0 to 100°C, and, in general, is completed in about 0.5 to 15 hours.

[Reaction formula 84]

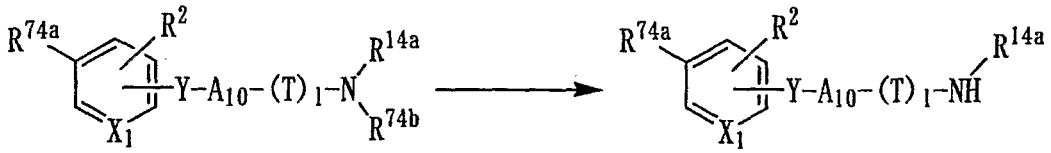


In the formula, R^2, X_1, Y, A_{10}, B_5, X_2, R^{14}, and R^{15} are the same as described above, and Q_1 represents an oxygen atom or a sulfur atom, provided that the a and b of A_{10} are bound to a -Y group and a $-Q_1$ group, respectively.

The reaction of the compound (124a) with the compound (125) is carried out under reaction conditions

similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 85]

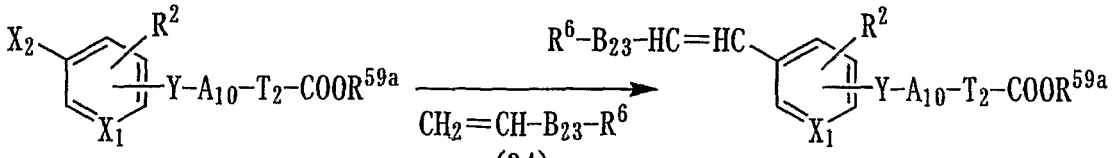


(109g) (109h)

In the formula, R^2, X_1, Y, A_{10}, R^{14a}, R^{74a}, T and l are the same as described above, and R^{74b} represents a lower alkanoyl group or a lower alkoxycarbonyl group, provided that the a and b of A_{10} are bound to a -Y group and a -(T)l group, respectively.

The reaction which converts the compound (109g) into the compound (109h) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

[Reaction formula 86]



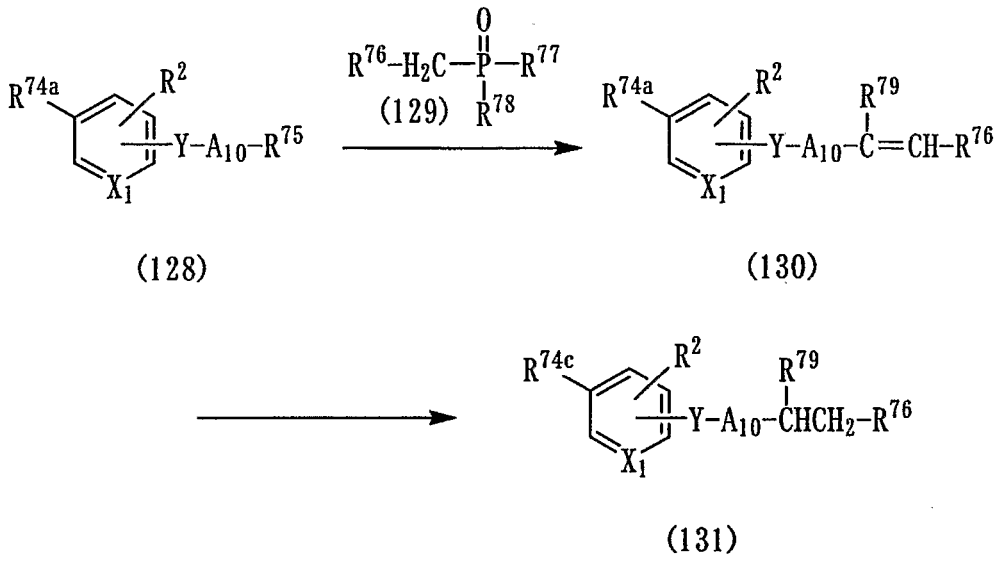
(126) (34) (127)

In the formula, R^2, X_1, Y, A_{10}, T_2, X_2, R^{59a}, B_{23} and R^6 are the same as described above, provided that the a and b of A_{10} are bound to -Y group and $-T_2$ group,

respectively.

The reaction of the compound (126) with the compound (34) is carried out under reaction conditions similar to those of the reaction of the compound (33) with the compound (34) in formula 43 described above.

[Reaction formula 87]



In the formula, R^2, X_1, Y, R^{74a} and A_{10} are the same as described above, R^{74c} represents an amino group or an $-R^1$ group (wherein R^1 is the same as described above), R^{75} represents a lower alkanoyl group, R^{76} represents a lower alkoxycarbonyl group, R^{77} and R^{78} are both lower alkoxy groups, and R^{79} represents a hydrogen atom or a lower alkyl group, provided that the a of A_{10} is bound to a -Y group, and the b of A_{10} is bound to a $-R^{75}$ group, $-C(R^{79})=CHR^{76}$ group or $-CH(R^{79})CH_2R^{76}$ group, and the $C(R^{79})=CH$ moiety or the $CH(R^{79})CH_2$ moiety has not more than 6 carbon atoms.

The reaction of the compound (128) with the

compound (129) is carried out in an appropriate solvent in the presence of a basic compound.

Any of the conventional solvents which do not affect the reaction may be used. Examples of such a solvent include ethers such as diethyl ether, dioxane, tetrahydrofuran, monoglyme, and diglyme, aromatic hydrocarbons such as benzene, toluene, and xylene, aliphatic hydrocarbons such as n-hexane, heptane, and cyclohexane, amines such as pyridine and N,N-dimethylaniline, aprotic polar solvents such as acetonitrile, N,N-dimethylformamide, dimethyl sulfoxide, and hexamethylphosphoric acid triamide, and alcohols such as methanol, ethanol, and isopropanol, and a mixture thereof.

Examples of the basic compound include metal sodium, metal potassium, sodium hydride, sodium amide, metal hydroxides such as sodium hydroxide, potassium hydroxide, and calcium hydroxide, carbonates such as sodium carbonate, potassium carbonate, and sodium bicarbonate, metal alcoholates such as sodium methylate, sodium ethylate, and potassium tert-butoxide, alkyl and aryl lithiums or lithium amides such as methyl lithium, n-butyryl lithium, phenyl lithium, and lithium diisopropylamide, and organic bases such as pyridine, piperidine, quinoline, trimethylamine, diisopropylethylamine, N,N-dimethylaniline. These basic compounds are used singly or in a mixture of two or more. The basic compound is

appropriately used in an amount typically 0.1 to 10 times, and preferably 0.5 to 5 times of the compound (128) on a molar basis.

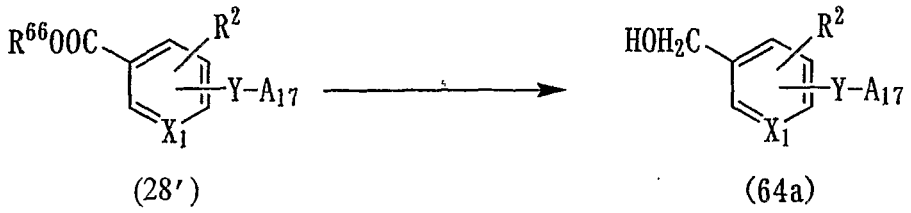
The compound (129) is appropriately used in an amount typically at least equimolar to the compound (128), and preferably 1 to 5 times of the compound (128) on a molar basis.

The above described reaction is carried out typically at -80 to 150°C, and preferably at about -80 to 120°C and, in general, is completed in about 0.5 to 40 hours.

When an organic base is used as the basic compound, the reaction proceeds advantageously by adding a lithium salt such as lithium chloride to the reaction system.

The reaction which converts the compound (130) into the compound (131) may be carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

[Reaction formula 88]



In the formula, R^2, X_1, Y, R^{66} and A_{17} are the same as described above.

The reaction which converts the compound (28′) into the compound (64a) is carried out under reaction conditions similar to those of the reaction which converts the compound (1f) into the compound (1g) of the above described reaction formula 3.

[Reaction formula 89]

(64b) (26a)

In the formula, R^2, X_1, Y and A are the same as described above.

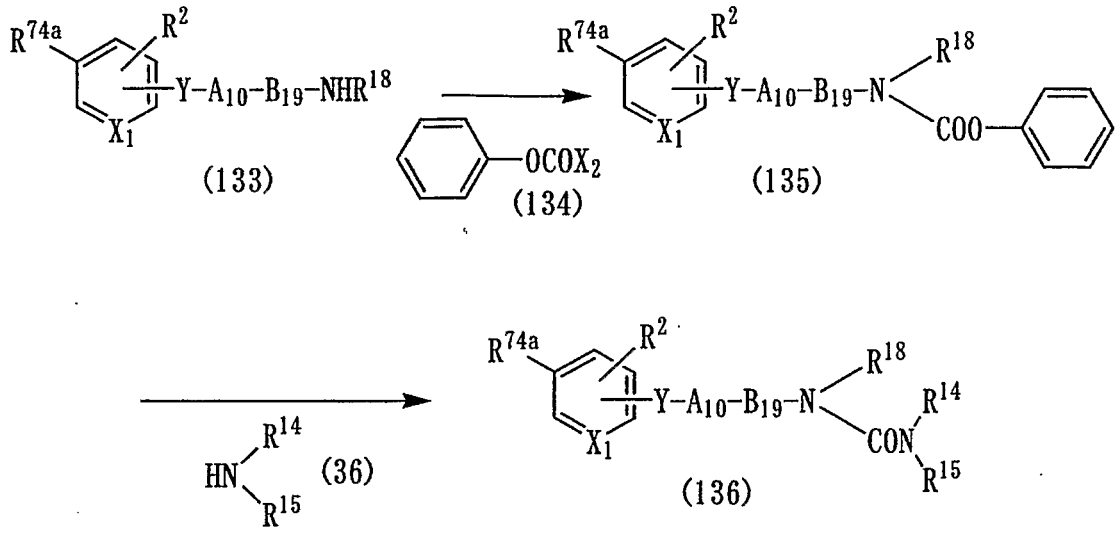
The reaction which converts the compound (64b) into the compound (26a) is carried out in an appropriate solvent in the presence of an oxidizing agent.

Examples of the solvent include water, fatty acids such as formic acid, acetic acid, trifluoroacetic acid, and propionic acid, esters such as ethyl acetate and methyl acetate, alcohols such as methanol, ethanol, and isopropanol, ethers such as dioxane, tetrahydrofuran, and diethyl ether, ketones such as acetone and methyl ethyl ketone, aromatic hydrocarbons such as benzene, toluene, chlorobenzene, and xylene, and halogenated hydrocarbons such as chloroform and dichloromethane, hexamethylphosphoric acid triamide, N,N-dimethylformamide, dimethyl sulfoxide, and pyridine, and a mixture thereof.

Examples of the oxidizing agent include peracids such as performic acid, peracetic acid, pertrifluoroacetic acid, perbenzoic acid, m-chloroperbenzoic acid, and o-carboxyperbenzoic acid, hydrogen peroxide, sodium metaperidodate, dichromic acid, dichromates such as sodium dichromate and potassium dichromate, manganese dioxide, permanganic acid, permanganates such as sodium permanganate and potassium permanganate, lead salts such as lead tetraacetate, silver oxide, and a Dess-Martin reagent (Dess-Martin periodinane). These oxidizing agents are used singly or in a mixture of two or more. The oxidizing agent is used in an amount typically at least equimolar to the compound (64b), and preferably 1 to 3 times of the compound (64b) on a molar basis.

The above described reaction is carried out typically at -10 to 100°C, and preferably at about 0 to 50°C, and is completed in about 30 minutes to 24 hours.

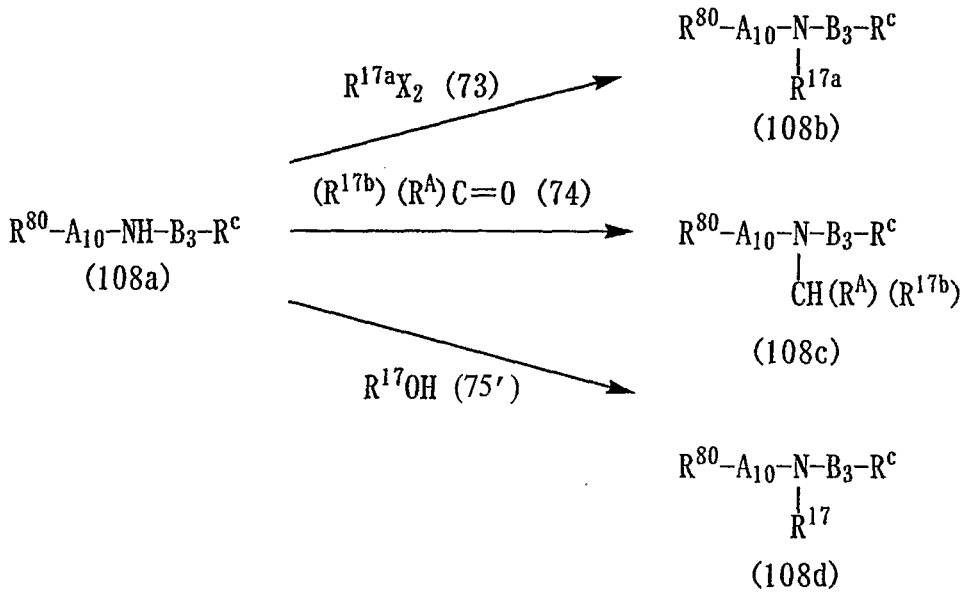
[Reaction formula 90]



In the formula, R^2, X_1, Y, A_{10}, B_{19}, R^{18}, X_2, R^{14}, R^{74a} and R^{15} are the same as described above, provided that the a and b of A_{10} are bound to a -Y group and a $-B_{19}$ group, respectively.

The reactions between compound (133) with the compound (134), and compound (135) with the compound (36) are carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 91]



In the formula, A_{10}, B_3, R^{17a}, R^{17b}, R^A, R^{17}, Y_1, R^c and X_2 are the same as described above, and R^{80} represents a $-Y_1H$ group or a $-OR^{81}$ group, R^{81} represents a protective group for the hydroxyl group, provided that the CHR^A moiety in the side chain ($-N(B_3R^c)(CHR^AR^{17b})$) of the compound (108c) has not more than 6 carbon atoms, the a of A_{10} is bound to a $-R^{80}$

group, and the b is bound to an $-NHB_3R^c$ group, $-N(R^{17a})B_3R^c$ group, $-N(CHR^AR^{17b})B_3R^c$ group or $-N(R_{17})B_3R^c$ group.

Here, examples of the protective group for the hydroxyl group include groups, which are previously mentioned, such as a phenyl lower alkyl group, a lower alkoxy lower alkyl group, tetrahydropyranyl group, tri lower alkysilyl group, a lower alkanoyl group, and a lower alkyl group.

The reaction of the compound (108a) with the compound (73) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

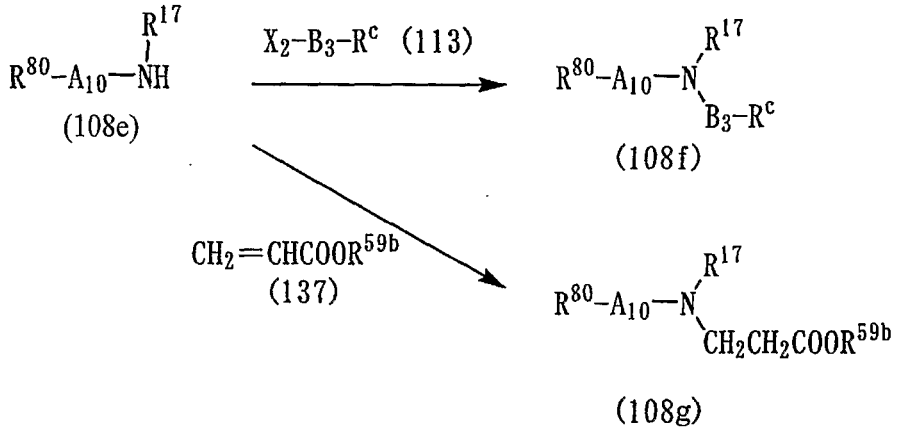
The reaction of the compound (108a) with the compound (75') is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (108a) with the compound (74) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

When the reaction is carried out using the compound (74) as a starting material, wherein R^A and R^{17b} are bound with each other, together with carbon atoms bound to these groups, to form a cycloalkyl ring, and a

hydride reducing agent, a cycloalkyloxytrialkylsilane such as [1-ethoxycyclopropyl]oxy]trimethylsilane may be used as a starting material in place of the compound (74) to produce the above described compound (74) in the reaction system.

[Reaction formula 92]



In the formula, R^{80}, A_{10}, R^{17}, B_3, R^c, X_2, and R^{59b} are the same as described above, provided that the a of A_{10} is bound to a $-R^{80}$ group and the b is bound to a $-NHR^{17}$ group, $-N(R^{17})B_3R^c$ group or $-N(R^{17})CH_2CH_2COOR^{59}$ group.

The reaction of the compound (108e) with the compound (113) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (108e) with the compound (137) is carried out in an appropriate solvent in the presence of an acid.

Any of the solvents used in the reaction of

the compound (2) with the compound (3) of the above described reaction formula 1 may be used in this reaction.

Examples of the acid used include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, organic acids such as acetic acid, trifluoroacetic acid, and sulfonic acids including p-toluenesulfonic acid, and Lewis acids such as aluminum chloride, zinc chloride, iron chloride, tin chloride, boron tribromide, and a boron trifluoride/diethyl ether complex. These acids may be used singly or in a mixture of two or more. The acid is appropriately used in an amount typically at least 0.01 to 5 times, and preferably 0.1 to 2 times of the compound (108e) on a molar basis. The compound (137) is appropriately used in an amount typically at least equimolar to the compound (108e), and preferably 1 to 10 times of the compound (108e) on a molar basis.

The above described reaction is carried out typically at 0 to 200°C, and preferably at about 0 to 150°C, and, in general, is completed in about 30 minutes to 80 hours.

[Reaction formula 93]

In the formula, R^{81} is the same as described above, R^{73b} represents a $-A_{10}-T_2-COOR^{59a}$ or $-A$ group, and

A_{10}, T_2, R^{59a} and A are the same as described above, provided that the a of A_{10} is bound to an $-OR^{81}$ group or a hydroxyl group, and the b of A_{10} is bound to a $-T_2$ group.

When R^{81} of the material compound (138) represents a phenyl lower alkyl group, the reaction which converts the compound (138) into the compound (139) may be carried out under reaction conditions similar to those of the reduction reaction (1) (method using a catalytic hydrogen reducing agent) which is one reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

When R^{81} of the material compound (138) represents a tetrahydropyranyl group or tri-lower alkylsilyl group, the reaction which converts the compound (138) into the compound (139) may be carried out under reaction conditions similar to those of the hydrolysis reaction B described for above described reaction formula 9. The reaction which converts the compound (138) into the compound (139) is favorably carried out by hydrolysis using an acid. The acid is appropriately used in an amount typically 1 to 10 times, and preferably 1 to 2 times of the compound (138) on a molar basis.

When R^{81} of the compound (138) represents a tri-lower alkylsilyl group, the compound (138) may be treated with a fluorine compound such as tetra-n-butyl

ammonium fluoride, hydrogen fluoride or cesium fluoride.

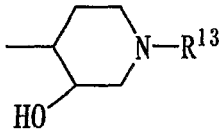
When R^{81} of the material compound (138) represents a lower alkoxy lower alkyl group or a lower alkyl group, the compound (138) may be treated in an appropriate solvent in the presence of an acid. Examples of the solvent include water, lower alcohols such as methanol, ethanol, and isopropanol, ethers such as dioxane, tetrahydrofuran, and diethyl ether, halogenated hydrocarbons such as dichloromethane, chloroform, and carbon tetrachloride, and polar solvents such as acetonitrile, and a mixture thereof. Examples of the acid used include mineral acids such as hydrochloric acid, sulfuric acid, and hydrobromic acid, fatty acids such as formic acid and acetic acid, sulfonic acids such as p-toluenesulfonic acid, Lewis acids such as boron trifluoride, aluminum chloride, and boron tribromide, iodides such as sodium iodide and potassium iodide, and a mixture of the above described iodide with the above described Lewis acid. The above described reaction is carried out at typically 0 to 200°C, and preferably at about room temperature to 150°C, and, in general, is completed in about 0.5 to 25 hours.

The above described hydrolysis may also be carried out using a basic compound under reaction conditions similar to those of the hydrolysis reaction B described for the above described reaction formula 9.

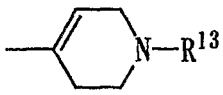
Here, amines such as triethylamine may be used as the basic compound in addition to the basic compounds used in the hydrolysis reaction B.

When R^{81} of the material compound (138) represents a lower alkanoyl group, the reaction which converts the compound (138) into the compound (139) may be carried out under reaction conditions similar to those of the hydrolysis reaction B described for the above described reaction formula 9.

When R^{73a} of the compound (138) represents a group of the formula:

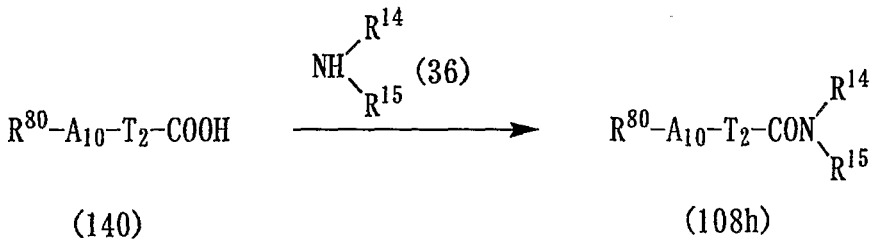


, a dehydration reaction takes place under the above described hydrolysis conditions, and sometimes the compound (138), wherein the corresponding R^{73a} represents a group of the formula:



may be obtained.

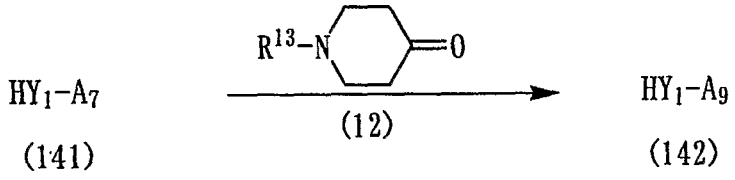
[Reaction formula 94]



In the formula, R^{80}, A_{10}, T_2, R^{14} and R^{15} are the same as described above, provided that the a and b of A_{10} are bound to a $-R^{80}$ group and a $-T_2$ group, respectively.

The reaction of the compound (140) with the compound (36) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

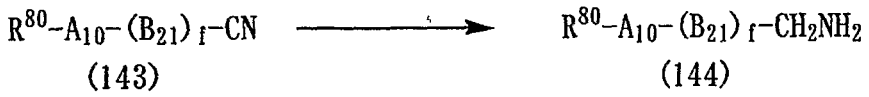
[Reaction formula 95]



In the formula, Y_1, A_7, R^{13} and A_9 are the same as described above.

The reaction of the compound (141) with the compound (12) is carried out under reaction conditions similar to those of the reaction of the compound (13) with the compound (12) in formula 8 described above.

[Reaction formula 96]

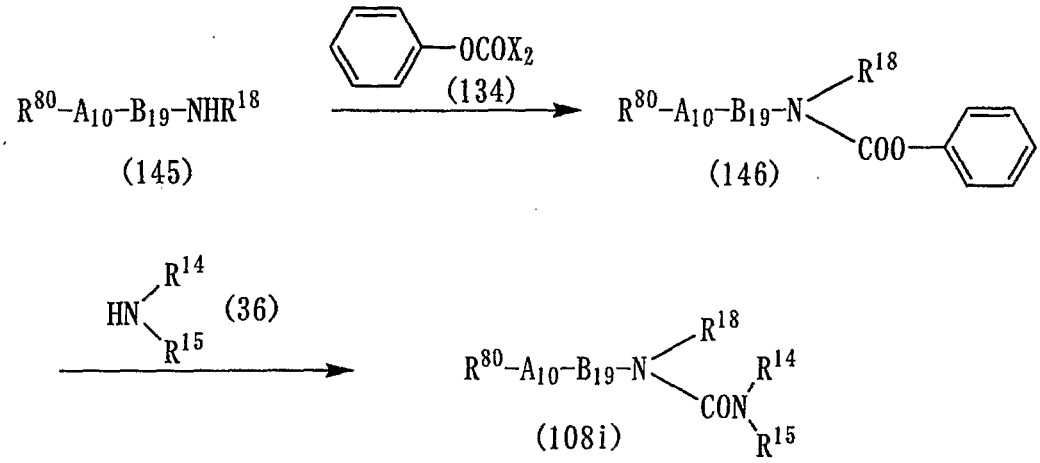


In the formula, R^{80}, A_{10}, B_{21} and f are the same as described above, provided that the alkyl moiety in the side chain ($-(B_{21})f-CH_2NH_2$) of the compound (144)

has not more than 6 carbon atoms.

The reaction which converts the compound (143) into the compound (144) may be carried out under reaction conditions similar to those of the reaction using a hydride reducing agent which is one reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 97]



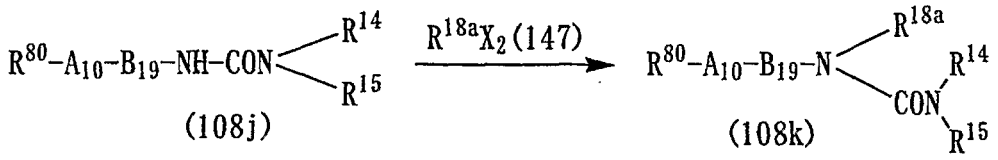
In the formula, R^{80}, A_{10}, B_{19}, X_2, R^{18}, R^{14} and R^{15} are the same as described above, provided that the a of A_{10} is bound to a $-R^{80}$ group and the b is bound to a $-B_{19}$ group.

The reaction of the compound (145) with the compound (134) is carried out under reaction conditions similar to those of the reaction of the compound (133) with the compound (134) in the reaction formula 90 described above.

The reaction of the compound (146) with the compound (36) is carried out under reaction conditions similar to those of the reaction of the compound (1b)

with the compound (6) of the above described reaction formula 2.

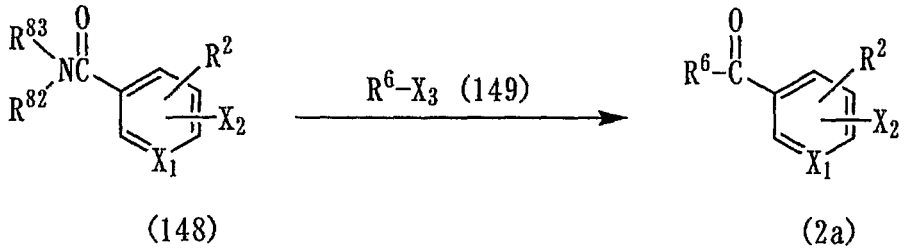
[Reaction formula 98]



In the formula, A_{10}, B_{19}, R^{14}, R^{15}, R^{80} and X_2 are the same as described above, and R^{18a} represents a lower alkyl group, provided that the a and b of A_{10} are bound to a $-R^{80}$ group and a $-B_{19}$ group, respectively.

The reaction of the compound (108j) with the compound (147) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 99]



In the formula, R^2, X_1, X_2, X_3 and R^6 are the same as described above, R^{82} represents a lower alkyl group, and R^{83} represents a lower alkoxy group.

The reaction of the compound (148) with the

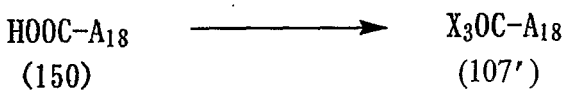
compound (149) is carried out in an appropriate solvent in the presence of a catalyst.

Any of the solvents used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used in this reaction.

Examples of the catalyst include magnesium. The catalyst is appropriately used in an amount typically at least equimolar to the compound (148), and preferably 1 to 5 times of the compound (148) on a molar basis.

The above described reaction is carried out typically at 0 to 200°C, preferably at about 0 to 150°C, and, in general, is completed in about 30 minutes to 10 hours.

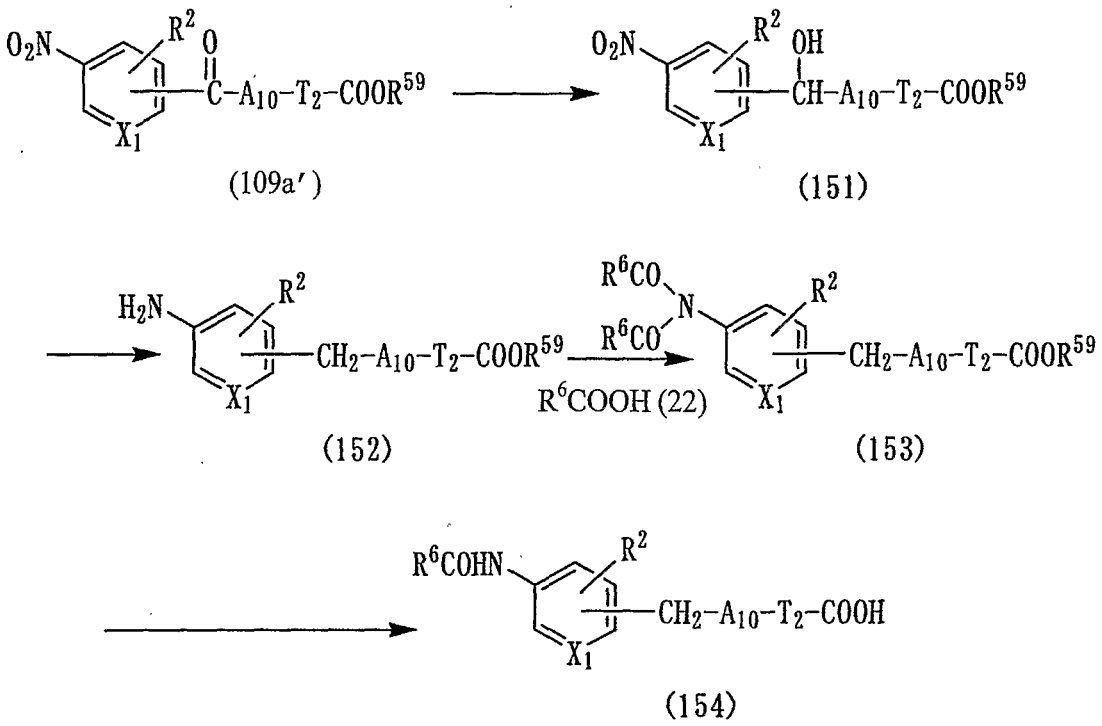
[Reaction formula 100]



In the formula, A_{18} represents a -A group or $-A_{10}-T_2-COOR^{59b}$ group, and A, A_{10}, T_2, R^{59b} and X_3 are the same as described above.

The reaction which converts the compound (150) into the compound (107') is carried out under reaction conditions similar to those of the reaction which converts the compound (85) into the compound (7') of the above described reaction formula 55.

[Reaction formula 101]



In the formula, R^2, X_1, A_{10}, T_2 and R^6 are the same as described above, provided that the a of A_{10} is bound to -CO group, -CH(OH) group or $-CH_2$, and the b is bound to a $-T_2$ group.

The reaction which converts the compound (109a') into the compound (151) may be carried out under reaction conditions similar to those of the reaction using a hydride reducing agent which is one reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

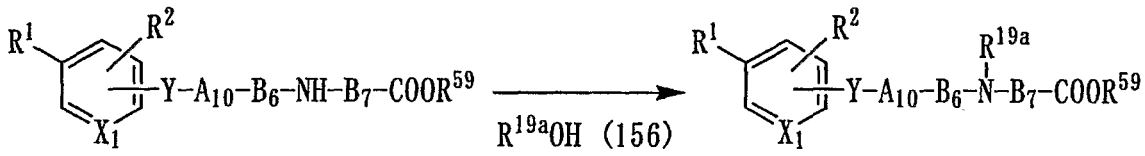
The reaction which converts the compound (151) into the compound (152) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69)

of the above described reaction formula 47.

The reaction of the compound (152) with the compound (22) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction which converts the compound (153) into the compound (154) may be carried out under reaction conditions similar to those of hydrolysis B reaction described for the above described reaction formula 9.

[Reaction formula 102]

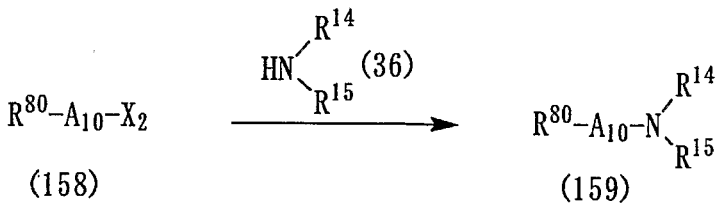


(155) (157)

In the formula, R^1, R^2, X_1, Y, A_{10}, B_6, B_7 or R^{59} are the same as described above, and R^{19a} represents a lower alkanoyl group, provided that the a and b of A_{10} are bound to a -Y group and a $-B_6$ group, respectively.

The reaction of the compound (155) with the compound (156) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

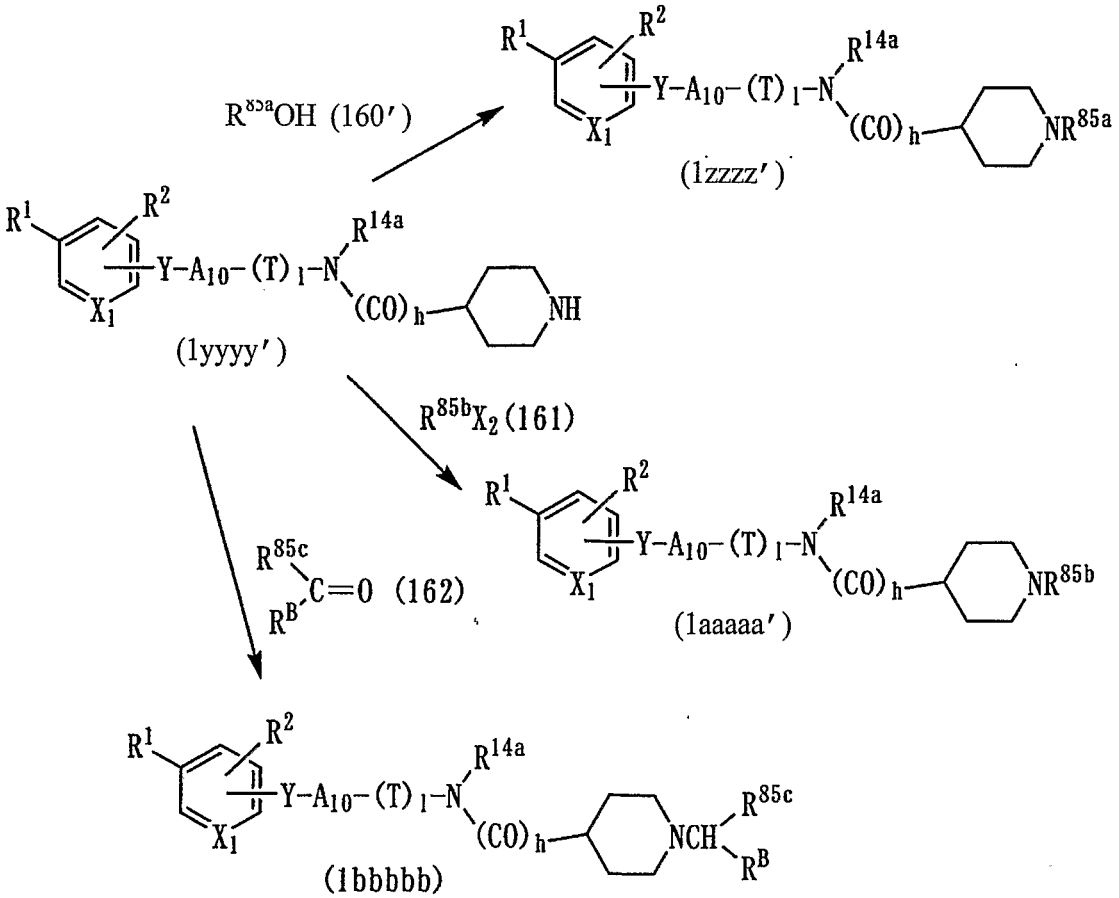
[Reaction formula 103]



In the formula, R^{80}, A_{10}, X_2, R^{14} and R^{15} are the same as described above.

The reaction of the compound (158) with the compound (36) is carried out under similar reacting conditions as the reaction of the compound (114) with the compound (36) of the above described reaction formula 74 in which l is 0.

[Reaction formula 104]



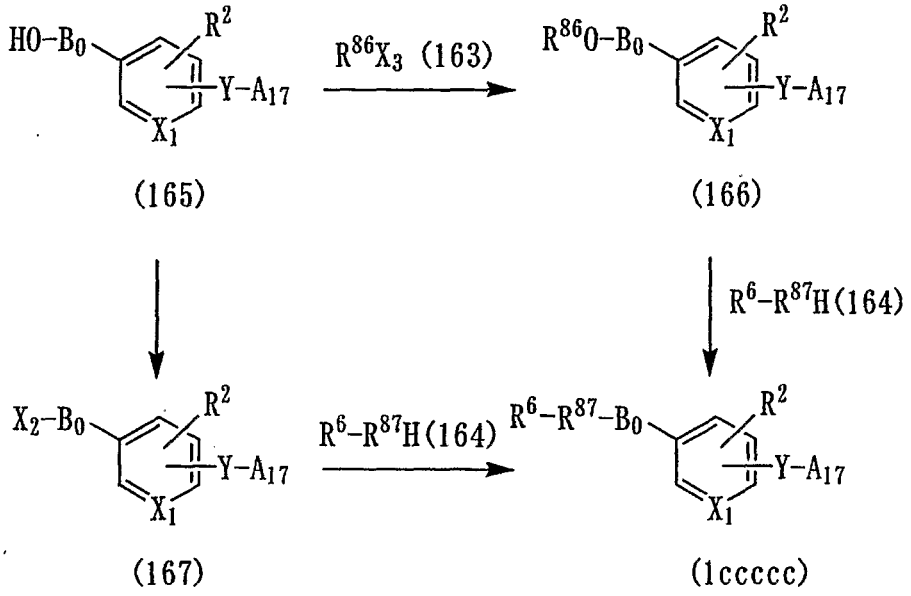
In the formula, R^1, R^2, Y, A_{10}, R^{14a}, h, T, l, R^B, X_1 and X_2 are the same as described above, R^{85a} represents a benzoyl group, R^{85b} represents a lower alkoxy carbonyl group, a phenyl lower alkyl group, a lower alkyl group or furyl lower alkyl group, and R^{85c} represents a hydrogen atom, a lower alkyl group, a phenyl group, phenyl lower alkyl group, a furyl group or a furyl lower alkyl group, provided that the $-CH(R^B)R^{85c}$ group of the compound (1bbbbb) has not more than 6 carbon atoms.

The reaction of the compound (1yyyy') with the compound (160') is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (1yyyy') with the compound (161) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

The reaction of the compound (1yyyy') with the compound (162) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2.

[Reaction formula 105]



In the formula, R^2, B_0, Y, X_1, A_{17}, R^8, X_2, X_3 and R^6 are the same as described above, R^{86} represents a lower alkylsulfonyl group, and R^{87} represents a oxygen atom or a $-N(R^8)-$ group.

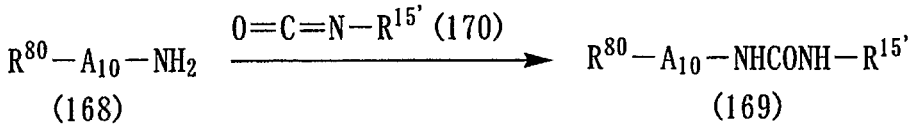
The reaction of the compound (165) with the compound (163) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction which converts the compound (165) into the compound (167) is carried out under reaction conditions similar to those of the reaction which converts the compound (85) into the compound (7′) of the above described formula 55.

The reaction of the compound (166) or the compound (167) with the compound (164) is carried out

under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

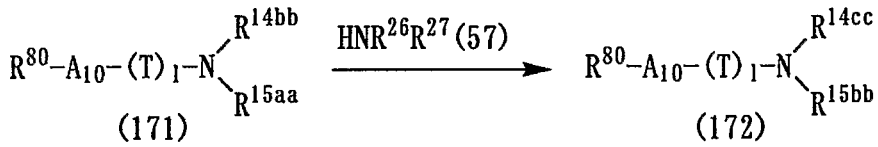
[Reaction formula 106]



In the formula, R^{80} and A_{10} are the same as described above, $R^{15'}$ represents the same group as (5) in R^{15} described above.

The reaction of the compound (168) with the compound (170) is carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (66) of the above described reaction formula 46.

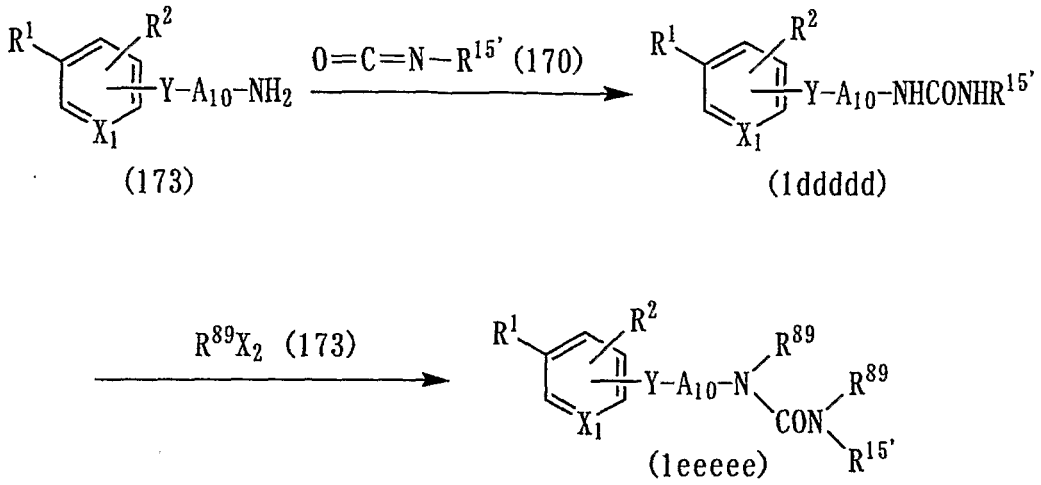
[Reaction formula 107]



In the formula, R^{80}, A_{10}, T, l, R^{14bb}, R^{15aa}, R^{14cc}, R^{15bb}, R^{26} and R^{27} are the same as described above.

The reaction of the compound (171) with the compound (57) is carried out under reaction conditions similar to those of the reaction of the compound (1iiii) with the compound (57) of the above described reaction formula 31.

[Reaction formula 108]

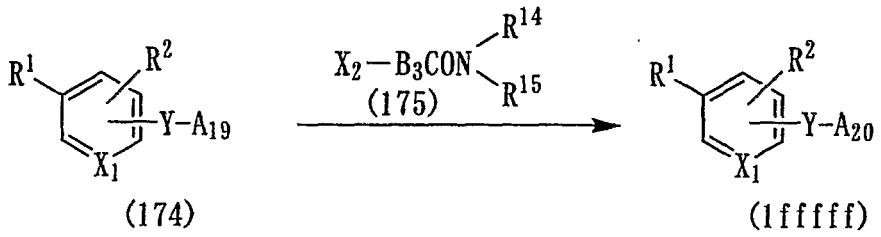


In the formula, R^1, R^2, X_1, Y, A_{10}, $R^{15'}$ and X_2 are the same as described above, and R^{89} represents a lower alkyl group.

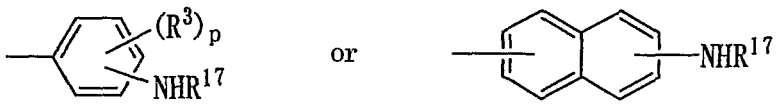
The reaction of the compound (173) with the compound (170) is carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (66) of the above described reaction formula 46.

The reaction of the compound (1ddddd) with the compound (173) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

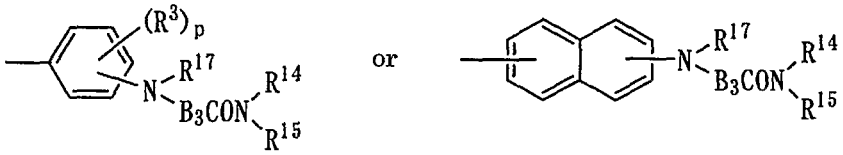
[Reaction formula 109]



In the formula, R^1, R^2, X_1, Y, X_2, B_3, R^{14} and R^{15} are the same as described above, and A_{19} represents a group of the formula:



, and A_{20} represents a group of the formula:



wherein R^3, p, R^{17}, B_3, R^{14} and R^{15} are the same as described above.

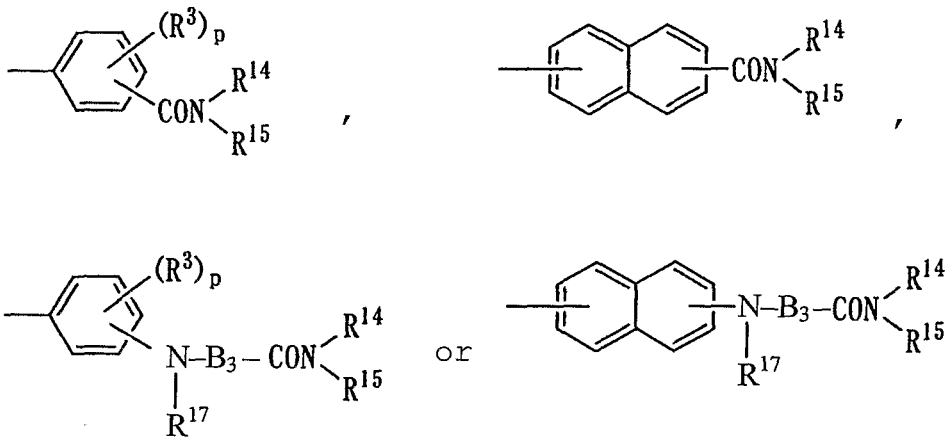
The reaction of the compound (174) with the compound (175) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 110]

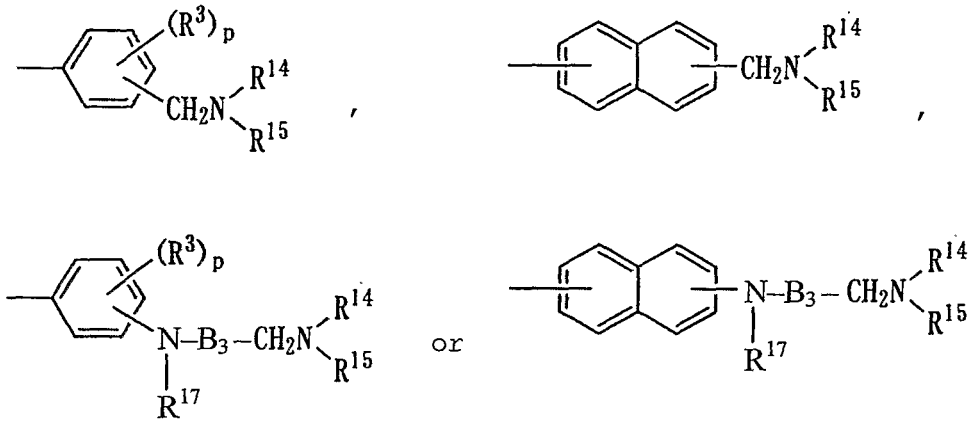
(1ggggg) (1hhhhh)

In the formula, R^1, R^2, X_1 and Y are the same as described above, A_{21} represents a group of the

formula:



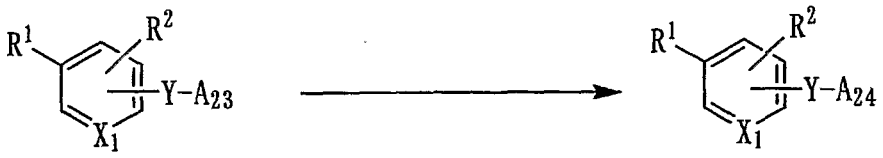
and A_{22} represents a group of the formula:



wherein R^3, p, R^{17}, B_3, R^{14} and R^{15} are the same as described above.

The reaction which converts the compound (1ggggg) into the compound (1hhhhh) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described reaction formula 2 in which a hydrogen reducing agent is used.

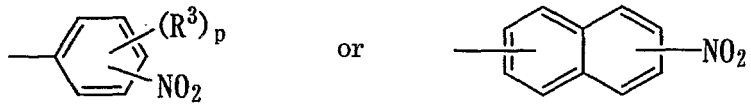
[Reaction formula 111]



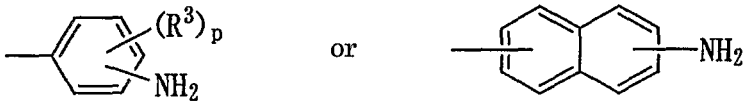
(1iiiii) (1jjjjj)

In the formula, R^1, R^2, X_1 and Y are the same as described above,

A_{23} represents a group of the formula:



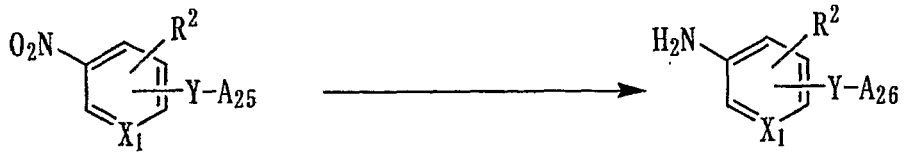
and A_{24} represents a group of the formula:



wherein R^3 and p are the same as described above.

The reaction which converts the compound (1iiiii) into the compound (1jjjjj) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) of the above described reaction formula 47.

[Reaction formula 112]

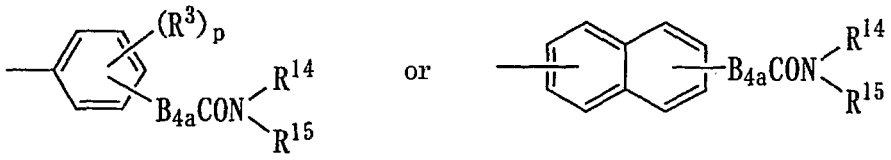


(1kkkkk) (1llllll)

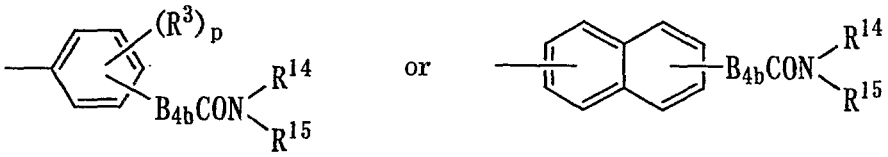
In the formula, R^2, X_1 and Y are the same as

described above,

A_{25} represents a group of the formula:



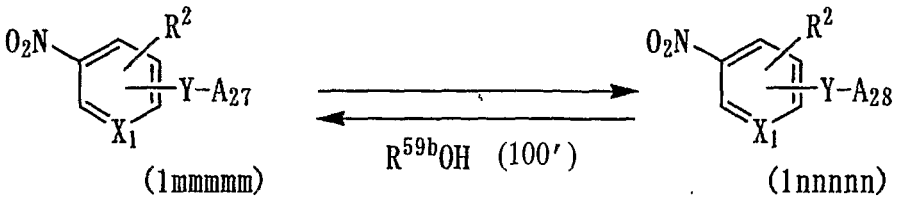
and A_{26} represents a group of the formula:



wherein B_{4a} represents a lower alkenylene group, B_{4b} represents a lower alkylene group, and R^3, p, R^{14} and R^{15} are the same as described above.

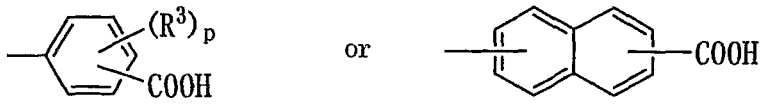
The reaction which converts the compound (1kkkkk) into the compound (1llllll) is carried out under reaction conditions similar to those of the reaction which converts the compound (68) into the compound (69) in the (1) method of formula 47 described above.

[Reaction formula 113]

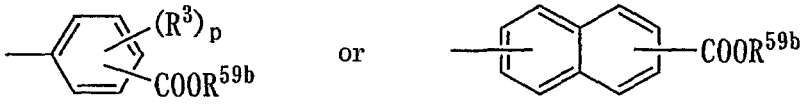


In the formula, R^2, X_1, Y, and R^{59b} are the same as described above,

A_{28} represents a group of the formula:



and A_{27} represents a group of the formula:

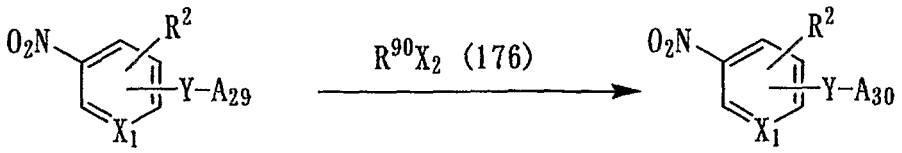


wherein R^3, p and R^{59b} are the same as described above.

The reaction which converts the compound (1mmmmm) into the compound (1nnnnn) is carried out under reaction conditions similar to those of the hydrolysis B reaction described for the above described reaction formula 9.

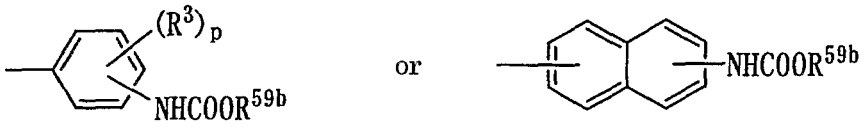
The reaction of the compound (1nnnnn) with the compound (100′) is carried out under reaction conditions similar to those of the reaction of the compound (1fff) with the compound (43) of the above described reaction formula 20.

[Reaction formula 114]

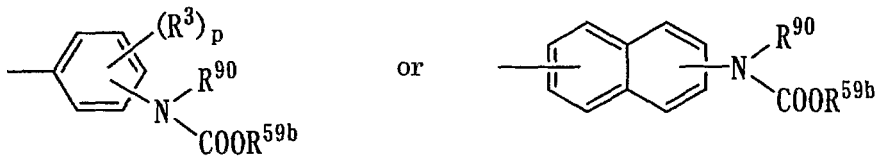


In the formula, R^2, X_1, X_2 and Y are the same as described above,

A_{29} represents a group of the formula:



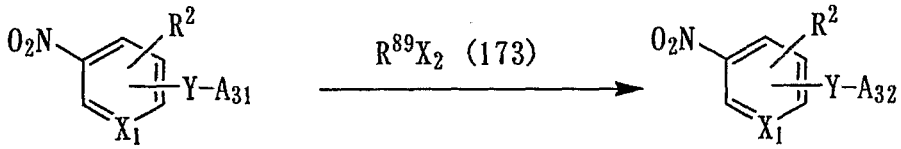
and A_{30} represents



wherein R^{90} represents a lower alkyl group which may have a hydroxyl group as a substituent, and R^3, p and R^{59b} are the same as described above.

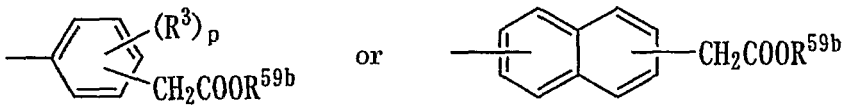
The reaction of the compound (looooo) with the compound (176) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 115]

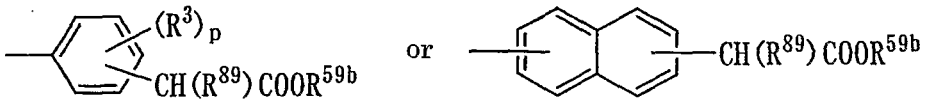


In the formula, R^2, X_1, X_2 and Y are the same as described above,

A_{31} represents a group of the formula:



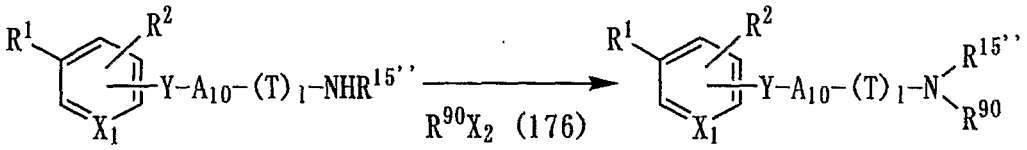
and A_{32} represents



wherein R^3, p, R^{59b} and R^{89} are the same as described above.

The reaction of the compound (1qqqqq) with the compound (173) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 116]



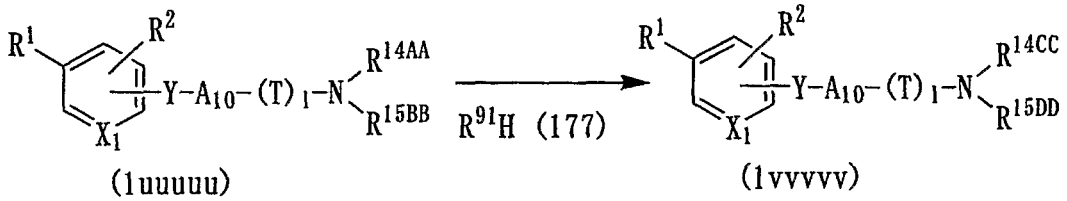
In the formula, R^1, R^2, X_1, Y, A_{10}, T, l, R^{90} and X_2 are the same as described above.

$R^{15''}$ represents the group (2), (3), (4), (5), (6), (7), (8), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), (26a), (27a), (28a), (29a), (30a), (31a), (32a), (33a), (34a), (35a), (36a), or (37a), which is defined for the above described R^{15} described above.

The reaction of the compound (1sssss) with the compound (176) is carried out under reaction

conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 117]



In the formula, R^1, R^2, X_1, Y, A_{10}, T and l are the same as described above,

R^{14AA} and R^{15BB} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(B_{12}CO)t-N(R^{20'})-CO-B_{16}X_2$ group thereon,

R^{14CC} and R^{15DD} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15}, except that the heterocyclic ring has at least one $-(B_{12}CO)t-N(R^{20'})-CO-B_{16}R^{91}$ group thereon, wherein B_{12}, t, B_{16} and X_2 are the same as described above,

R^{91} represents an imidazolyl group, and

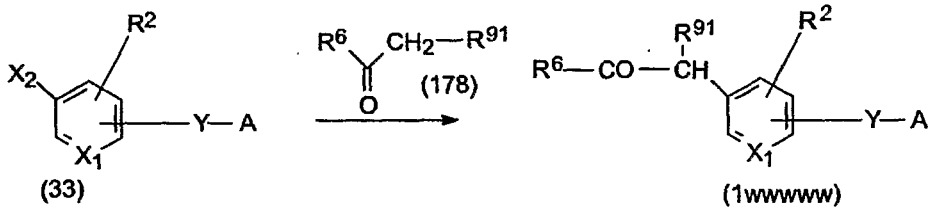
$R^{20'}$ represents a hydrogen atom, a cycloalkyl group, an amino group which may have a lower alkoxycarbonyl group as a substituent, a benzoyl group which may have 1 to 3 lower alkoxy groups as substituents on the phenyl ring, a lower alkyl group, a lower alkyl group which have 1

or 2 phenyls which may be substituted on the phenyl ring with 1 to 3 substituents selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent and a lower alkylthio group, a phenyl group which may be substituted on the phenyl ring with 1 to 3 groups selected from the group consisting of a lower alkoxy group which may have a halogen atom as a substituent and a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a cycloalkyl lower alkyl group, a pyrrolidinyl lower alkyl group which may have, on the pyrrolidine ring, 1 to 3 lower alkyl groups which may have a hydroxyl group as a substituent, an amino substituted lower alkyl group which may have a substituent selected from the group consisting of a phenyl group and a lower alkyl group, a 1,2,3,4-tetrahydronaphthyl substituted lower alkyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a naphthyl lower alkyl group, a pyridyl lower alkyl group, a quinolyl lower alkyl group, a 1,2,3,4-tetrazolyl lower alkyl group which may have, on the tetrazole ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a tetrahydrofuryl

lower alkyl group which may have a hydroxyl group as a substituent on the lower alkyl group, a phenoxy lower alkyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkyl group and a nitro group, a phenyl lower alkanoyl group, a lower alkanoyl group which may have a halogen atom as a substituent, an imidazolyl lower alkanoyl group, a lower alkoxycarbonyl lower alkyl group, a pyridyl group or a carboxy lower alkyl group.

The reaction of the compound (luuuuu) with the compound (177) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 118]



In the formula, X_1, X_2, R^2, Y, A and R^6 are the same as described above, and R^{91} represents a hydrogen atom or a lower alkyl group.

The reaction of the compound (33) with the compound (178) may also be carried out in an appropriate solvent in the presence of a basic compound and a catalyst. Examples of the inert solvent used include water, aromatic hydrocarbons such as benzene,

toluene, and xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, 2-methoxyethanol, monoglyme, and diglyme, halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, lower alcohols such as methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, fatty acids such as acetic acid, esters such as ethyl acetate and methyl acetate, ketones such as acetone and methyl ethyl ketone, acetonitrile, pyridine, N-methylpyrrolidone, dimethyl sulfoxide, N,N-dimethylformamide, and hexamethylphosphoric acid triamide, and a mixture thereof.

Examples of the basic compound include carbonates such as sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, and cesium carbonate, metal hydroxides such as sodium hydroxide, potassium hydroxide, and calcium hydroxide, potassium phosphate, sodium phosphate, sodium hydride, potassium hydride, potassium, sodium, sodium amide, metal alcoholates such as sodium methylate, sodium ethylate, sodium n-butoxide, sodium tert-butoxide, and potassium tert-butoxide, alkylsilylamide alkali metal salts such as potassium bis(trimethylsilyl)amide, and organic bases such as pyridine, imidazole, N-ethyldiisopropylamine, dimethylaminopyridine, triethylamine, trimethylamine, dimethylaniline, N-methylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5

(DBN), 1,8-diazabicyclo[5.4.0]undecene-7 (DBU), and 1,4-diazabicyclo[2.2.2]octane (DABCO), and a mixture thereof.

Examples of the catalyst may include palladium compounds such as palladium acetate, bis(tributyltin)/bis(dibenzylideneacetone)palladium, copper iodide/2,2'-bipyridyl, bis(dibenzylidene-acetone)palladium, copper iodide/bis(triphenyl-phosphine)palladium dichloride, tris(dibenzylidene-acetone)dipalladium, R-tris(dibenzylideneacetone)-dipalladium, S-tris(dibenzylideneacetone)dipalladium, palladium (II) acetate, [1,1'-bis(diphenylphosphino)-ferrocene]dichloropalladium (II), and tetrakis (triphenylphosphine)palladium, compounds such as R-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (R-BINAP), S-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (S-BINAP), RAC-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (RAC-BINAP), and 2,2-bis(diphenylimidazolidinyliden), xanthene compounds such as 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene, and borates such as tri-tert-butylphosphine tetrafluoroborate, and a mixture thereof.

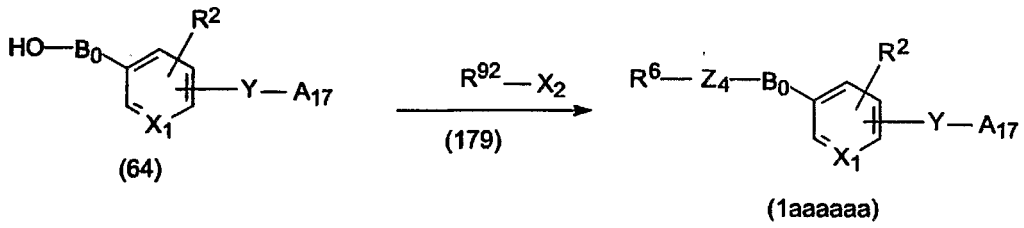
The basic compound is appropriately used in an amount at least 0.5 times, and preferably 0.5 to 40 times of the compound (33) on a molar basis. The catalyst is appropriately used in a typical catalyst amount based on the compound (33).

The compound (178) is appropriately used in

an amount at least in 0.5 times, and preferably 0.5 to 3 times of the compound (33) on a molar basis.

The above described reaction is carried out typically at room temperature to 200°C, preferably at room temperature to about 150°C, and is completed in about 0.5 to 20 hours.

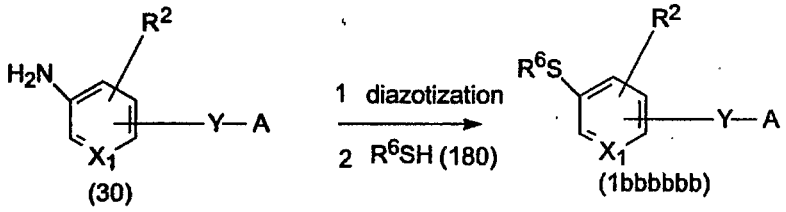
[Reaction formula 119]



In the formula, B_o, X_1, R^2, Y, A_{17}, R^6 and X_2 are the same as described above, R^{92} represents a R^6-Z_4-group or R^6- group and Z_4 represents a lower alkylene group.

The reaction of the compound (64) with the compound (179) may be carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 120]



In the formula R^2, X_1, Y, A and R^6 are the

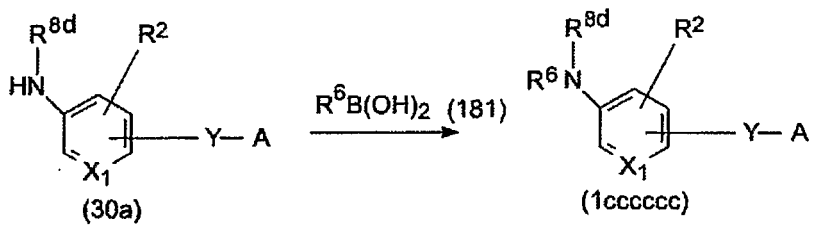
same as described above.

The method for converting the compound (30) into the compound (1bbbbbb) is to obtain a compound (1bbbbbb) by subjecting the compound (30) to diazotization and by reacting the diazonium salt thus obtained with the compound (180).

The diazotization reaction 1. may be carried out in an appropriate solvent in the presence of an acid and a diazotizing agent. Examples of the solvent used in the above described reaction include water and acetonitrile. Examples of the acid used include hydrochloric acid, hydrobromic acid, sulfuric acid, tetrafluoroboric acid, and hexafluorophosophoric acid. Examples of the diazotizing agent include metal nitrites such as sodium nitrite and potassium nitrite, lower alkyl nitrites such as t-butyl nitrite and isoamyl nitrite. The acid is appropriately used in an amount typically about 1 to 10 times of the compound (30), and preferably about 1 to 5 times of the compound (30) on a molar basis. The diazotizing agent is appropriately used in an amount typically at least about equimolar to the compound (30), and preferably 1 to 3 times of the compound (30) on a molar basis. The above described reaction is typically carried out at about 0 to 70°C, and preferably at about 0°C to room temperature, and is completed in about a few minutes to 5 hours. The reaction 2. of the diazonium salt obtained in the reaction 1. with the compound (180) may

be carried out in the similar solvent as in the reaction 1 and in the presence of a basic compound. Any of the basic compounds used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used in this reaction. The basic compound is appropriately used in an amount at least equimolar to the compound (30), and preferably 1 to 5 times of the compound (30) on a molar basis. The compound (180) is appropriately used in an amount at least equimolar to the compound (30), and preferably 1 to 5 times of the compound (30) on a molar basis. The above described reaction is carried out typically at about 0 to 70°C, preferably at about 0°C to room temperature, and is completed in about a few minutes to 5 hours.

[Reaction formula 121]



In the formula, X_1, R^{8d}, Y, A, R^2 and R^6 are the same as described above.

The reaction of the compound (30a) with the compound (181) may be carried out in an appropriate solvent in the presence of an acid and a catalyst. Examples of the inert solvent used include water, aromatic hydrocarbons such as benzene, toluene, and

xylene, ethers such as diethyl ether, tetrahydrofuran, dioxane, 2-methoxyethanol, monoglyme, and diglyme, halogenated hydrocarbons such as dichloromethane, dichloroethane, chloroform, and carbon tetrachloride, lower alcohols such as methanol, ethanol, isopropanol, butanol, tert-butanol, and ethylene glycol, fatty acids such as acetic acid, esters such as ethyl acetate and methyl acetate, ketones such as acetone and methyl ethyl ketone, acetonitrile, pyridine, dimethylsulfoxide, N,N-dimethylformamide, and hexamethylphosphoric acid triamide, and a mixture thereof.

Examples of the basic compound include carbonates such as sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, and cesium carbonate, metal hydroxides such as sodium hydroxide, potassium hydroxide, and calcium hydroxide, sodium hydride, potassium hydride, potassium, sodium, sodium amide, metal alcoholates such as sodium methylate, sodium ethylate, sodium n-butoxide, sodium tert-butoxide, and potassium tert-butoxide, organic bases such as pyridine, imidazole, N-ethyldiisopropylamine, dimethylaminopyridine, triethylamine, trimethylamine, dimethylaniline, N-methylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5 (DBN), 1,8-diazabicyclo[5.4.0]undecene-7 (DBU), and 1,4-diazabicyclo[2.2.2]octane (DABCO), and a mixture thereof.

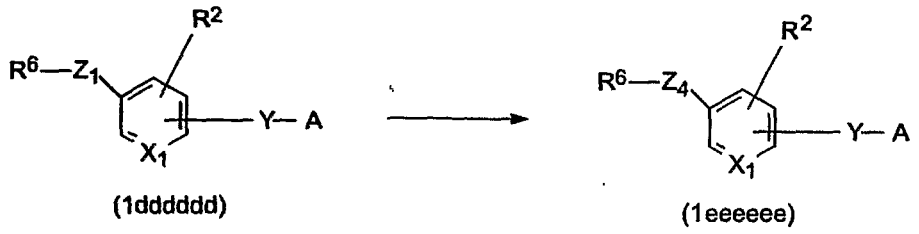
Examples of the catalyst include palladium compounds such as tetrakis(triphenylphosphine)palladium (0) and dichlorobis(triphenylphosphine)palladium (II), and copper compounds such as copper (II) acetate.

The basic compound is appropriately used in an amount at least equimolar to the compound (30a), and preferably 1 to 5 times of the compound (30a) on a molar basis. The catalyst is appropriately used in an amount 0.001 to 1 times, and preferably 0.01 to 0.5 times of the compound (30a) on a molar basis.

The compound (181) is appropriately used in an amount at least equimolar to the compound (30a), and preferably 1 to 5 times of the compound (30a) on a molar basis.

The above described reaction is carried out typically at -30 to 200°C, and preferably at 0 to 150°C and is completed in 0.5 to about 30 hours. A molecular sieve such as Molecular Sieves 3A (MS-3A), Molecular Sieves 4A (MS-4A) or the like may be added to the reaction.

[Reaction formula 122]



In the formula, R^6, Z_1, X_1, R^2, Y and A are the same as described above. Z_4 represents a lower alkylene

group.

The reaction which converts the compound (1dddddd) into the compound (1eeeeee) may be carried out in an appropriate solvent in the presence of a catalytic hydrogen reducing agent.

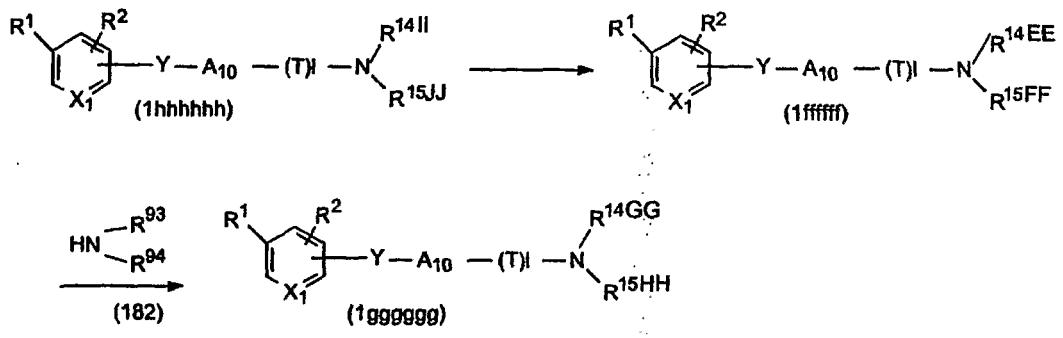
Examples of the solvent used include water, fatty acids such as acetic acid, alcohols such as methanol, ethanol, and isopropanol, aliphatic hydrocarbons such as n-hexane, alicyclic hydrocarbons such as cyclohexane, ethers such as diethyl ether, dimethoxyethane, tetrahydrofuran, monoglyme, diglyme, and 1,4-dioxane, esters such as methyl acetate, ethyl acetate, and butyl acetate, and aprotic polar solvents such as N,N-dimethylformamide, N,N-dimethylacetoamide, and N-methylpyrrolidone, and a mixture thereof.

Examples of the catalytic hydrogen reducing agent include palladium, palladium-black, palladium-carbon, palladium hydroxide-carbon, rhodium-alumina, platinum, platinum oxide, copper chromite, Raney nickel, and palladium acetate.

The above described catalytic hydrogen reducing agent is typically used in an amount 0.01 to 1 times of the compound (1dddddd) on a molar basis.

The above reaction favorably proceeds typically at about -20 to 150°C, and preferably at 0 to 100°C and, in general, is completed in 0.5 to 20 hours. The hydrogen pressure may be applied typically at 1 to 10 atm.

[Reaction formula 123]

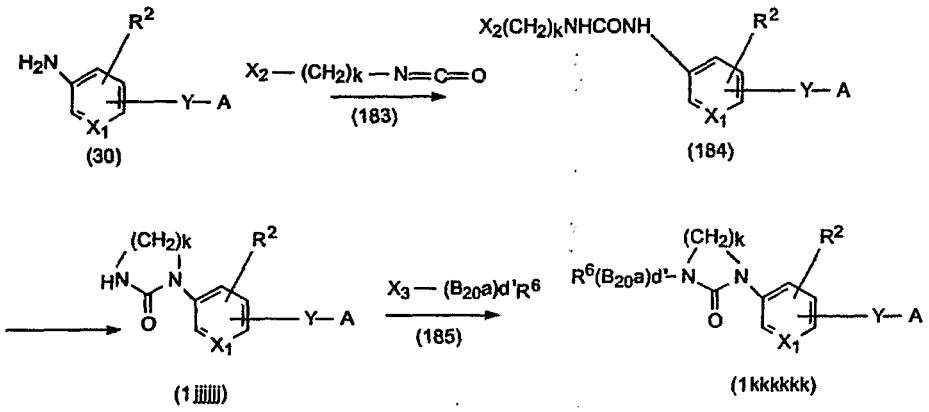


In the formula, R^1, R^2, Y, X_1, A_{10}, T and l are the same as described above; R^{14II} and R^{15JJ} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15} except for having at least one phenyl group which has a lower alkoxycarbonyl group on the heterocyclic ring; R^{14EE} and R^{15FF} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15} except for having at least one phenyl group which has a carboxy group on the heterocyclic ring; R^{14GG} and R^{15HH} represent a 5- to 10-membered saturated or unsaturated heterocyclic group the same as defined for the above described R^{14} and R^{15} except for having at least one phenyl group which has a carbamoyl group which may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group on the heterocyclic ring; and R^{93} and R^{94} represent a hydrogen atom, a lower alkyl group or a lower alkoxy lower alkyl group.

The reaction which converts the compound (1hhhhhh) into the compound (1ffffff) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (1ffffff) with the compound (182) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

[Reaction formula 124]



In the formula, X_1, R^2, Y, A, X_2, k, X_3, R^6, B_{20a} and d' are the same as described above.

The reaction of the compound (30) with the compound (183) is carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (66) of the above described reaction formula 46.

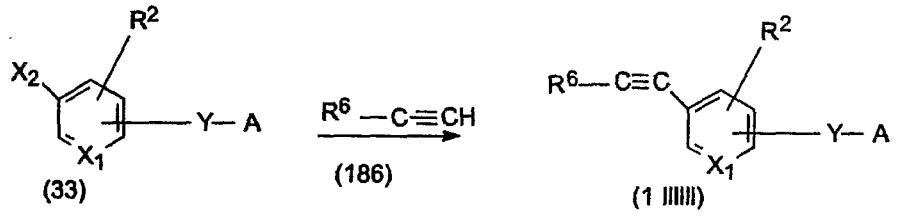
The reaction which converts the compound (184) into the compound (1jjjjjj) may be carried out

under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

The reaction of the compound (1jjjjjj) with the compound (185) is carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

When d′ represents 0 in the compound (185), the reaction which converts the compound (1jjjjjj) into the compound (1kkkkkk) may also be carried out in an appropriate solvent in the presence of a halogenated copper such as copper iodide, an alkylglycine such as N,N-dimethylglycine, or an alkali metal phosphate such as potassium phosphate. Any of the solvents used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used here. Halogenated copper or alkylglycine is used in a typical catalyst amount. The alkali metal phosphate is appropriately used in an amount typically equimolar to the compound (1jjjjjj), and preferably 1 to 5 times of the compound (1jjjjjj) on a molar basis. The compound (185) is used in an amount typically 0.5 to 5 times, and preferably 0.5 to 3 times of the compound (1jjjjjj) on a molar basis. The above described reaction is carried out typically at about room temperature to 200°C, preferably at about room temperature to 150°C and is completed in about 1 to 30 hours.

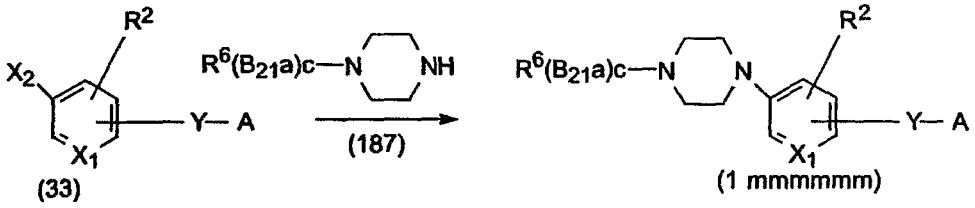
[Reaction formula 125]



In the formula, X_2, R^2, X_1, Y, A and R^6 are the same as described above.

The reaction of the compound (33) with the compound (186) is carried out under reaction conditions similar to those of the reaction of the compound (33) with the compound (178) of the above described reaction formula 118.

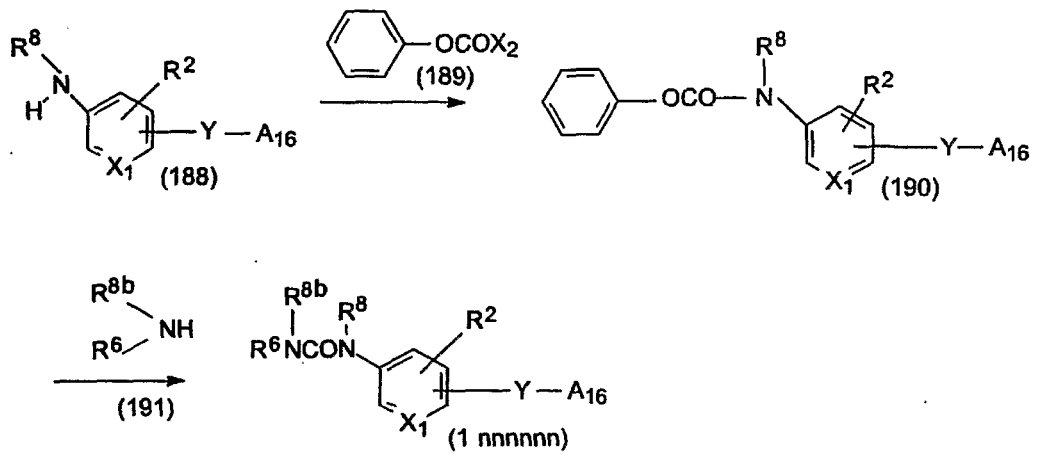
[Reaction formula 126]



In the formula, X_1, X_2, R^2, R^6, Y, A, B_{21a} and c are the same as described above.

The reaction of the compound (33) with the compound (187) is carried out under reaction conditions similar to those of the reaction of the compound (33) with the compound (178) of the above described reaction formula 118.

[Reaction formula 127]



In the formula, R^8, R^2, X_1, Y, A_{16}, X_2, R^6 and R^{8b} are the same as described above.

The reaction of the compound (188) with the compound (189) may be carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) by the method (d) of the formula 2 in which carboxylic acid halide is reacted with amine.

The reaction of the compound (190) with the compound (191) may be carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above described reaction formula 1.

[Reaction formula 128]

In the formula, R^1, R^2, X_1, Y and A_{16} are the same as described above. Xa represents a halogen atom.

The reaction which converts the compound (1oooooo) into the compound (1pppppp) may be carried out in an appropriate solvent in the presence of a catalytic hydrogenation reducing agent and a hydrogen donor such as formic acid, ammonium formate, cyclohexene, or hydrazine hydrate.

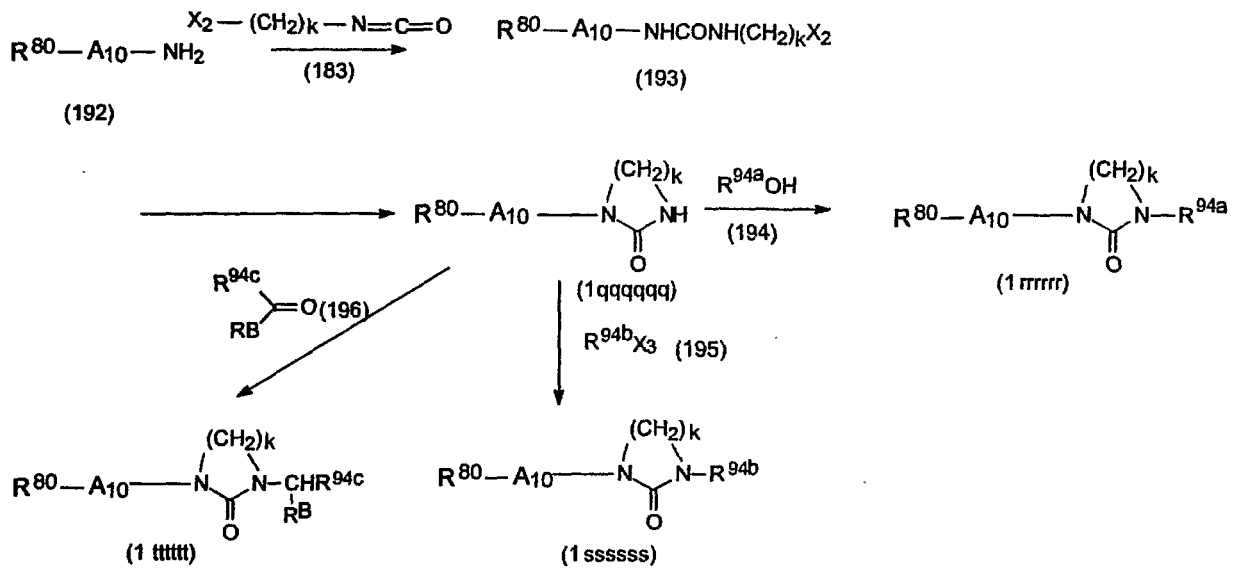
Any solvent and catalytic hydrogenatioin reducing agent, which are used in the reaction which converts the compound (1dddddd) into the compound (1eeeeee) of the above described reaction formula 122, may be used in the above described reaction.

The above described reaction is carried out under hydrogen atmosphere typically at about 1 atm to 20 atm, and preferably at about 1 atm to 10 atm, and at about -30 to 150°C, and preferably at about 0 to 100°C. In general, the reaction is completed in about 1 to 12 hours.

The catalytic hydrogenation reducing agent is typically used at 0.01 to 40 wt%, and preferably 0.01 to 20 wt% of the compound (1oooooo).

The hydrogen donor is typically used in an amount at least equimolar to the compound (1oooooo), and preferably 1 to 10 times of the compound (1oooooo) on a molar basis.

[Reaction formula 129]



In the formula, A_{10}, X_2, k, X_3, R^{80} and R^B are the same as described above; R^{94a} represents a group defined as a substituent (35), (40), (42) or (50), in which o is 1, or (67), (75) to (76), (78), (80) to (81) or (84), in which s is 0, in the case where the above described R^{14} and R^{15} form a heterocyclic ring; R^{94b} represents a group defined as a substituent (28), (30) to (34), (36) to (39), (41), (43) to (45), (47) or (49), in which t is 1, (50), in which o is 0, (52) to (60), (62) to (66), (70), (77), (79), (82) to (83), (87), (88a) or (90a) in the case where the above described R^{14} and R^{15} form a heterocyclic ring; and R^{94c} represents a group defined as a substituent (28), (30) to (34), (39), (41), (45), (47) or (49), in which t is 1, and (50), in which o is 0, (54) to (58), (62) to (64), (66), (70), (79) or (82) to (83) in the case

where the above described R^{14} and R^{15} form a heterocyclic ring, a phenyl group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkanoyl group, an amino group which may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group which may have a halogen atom as a substituent, a lower alkoxy group which may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxy group and a lower alkylenedioxy group, a pyridyl group which may have, on the pyridine ring, 1 to 3 substituents selected from the group consisting of a hydroxy group and a lower alkyl group which may have a hydroxyl group as a substituent, a pyrrolyl group which may have 1 to 3 lower alkyl groups as substituents, a benzoxazolyl group, a benzothiazolyl group, a furyl group, a lower alkyl group which may have a substituent selected from the group consisting of a hydroxy group and a halogen atom, a naphthyl group, a 1,2,3,4-tetrahydronaphthyl group which may have 1 to 5 lower alkyl groups as substituents on the 1,2,3,4-tetrahydronaphthalene ring, a quinolyl group, a 1,2,3,4-tetrazolyl group which may have, on the tetrazole ring, a substituent selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group; a thiazolyl group which may have a phenyl group as a substituent on the thiazole ring; a benzoyl

group which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkoxy group and a halogen atom, a piperidinyl group which may have a lower alkyl group as a substituent on the piperidine ring, a 1,2,3,4-tetrahydroquinolyl group which may have an oxo group as a substituent on the tetrahydroquinoline ring, a 1,3,4-oxadiazolyl group which may have an oxo group as a substituent on the 1,3,4 oxadiazole ring, a cycloalkyl group, a thienyl group, or an imidazolyl group.

The reaction of the compound (192) with the compound (183) may be carried out under reaction conditions similar to those of the reaction of the compound (30) with the compound (183) of the above described reaction formula 124.

The reaction which converts the compound (193) into the compound (1qqqqqq) may be carried out under reaction conditions similar to those of the reaction which converts the compound (184) into the compound (1jjjjjj) of the above described reaction formula 124.

The reaction of the compound (1qqqqqq) with the compound (195) may be carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described reaction formula 2.

When R^{94b} of the compound (195) represents (36) to (38), (43), (44), (53), (59) to (60), (87),

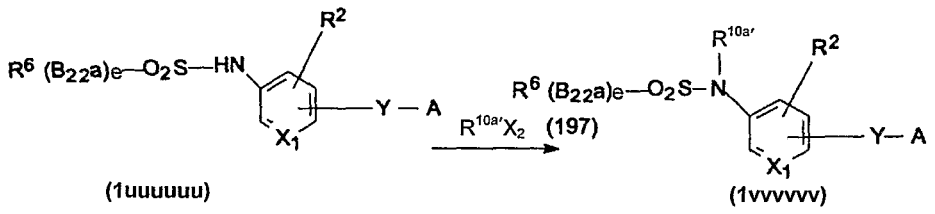
(88a) or (90a), the reaction of the compound (1qqqqqq) with the compound (195) may also be carried out in an appropriate solvent in the presence of a copper halide such as copper iodide, an alkylglycine such as N,N-dimethylglycine, or an alkali metal phosphate such as potassium phosphate. In the above described reaction, any of the solvents used in the reaction of the compound (2) with the compound (3) of the above described reaction formula 1 may be used. The copper halide and alkylglycine are used in a normal catalyst amount. The alkali metal phosphate is appropriately used in an amount typically at least in equimolar to the compound (1qqqqqq), and preferably 1 to 5 times of the compound (1qqqqqq) on a molar basis. The compound (195) is appropriately used in an amount typically 0.5 to 5 times, and preferably 0.5 to 3 times of the compound (1qqqqqq) on a molar basis. The above described reaction is carried out typically at room temperature to 200°C, and preferably about room temperature to 150°C, and is completed in about 1 to 30 hours.

The reaction of the compound (1qqqqqq) with the compound (194) may be carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The reaction of the compound (1qqqqqq) with the compound (196) may be carried out under reaction

conditions similar to those of the reaction of the compound (1b) with the compound (5) of the above described formula 2.

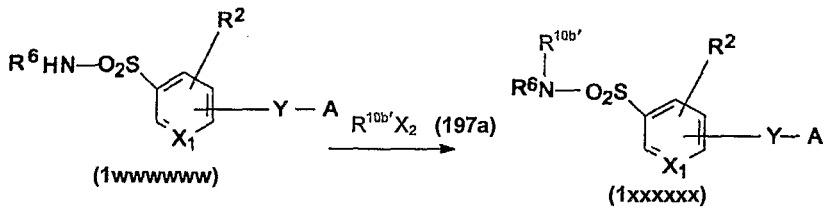
[Reaction formula 130]



In the formula, X_1, Y, A, R^2, R^6, B_{22a}, e and X_2 are the same as described above, and $R^{10a'}$ represents a lower alkyl group.

The reaction of the compound (1uuuuuu) with the compound (197) may be carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (4) of the above described formula 2.

[Reaction formula 131]

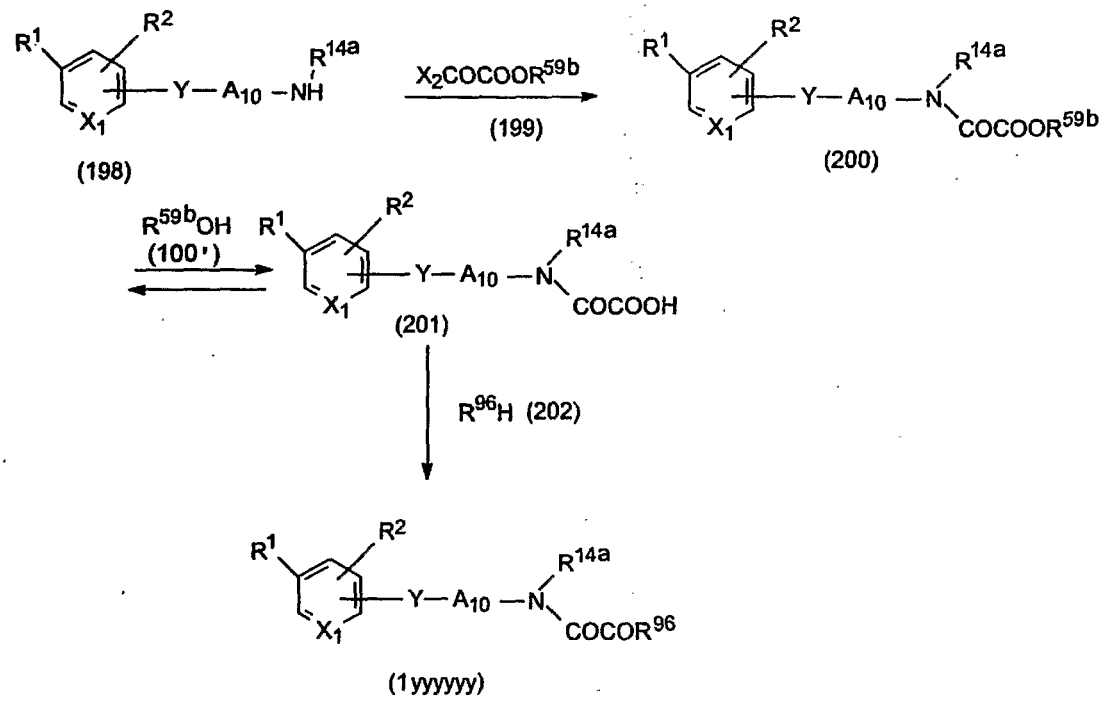


In the formula, X_1, Y, A, R^2, R^6 and X_2 are the same as described above. $R^{10b'}$ represents a lower alkyl group.

The reaction of the compound (1wwwwww) with the compound (197a) may be carried out under reaction conditions similar to those of the reaction of the

compound (1b) with the compound (4) of the above described reaction formula 2.

[Reaction formula 132]



In the formula, R^1, X_1, R^2, Y, A_{10}, X_2, R^{14a} and R^{59b} are the same as described above, and R^{96} represents a piperazinyl group which may have, on the piperazine ring, 1 to 3 substituents selected from the group consisting of a phenyl lower alkyl group (which may have, on the phenyl ring, 1 to 3 substituents selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group) and a pyridyl lower alkyl group.

The reaction of the compound (198) with the compound (199) may be carried out under reaction conditions similar to those of the reaction of the compound (2) with the compound (3) of the above

described reaction formula 1.

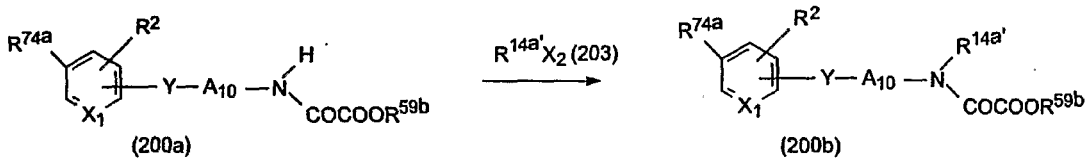
The reaction which converts the compound (200) into the compound (201) may be carried out under reaction conditions similar to those of the hydrolysis B described for the above described reaction formula 9.

The reaction of the compound (201) with the compound (100′) is carried out under reaction conditions similar to those of the reaction of the compound (120b) with the compound (100′) of the above described reaction formula 79.

The reaction of the compound (201) with the compound (202) is carried out under reaction conditions similar to those of the reaction of the compound (1b) with the compound (6) of the above described reaction formula 2.

The compound (200) may also be produced by the method of the following reaction formula 133:

[Reaction formula 133]



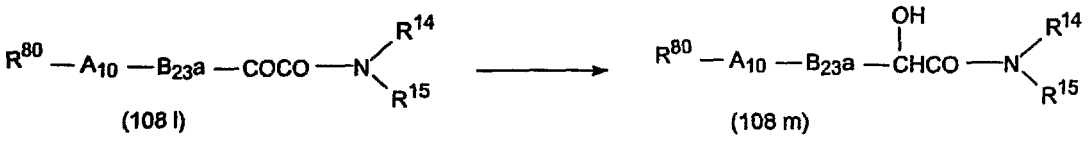
wherein R^{74a}, R^2, X_1, Y, A_{10}, R^{59b} and X_2 are the same as described above, and $R^{14a'}$ represents a lower alkyl group which may have a hydroxy group as a substituent.

The reaction of the compound (200a) with the compound (203) may be carried out under reaction conditions similar to those of the reaction of the

compound (2) with the compound (3) of the above described reaction formula 1.

The compound (3) may also be produced by the method of the following reaction formula 134:

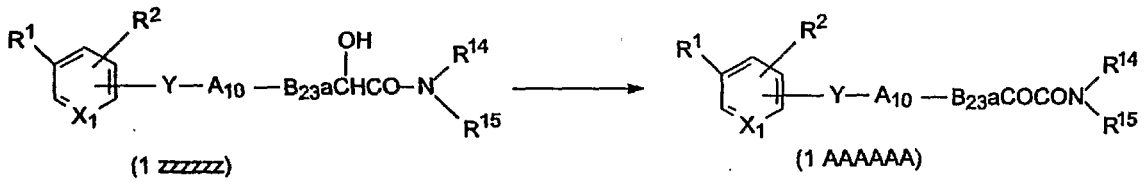
[Reaction formula 134]



wherein R^{80}, A_{10}, B_{23a}, R^{14} and R^{15} are the same as described above.

The reaction which converts the compound (108l) into the compound (108m) may be carried out under reaction conditions similar to those of the reaction which converts the compound (1f) into the compound (1g) of the above described reaction formula 3.

[Reaction formula 135]



In the formula, R^1, R^2, X_1, Y, A_{10}, B_{23a}, R^{14} and R^{15} are the same as described above.

The reaction which converts the compound (1zzzzzz) into the compound (1AAAAAA) may be carried out under reaction conditions similar to those of the

reaction which converts the compound (64b) into the compound (26a) of the above described reaction formula 89 described above.

Each of the target compounds obtained by the formulas shown above may be isolated and purified by separating the crude reaction product from the reaction mixture after cooling using an isolation procedure such as filtration, concentration, or extraction, and by purifying using a common purification procedure such as column chromatography or re-crystallization.

The compound of the present invention represented by the general formula (1) includes a stereoisomers and an optical isomer.

The compound of the present invention, which has a basic group, may easily form a salt with a common pharmacologically acceptable acid. Examples of such an acid include mineral acids such as hydrochloric acid, hydrobromic acid, nitric acid, sulfuric acid, and phosphoric acid, and organic acids such as methanesulfonic acid, p-toluenesulfonic acid, acetic acid, citric acid, tartaric acid, maleic acid, fumaric acid, malonic acid, and lactic acid.

The compound of the present invention, which has an acidic group, may easily form a salt with a common pharmacologically acceptable basic compound. Examples of such a basic compounds include sodium hydroxide, potassium hydroxide, calcium hydroxide, sodium carbonate, potassium carbonate, sodium

bicarbonate, and potassium bicarbonate.

Next, medical formulations which contain the compound of the present invention as an active ingredient will be described.

The above described medical formulations, which are obtained by preparing the compound of the present invention formulated into a common pharmaceutical form, are prepared using a diluent or excipient commonly used such as a filler, expander, binder, moistener, disintegrator, surfactant, or lubricant.

Such medical formulations may be chosen from various forms according to the therapeutic objectives, and typical examples of such formulations include tablets, pills, powders, liquids, suspensions, emulsions, granules, capsules, suppositories, and injections (liquids, suspensions).

Carriers which are used for forming tablets may be chosen widely from the conventional ones, of which examples include excipients such as lactose, saccharose, sodium chloride, glucose, urea, starch, calcium carbonate, kaolin, and crystalline cellulose, binders such as water, ethanol, propanol, simple syrup, a glucose solution, a starch solution, a gelatin solution, carboxymethylcellulose, shellac, methylcellulose, potassium phosphate, and polyvinylpyrrolidone, disintegrators such as dried starch, sodium arginate, agar powder, laminaran powder,

sodium bicarbonate, calcium carbonate, polyoxyethylene sorbitan fatty acid ester, sodium lauryl sulfate, stearic acid monoglyceride, starch, and lactose, anti-disintegrators such as saccharose, stearine, cacao butter, and hydrogenated oil, absorbefacients such as quartenary ammonium base and sodium lauryl sulfate, wetting agents such as glycerol and starch, adsorbents such as starch, lactose, kaolin, bentonite, and colloidal silicate, and lubricants such as purified talc, stearate, boric acid powder, and polyethylene glycol.

Further, tablets may be made into conventional coated tablets, for example, sugar-coated tablets, gelatin-coated tablets, enteric-coated tablets, film-coated tablets, or double or multi-layered tablets.

Carriers which are used for forming pills may be chosen widely from the conventional ones, of which examples include excipients such as glucose, lactose, starch, cacao butter, hydrogenated vegetable oil, kaolin, and talc, binders such as gum arabic powder, tragacanth powder, gelatin, and ethanol, and disintegrators such as laminaran and agar.

Carriers which are used for forming suppositories may be chosen widely from the conventional ones, of which examples include polyethylene glycol, cacao butter, higher alcohols, esters of higher alcohols, gelatin, and semi-synthetic

glycerides.

The injection preparations in liquid, emulsion and suspension forms are preferably sterilized and isotonic with the blood. Diluents which are used for forming these liquid, emulsion and suspension preparations may be chosen widely from the conventional ones, of which examples include water, ethanol, propylene glycol, ethoxylated isostearyl alcohol, polyoxylated isostearyl alcohol, and polyoxyethylene sorbitan fatty acid ester. In this case, the medical formulations may contain sodium chloride, glucose or glycerol enough to prepare isotonic solutions. Also, conventional solubilizers, buffers, analgestics, and the like, and, as necessary, coloring agents, preservatives, spices, flavors, sweets and the like, or other pharmaceuticals may be added.

Although the amount of the compound of the present invention included in the medical formulation is not limited and may be selected appropriately in a wide range, it is typically preferable that the medical formulation contains the compound of the present invention at 1 to 70 wt%.

The method for administration of the medical formulation of the present invention is not limited and the administration is carried out in accordance with the conditions such as forms of the medical formulation, patient's age, sex, severity of the disease and other conditions. For example, tablets,

pills, liquids, suspensions, emulsions, granules and capsules are administered orally. The injection formulations are administered intravenously singly or by mixing with a conventional fluid replacement such as a glucose solution or amino acid solution, or, as necessary, administered singly and intramuscularly, intradermally, subcutaneously or intraperitoneally. The suppositories are administered into the rectum.

The dosage for the above mentioned medical formulation may be chosen appropriately according to the usage, patient's age, sex and severity of the disease and other conditions. Typically, 0.001 to 100 mg per kg body weight per day, preferably 0.001 to 50 mg per kg body weight per day, is administered once or in several times a day.

Since the above described dosage may vary in accordance with various conditions, it may be sufficient with a dosage smaller than in the above described range, or it may be necessary to administer a dosage larger than in the above described range.

The compound of the present invention has a superior effect on suppressing the production of collagen.

The compound of the present invention has lower side effects and is excellent in safety.

EXAMPLES

The present invention is explained in more detail by illustrating Reference Examples, Examples, Formulation Example and Pharmacological Test as follows.

Reference Example 1

Production of 1-(*t*-butoxycarbonyl)-4-(4-hydroxyphenyl)-1,2,5,6-tetrahydropyridine

(Step 1)

Production of 1-(*t*-butoxycarbonyl)-4-[(4-methoxymethoxy)phenyl]-4-hydroxypiperidine

A solution of 1-bromo-4-methoxymethoxybenzene (5.43 g, 25.0 mmol) in tetrahydrofuran (THF) (100 mL) was stirred at -85°C, and a 2.46 M *n*-butyllithium hexane solution (10.2 mL, 25.0 mmol) was added dropwise to the stirred solution over 10 minutes. The resulting solution was stirred at the same temperature for 40 minutes. To the reaction solution was added dropwise for 10 minutes a solution of 1-(*t*-butoxycarbonyl)-4-piperidone (5.20 g, 26.0 mmol) in THF (30 mL). The temperature of the resulting solution was raised to -25°C over 4 hours, and then the solution was stirred at that temperature for 2 hours. An aqueous solution of saturated ammonium chloride was then added to this solution. The reaction solution was extracted with ethyl acetate and dried over anhydrous magnesium sulfate, after which the solvent was evaporated. The

residue was purified by silica gel column chromatography (ethyl acetate: *n*-hexane = 2 : 3, in ratio by volume; hereinafter the same), to thereby yield 7.63 g of the title compound.

Appearance: Colorless oil

^{1}H NMR ($CDCl_3$) δ 1.49(9H, s), 1.73(2H, d, J = 12.0 Hz), 1.97(2H, brs), 3.24(2H, brs), 3.48(3H, s), 4.00(2H, brs), 5.17(2H, s), 7.03(2H, d, J = 9.0 Hz), 7.39(2H, d, J = 9.0 Hz).

(Step 2)

Production of 1-(*t*-butoxycarbonyl)-4-(4-hydroxyphenyl)-1,2,5,6-tetrahydropyridine

To a solution of 1-(*t*-butoxycarbonyl)-4-[(4-methoxymethoxy)phenyl]-4-hydroxypiperidine (5.32 g, 15.8 mmol) in toluene (100 mL) was added *p*-toluenesulfonic acid monohydrate (0.56 g, 2.95 mmol), and the resulting solution was refluxed for 21 hours. The reaction solution was cooled to room temperature, and evaporated under reduced pressure. To this crude product were added ethanol (60 mL) and 2 M hydrochloric acid (40 mL, 80 mmol), and the resulting solution was stirred for 2 hours at 60°C. The reaction solution was again cooled to room temperature, and evaporated under reduced pressure. To the residue were added methanol (100 mL), triethylamine (9.0 mL, 64.6 mmol) and di-*t*-butyl dicarbonate (5.20 g, 23.8 mmol), and the resulting solution was stirred for 24 hours at room temperature. The solvent was evaporated under reduced

pressure, after which to the residue was added 100 mL of ethyl acetate. Insoluble matter was removed by filtration, after which the filtrate was evaporated under reduced pressure. To the residue were added 1,4-dioxane (50 mL) and a 1 M aqueous solution of sodium hydroxide (50 mL, 50 mmol) and stirred for 14 hours at 60°C. To the resulting reaction solution was added at room temperature 2 M hydrochloric acid (25 mL, 50 mmol) to neutralize, and then extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated to thereby yield 4.10 g of the title compound.

Appearance: Brown amorphous

^{1}H NMR ($CDCl_3$) δ 1.49(9H, s), 2.47(2H, brs), 3.62(2H, t, J = 5.5 Hz), 4.05(2H, brs), 5.91(1H, brs), 6.81(2H, d, J = 9.0 Hz), 7.25(2H, d, J = 9.0 Hz).

Reference Example 2

Production of methyl 5-(4-benzylpiperazin-1-yl)-2-methoxymethoxybenzoate

To a solution of methyl 5-chloro-2-methoxymethoxybenzoate (1.45 g, 6.29 mmol) and 1-benzylpiperazine (1.66 g, 9.43 mmol) in toluene (50 mL) were added palladium acetate (28 mg, 0.126 mmol), 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (157 mg, 0.252 mmol) and cesium carbonate (3.07 g, 9.43 mmol), and the resulting solution was refluxed for 3 hours. Water was added to the resulting solution, and extracted with

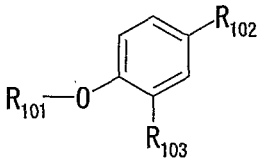
ethyl acetate. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (ethyl acetate : *n*-hexane = 1 : 2), to thereby yield 400 mg of the title compound.

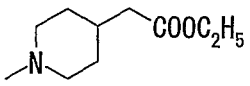
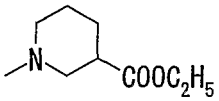
Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 2.59-2.62(4H, m), 3.12-3.16(4H, m), 3.51(3H, s), 3.57 (2H, s), 3.88(3H, s), 5.16(2H, s), 7.01(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.10(1H, d, J = 9.1 Hz), 7.28-7.35(6H, m).

The following compounds were produced in the same manner as in Reference Example 2.

Table 1



Reference Example No.	R_{101}	R_{102}	R_{103}	^{1}H NMR ($CDCl_3$) δppm
3	$-CH_2OCH_3$		-H	1.27(3H, t, J = 7.0 Hz), 1.43-1.48(2H, m), 1.83(2H, brd, J = 13.0 Hz), 1.90(1H, m), 2.28(2H, d, J = 7.0 Hz), 2.66(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.47(3H, s), 3.50(2H, brd, J = 12.0 Hz), 4.15(2H, q, J = 7.0 Hz), 5.10(2H, s), 6.89(2H, d, J = 9.0 Hz), 6.95(2H, d, J = 9.0 Hz).
4	$-CH_2OCH_3$		-H	1.27(3H, t, J = 7.0 Hz), 1.57-1.75(2H, m), 1.82(1H, m), 2.00(1H, m), 2.68-2.75(2H, m), 2.93(1H, dd, J = 10.0 Hz, 12.0 Hz), 3.34(1H, d, J = 12.0 Hz), 3.48(3H, s), 3.56(1H, brd, J = 10.0 Hz), 4.16(2H, q, J = 7.0 Hz), 5.11(2H, s), 6.91(2H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz).

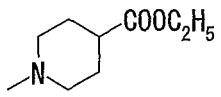
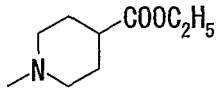
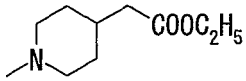
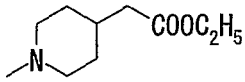
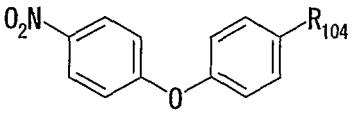
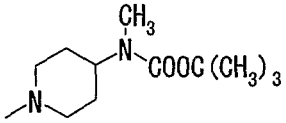
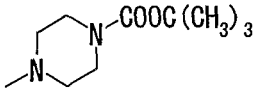
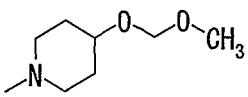
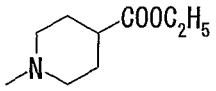
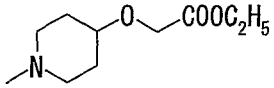
5	-CH_3		-H	1.27(3H, t, J = 7.0 Hz), 1.91(2H, dq, J = 3.0 Hz, 13.5 Hz), 2.02(2H, dd, J = 13.5 Hz, 3.0 Hz), 2.38(1H, m), 2.69(2H, dt, J = 3.0 Hz, 12.0 Hz), 3.48(2H, dt, J = 12.0 Hz, 3.0 Hz), 3.37(3H, s), 4.16(2H, q, J = 7.0 Hz), 6.83(2H, d, J = 9.0 Hz), 6.91(2H, d, J = 9.0 Hz).
6	-CH_2OCH_3		-CH_3	1.27(3H, t, J = 7.1 Hz), 1.82-1.99(4H, m), 2.22(3H, s), 2.33-2.42(1H, m), 2.64-2.73(2H, m), 3.50-3.52(5H, m), 4.15(2H, q, J = 7.1 Hz), 5.12(2H, s), 6.70(1H, dd, J = 8.9 Hz, 3.1 Hz), 6.78(1H, d, J = 3.0 Hz), 6.95(1H, d, J = 8.7 Hz).
7	-CH_2OCH_3		-OCH_3	1.27(3H, t, J = 7.1 Hz), 1.37-1.47(2H, m), 1.81-1.94(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.64-2.73(2H, m), 3.51(3H, s), 3.54(2H, brs), 3.85(3H, s), 4.15(2H, q, J = 7.1 Hz), 5.13(2H, s), 6.44(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.56(1H, d, J = 2.6 Hz), 7.02(1H, d, J = 8.7 Hz).
8	-CH_2OCH_3		-CH_3	1.27(3H, t, J = 7.1 Hz), 1.37-1.49(2H, m), 1.80-2.04(3H, m), 2.22(3H, s), 2.27(2H, d, J = 6.9 Hz), 2.60-2.68(2H, m), 3.48(3H, s), 3.52(2H, brs), 4.14(2H, q, J = 7.1 Hz), 5.11(2H, s), 6.69-6.79(2H, m), 6.94(1H, d, J = 8.7 Hz).

Table 2



Reference Example No.	R_{104}	^{1}H NMR ($CDCl_3$) δppm
9		1.48(9H, s), 1.76-1.89(4H, m), 2.78(3H, brs), 2.81(2H, brt, J = 12.0 Hz), 3.71(2H, brd, J = 12.0 Hz), 4.15(1H, brs), 6.96(2H, d, J = 9.0 Hz), 6.98(4H, s), 8.17(2H, d, J = 9.0 Hz).
10		1.49(9H, s), 3.13(4H, t, J = 5.0 Hz), 3.60(4H, t, J = 5.0 Hz), 6.96-7.00(6H, m), 8.18(2H, d, J = 9.0 Hz).
11		1.79(2H, m), 2.03(2H, m), 2.96(2H, m), 3.41(3H, s), 3.51(2H, m), 3.73(1H, m), 4.74(2H, s), 6.95-6.98(6H, m), 8.17(2H, d, J = 9.0 Hz).

12		1.28(3H, t, J = 7.0 Hz), 1.90(2H, dq, J = 4.0 Hz, 13.0 Hz), 2.05(2H, dd, J = 13.0 Hz, 4.0 Hz), 2.45(1H, m), 2.82(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.62(2H, brd, J = 12.5 Hz), 4.17(2H, q, J = 7.0 Hz), 6.95-6.98(6H, m), 8.17(2H, d, J = 9.0 Hz).
13		1.31(3H, t, J = 7.0 Hz), 1.83(2H, m), 2.05(2H, m), 2.96(1H, m), 3.07(1H, m), 3.46(1H, m), 3.53(1H, m), 3.60(1H, m), 4.16(2H, s), 4.24(2H, q, J = 7.0 Hz), 6.95-7.01(6H, m), 8.17(2H, d, J = 9.0 Hz).

Reference Example 14

Production of methyl 5-(4-benzylpiperazin-1-yl)-2-hydroxybenzoate

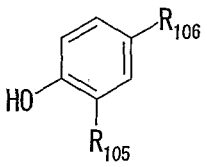
To a solution of 400 mg of methyl 5-(4-benzylpiperazin-1-yl)-2-methoxymethoxybenzoate (1.1 mmol) in 1,4-dioxane (20 mL) was added a solution of 4 N hydrogen chloride in 1,4-dioxane (4 mL, 16 mmol), and the resulting solution was stirred for 2 hours at 100°C. The resulting reaction solution was subjected to distillation under reduced pressure to obtain a residue. This residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1), to thereby yield 353 mg of the title compound.

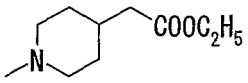
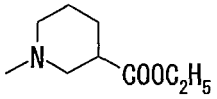
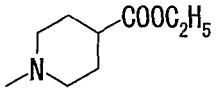
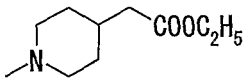
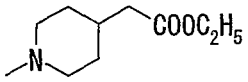
Appearance: Pale yellow powder

^{1}H NMR (CD_3OD) δ 3.29-3.40(8H, m), 3.94(3H, s), 4.39(2H, s), 6.91(1H, d, J = 8.9 Hz), 7.28(1H, dd, J = 8.9 Hz, 3.0 Hz), 7.42(1H, d, J = 3.0 Hz), 7.49-7.60(5H, m).

The following compounds were produced in the same manner as in Reference Example 14.

Table 3



Reference Example No.	R_{105}	R_{106}	Form	^{1}H NMR (solvent) δppm
15	-H		free	(DMSO-d_6) 1.20(3H, t, J = 7.0 Hz), 1.78(2H, brs), 1.91(2H, brs), 2.10(1H, brs), 2.34(2H, brs), 3.45(2H, brs), 3.55(2H, brs), 4.09(2H, q, J = 7.0 Hz), 6.88(2H, brs), 7.60(2H, brs), 10.05(1H, brs), 11.75 (1H, brs).
16	-H		free	(DMSO-d_6) 1.20(3H, t, J = 7.0 Hz), 1.64(1H, brs), 1.93(2H, brs), 2.08(2H, brs), 3.30(1H brs), 3.45(2H, brs), 3.48(2H, brs), 4.10(2H, q, J = 7.0 Hz), 6.88(2H, brs), 7.66(2H, brs), 10.05(1H, brs), 12.60 (1H, brs).
17	-CH_3		hydro-chloride	(DMSO-d_6) 1.22(3H, t, J = 7.1 Hz), 2.03-2.13(4H, m), 2.14(3H, s), 2.75(1H, brs), 3.38-3.57(4H, m), 4.12(2H, q, J = 7.1 Hz), 6.89(1H, d, J = 8.6 Hz), 7.46-7.53(2H, m), 9.99(1H, brs).
18	-OCH_3		free	($CDCl_3$) 1.27(3H, t, J = 7.1 Hz), 1.98-2.18(3H, m), 2.41-2.44(4H, m), 3.30(2H, t, J = 12.0 Hz), 3.66(2H, d, J = 11.9 Hz), 3.95(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.26(1H, brs), 6.96-7.03(2H, m), 7.85(1H, s).
19	-CH_3		hydro-chloride	(DMSO-d_6) 1.20(3H, t, J = 7.1 Hz), 1.87(4H, brs), 2.14(4H, brs), 2.33(2H, d, J = 6.4 Hz), 2.52(2H, brs), 3.44(2H, brs), 4.19(2H, q, J = 7.1 Hz), 6.88(1H, d, J = 8.6 Hz), 7.46-7.57(2H, m), 9. 98(1H, brs), 12.04(1H, brs).

Reference Example 20

Production of ethyl N-(4-hydroxyphenyl)isonipecotate

To a solution of ethyl N-(4-methoxyphenyl)-isonipecotate (2.63 g, 10 mmol) in dichloromethane (100

mL) was added a solution of 2 M boron tribromide in dichloromethane (20 mL, 40 mmol), and the resulting solution was stirred for 0.5 hours at room temperature. The resulting reaction solution was poured into ice water, then an aqueous solution of 1 M sodium hydroxide (110 mL)was added to the solution. After stirring, the resulting solution was separated. The organic layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated under reduced pressure to thereby yield 2.43 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.0 Hz), 1.91(2H, m), 2.02(2H, brd, J = 11.5 Hz), 2.38(1H, m), 2.68(2H, dt, J = 2.0 Hz, 11.5 Hz), 3.46(2H, dt, J = 12.0 Hz, 3.0 Hz), 4.16(2H, q, J = 7.0 Hz), 4.45(1H, brs), 6.75(2H, d, J = 9.0 Hz), 6.86(2H, d, J = 9.0 Hz).

The following compounds were produced in the same manner as in Reference Example 20.

Reference Example 21

4-(2-Fluoro-4-nitrophenoxy)phenol

^{1}H NMR (DMSO-d_6) δ 6.80-7.10(5H, m), 8.04(1H, ddd, J = 1.4 Hz, 2.7 Hz, 9.2 Hz), 8.29(1H, dd, J = 2.7 Hz, 10.9 Hz), 9.59(1H, s).

Reference Example 22

1-Benzyl-3-(4-hydroxyphenyl)imidazolidin-2-one

^{1}H NMR (DMSO-d_6) δ 3.18-3.40(2H, m), 3.61-3.80(2H, m), 4.35(2H, s), 6.71(2H, d, J = 8.8 Hz), 7.15-7.48(7H, m), 9.10(1H, s).

Reference Example 23

Production of 2-(4-hydroxyphenylamino)-1-(4-piperonylpiperazin-1-yl)ethanone

To a solution of N-(4-hydroxyphenyl)glycine (11.38 g, 68.1 mmol) in N,N-dimethylformamide (DMF) (150 mL) were added under ice cooling 1-piperonylpiperazine (15.0 g, 68.1 mmol), 1-hydroxybenzotriazole monohydrate (10.43 g, 68.1 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (15.66 g, 81.7 mmol), and the resulting solution was stirred for 30 minutes under ice cooling and for 4.5 hours at room temperature. The reaction solution was concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution (400 mL), and extracted with ethyl acetate (400 mL). The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, to leave the resulting product solidified in a powdered form. Ethyl acetate was added, and the resulting product was filtered off and washed with ethyl acetate, to thereby yield 18.58 g of the title compound.

Appearance: Brown powder

^{1}H NMR (DMSO-d_6) δ 2.30(2H, brs), 2.36(2H, brs), 3.40(2H, s), 3.47(4H, t, J = 14.5 Hz), 4.03(2H, d, J = 7.0 Hz), 4.90(1H, brs), 5.99(2H, s), 6.49(2H, d, J = 8.9 Hz), 6.54(2H, d, J = 8.9 Hz), 6.75(1H, dd, J = 8.0 Hz, 1.1 Hz), 6.85(1H, d, J = 8.0 Hz), 6.87(1H, s), 8.42(1H, s).

The following compounds were produced in the same manner as in Reference Example 23.

Reference Example 24

6-Chloro-N-(3,4-dichlorophenyl)nicotinamide

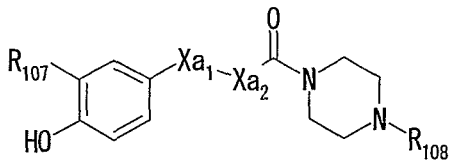
^{1}H NMR ($CDCl_3$) δ 7.64(1H, d, J = 8.9 Hz), 7.72(1H, dd, J = 8.7 Hz, 2.3 Hz), 7.73(1H, dd, J = 8.3 Hz, 0.7 Hz), 8.12(1H, d, J = 2.3 Hz), 8.35(1H, dd, J = 8.3 Hz, 2.5 Hz), 8.95(1H, dd, J = 2.5 Hz, 0.7 Hz), 10.71(1H, brs).

Reference Example 25

4-(4-Piperonylpiperazine-1-carbonyl)-1-(4-hydroxyphenyl)pyrrolidin-2-one

^{1}H NMR ($CDCl_3$) δ 2.43-2.45(4H, m), 2.73-2.95(2H, m), 3.45(2H, s), 3.49-3.54(4H, m), 3.65-3.72(1H, m), 3.78-3.87(1H, m), 4.17-4.23(1H, m), 5.96(2H, s), 6.71-6.80(4H, m), 6.84-6.85(1H, m), 7.29(2H, d, J = 8.9 Hz).

Table 4



Reference Example No.	Xa_1	Xa_2	R_{107}	R_{108}	Form	^{1}H NMR (solvent) δppm
26	-NH-	-CH_2-	-H	benzyl	free	($CDCl_3$) 2.46-2.48(4H, m), 3.45(2H, t, J = 5.0 Hz), 3.54 (2H, s), 3.68(2H, t, J = 5.0 Hz), 3.82(2H, s), 6.53(2H, d, J = 8.7 Hz), 6.70(2H, d, J = 8.7 Hz), 7.27-7.34(5H, m).
27	-CH_2-	-CH_2-	-H	benzyl	free	($CDCl_3$) 2.30-2.33(2H, m), 2.41-2.45(2H, m), 2.55-2.60 (2H, m), 2.85-2.91(2H, m), 3.36-3.40(2H, m), 3.52(2H, s), 3.62-3.66(2H, m), 5.10(1H, brs), 6.74-6.77(2H, m), 7.03(2H, d, J = 8.6 Hz), 7.27-7.32(5H, m).
28	-CH_2-	-CH_2-	-H	piperonyl	hydro-chloride	(DMSO-d_6) 2.56-3.47(10H, m), 4.01-4.07(1H, m), 4.18-4.48(3H, m), 6.07(2H, s), 6.65-6.68(2H, m), 7.00-7.03(4H, m), 7.21(1H, s), 9.18(1H, brs), 11.04(1H, brs).
29	-O-	-CH_2-	-H	piperonyl	free	($CDCl_3$) 2.31-2.50(4H, m), 3.41(2H, s), 3.52-3.72(4H, m), 4.63(2H, s), 5.94(2H, s), 6.25(1H, brs), 6.70(2H, d, J = 9.1 Hz), 6.69-6.77(1H, m), 6.73(1H, s), 6.77(2H, d, J = 9.1 Hz), 6.83(1H, d, J = 0.9 Hz).
30	-O-	-CH_2-	-H	benzyl	free	($CDCl_3$) 2.40-2.52(4H, m), 3.51(2H, s), 3.53-3.73(4H, m), 4.63(2H, s), 5.89(1H, brs), 6.70(2H, d, J = 9.2 Hz), 6.78 (2H, d, J = 9.2 Hz), 7.22-7.43(5H, m).
31	-CH(OH)-	none	-H	benzyl	free	($CDCl_3$) 1.89-2.03(1H, m), 2.21-2.32(1H, m), 2.32-2.57 (2H, m), 3.00-3.18(1H, m), 3.20-3.35(1H, m), 3.40(1H, d, J = 13.1 Hz), 3.46(1H, d, J = 13.1 Hz), 3.60-3.83(2H, m), 5.13(1H, s), 6.71(2H, d, J = 8.6 Hz), 7.09(2H, d, J = 8.6 Hz), 7.18-7.35(5H, m).
32	none	none	-H	3-pyridyl	free	(DMSO-d_6) 3.18-3.35(4H, m), 3.64(4H, brs), 6.82(2H, d, J = 8.4 Hz), 7.21-7.37(4H, m), 8.02-8.03(1H, m), 8.32 (1H, d, J = 2.4 Hz), 9.90(1H, brs).
33	-CH_2-	-CO-	-H	-$CO_2C(CH_3)_3$	free	($CDCl_3$) 1.44(9H, s), 2.93-3.15(4H, m), 3.32(2H, t, J = 5.2 Hz), 3.50(2H, t, J = 5.2 Hz), 3.97(2H, s), 5.48(1H, brs), 6.81(2H, d, J = 8.6 Hz), 7.11(2H, d, J = 8.6 Hz).
34	-NH-	-CH_2-	-CH_3	piperonyl	free	($CDCl_3$) 2.20(3H, s), 2.41-2.46(4H, m), 3.44(4H, brs), 3.67(2H, t, J = 4.8 Hz), 3.81(2H, s), 4.34(1H, brs), 4.52(1H, brs), 5.95(2H, s), 6.37(1H, dd, J = 8.4 Hz, 2.6 Hz), 6.44(1H, d, J = 2.8 Hz), 6.64(1H, d, J = 8.4 Hz), 6.70-6.77(2H, m), 6.85(1H, s).

Reference Example 35

Production of ethyl (4-hydroxy-3-methylphenylamino)acetate

Potassium carbonate (5.04 g, 36.5 mmol) was added at room temperature to a solution of 4-amino-*o*-cresol (3.00 g, 24.4 mmol) and ethyl bromoacetate (2.70 mL, 24.4 mmol) in DMF (30 mL). The resulting solution was stirred at room temperature for 1.5 hours. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine. The ethyl acetate layer was dried over anhydrous sodium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 3 : 1), to thereby yield 5.10 g of the title compound.

Appearance: Yellow solid

^{1}H NMR ($CDCl_3$) δ 1.28(3H, t, J = 7.1 Hz), 2.19(3H, s), 3.84(2H, s), 3.95(1H, brs), 4.22(2H, q, J = 7.1 Hz), 4.59(1H, brs), 6.36(1H, dd, J = 8.4 Hz, 2.9 Hz), 6.44(1H, d, J = 2.9 Hz), 6.63(1H, d, J = 8.4 Hz).

The following compounds were produced in the same manner as in Reference Example 35.

Reference Example 36

Ethyl (3-hydroxyphenylamino)acetate

^{1}H NMR ($CDCl_3$) δ 1.30(3H, t, J = 7.1 Hz), 3.88(2H, s), 4.25(2H, q, J = 7.1 Hz), 4.29(1H, brs), 4.85(1H, s),

6.08-6.10(1H, m), 6.18-6.24(2H, m), 7.01-7.07(1H, m).

Reference Example 37

Benzyl (4-hydroxy-3-methoxyphenylamino)acetate

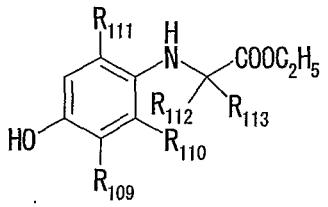
^{1}H NMR ($CDCl_3$) δ 3.81(3H, s), 3.92(2H, brs), 4.01(1H, brs), 5.09(1H, brs), 5.20(2H, s), 6.11(1H, dd, J = 8.4 Hz, 2.6 Hz), 6.23(1H, d, J = 2.6 Hz), 6.76(1H, d, J = 8.4 Hz), 7.31-7.38(5H, m).

Reference Example 38

t-Butyl [3-(4-benzyloxy-3-methylphenyl)-2-oxotetrahydropyrimidin-1-yl]acetate

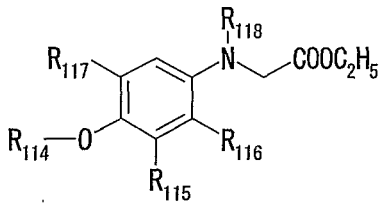
^{1}H NMR ($CDCl_3$) δ 1.47(9H, s), 2.04-2.21(2H, m), 2.25(3H, s), 3.45(2H, t, J = 5.9 Hz), 3.67(2H, t, J = 5.9 Hz), 4.04(2H, s), 5.06(2H, s), 6.82(1H, d, J = 8.6 Hz), 7.01(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.06-7.12(1H, m), 7.26-7.48(5H, m).

Table 5



Reference Example No.	R_{109}	R_{110}	R_{111}	R_{112}	R_{113}	^{1}H NMR ($CDCl_3$) δppm or MS
39	-CH_3	-CH_3	-H	-H	-H	^{1}H NMR 1.30(3H, t, J = 7.1 Hz), 2.14(3H, s), 2.20(3H, s), 3.87(2H, s), 4.24(2H, q, J = 7.1 Hz), 4.42(1H, brs), 6.29(1H, d, J = 8.6 Hz), 6.58(1H, d, J = 8.6 Hz).
40	-F	-H	-F	-H	-H	^{1}H NMR 1.30(3H, t, J = 7.1 Hz), 3.85(2H, s), 4.25(2H, q, J = 7.1 Hz), 4.77(1H, s), 6.37(1H, dd, J = 7.9 Hz, 11.8 Hz), 6.73(1H, dd, J = 7.9 Hz, 11.6 Hz).
41	-CH_3	-H	-CH_3	-H	-H	^{1}H NMR 1.30(3H, t, J = 7.1 Hz), 2.15(3H, s), 2.19(3H, s), 3.84(1H, brs), 3.89(2H, s), 4.17(1H, s), 4.25(2H, q, J = 7.1 Hz), 6.28(1H, s), 6.57(1H, s).
42	-H	-CH_3	-CH_3	-H	-H	MS 223(M^+)
43	-OCH_3	-H	-H	-H	-H	^{1}H NMR 1.29(3H, t, J = 7.1 Hz), 3.82(3H, s), 3.85(2H, s), 4.23(2H, q, J = 7.1 Hz), 5.26(1H, brs), 6.11(1H, dd, J = 8.4 Hz, 2.6 Hz), 6.25(1H, d, J = 2.6 Hz), 6.76(1H, d, J = 8.4 Hz).
44	-F	-H	-H	-H	-H	^{1}H NMR 1.30(3H, t, J = 7.1 Hz), 3.83(2H, s), 4.08(1H, brs), 4.24(2H, q, J = 7.1 Hz), 4.62(1H, d, J = 3.3 Hz), 6.30-6.41(2H, m), 6.85(1H, t, J = 8.9 Hz).
45	-H	-H	-H	-CH_3	-CH_3	^{1}H NMR 1.20(3H, t, J = 7.1 Hz), 1.48(6H, s), 4.15(2H, q, J = 7.1 Hz), 6.60-6.69(4H, m).
46	-CH_3	-H	-H	-CH_3	-H	^{1}H NMR 1.24(3H, t, J = 7.3 Hz), 1.44(3H, d, J = 6.9 Hz), 2.18(3H, s), 3.80(1H, brs), 4.03(1H, q, J = 6.9 Hz), 4.17(2H, q, J = 7.3 Hz), 4.25(1H, brs), 6.37(1H, dd, J = 8.4 Hz, 3.0 Hz), 6.45(1H, d, J = 2.8 Hz), 6.62(1H, d, J = 8.4 Hz).
47	-H	-H	-H	-CH_3	-H	^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 1.44(3H, d, J = 6.7 Hz), 3.88(1H, brs), 4.04(1H, q, J = 6.9 Hz), 4.17(2H, q, J = 7.1 Hz), 4.59(1H, brs), 6.54(2H, d, J = 8.9 Hz), 6.68(2H, d, J = 8.9 Hz).
48	-CF_3	-H	-H	-H	-H	MS 263(M^+)

Table 6



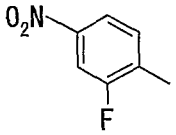
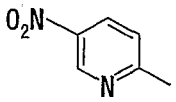
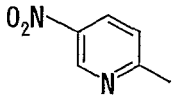
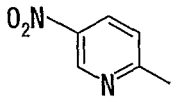
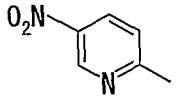
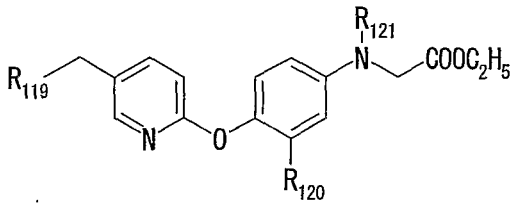
Reference Example No.	R_{114}	R_{115}	R_{116}	R_{117}	R_{118}	^{1}H NMR (solvent) δppm or MS
49		-H	-H	-H	-H	^{1}H NMR (DMSO-d_6) 1.18(3H, t, J = 7.1 Hz), 3.89(2H, d, J = 6.2 Hz), 4.11(2H, q, J = 7.1 Hz), 6.14(1H, t, J = 6.2 Hz), 6.62(2H, d, J = 8.8 Hz), 6.90(1H, t, J = 9.0 Hz), 6.97(2H, d, J = 8.8 Hz), 8.03(1H, dd, J = 2.6 Hz, 9.0 Hz), 8.24(1H, dd, J = 2.6 Hz, 10.9 Hz).
50		-F	-H	-F	-CH_3	^{1}H NMR ($CDCl_3$) 1.29(3H, t, J = 7.1 Hz), 3.07(3H, s), 4.03 (2H, s), 4.22(2H, q, J = 7.1 Hz), 6.22-6.35(2H, m), 7.15(1H, d, J = 9.0 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.01(1H, d, J = 2.8 Hz).
51		-F	-F	-H	-CH_3	^{1}H NMR ($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 3.05(3H, s), 4.06 (2H, s), 4.20(2H, q, J = 7.1 Hz), 6.72(1H, td, J = 2.2 Hz, 9.0 Hz), 6.90(1H, td, J = 1.8 Hz, 9.4 Hz), 7.11(1H, d, J = 9.0 Hz), 8.50(1H, dd, J = 2.7 Hz, 9.0 Hz), 9.02(1H, d, J = 2.7 Hz).
52		-H	-H	-H	-SO_2CH_3	^{1}H NMR ($CDCl_3$) 1.31(3H, t, J = 7.1 Hz), 3.17(3H, s), 4.25(2H, q, J = 7.1 Hz), 4.47(2H, s), 7.09(1H, d, J = 8.9 Hz), 7.20(2H, d, J = 8.7 Hz), 7.60(2H, d, J = 8.9 Hz), 8.51(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
53		-CH_3	-H	-H	-SO_2CH_3	^{1}H NMR ($CDCl_3$) 1.31(3H, t, J = 7.1 Hz), 2.16(3H, s), 3.17(3H, s), 4.25(2H, q, J = 7.1 Hz), 4.46(2H, s), 7.07(1H, dd, J = 9.1 Hz, 0.7 Hz), 7.08(1H, d, J = 7.3 Hz), 7.40(1H, d, J = 2.6 Hz), 7.44(1H, dd, J = 7.3 Hz, 2.6 Hz), 8.50(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, dd, J = 2.8 Hz, 0.7 Hz).
54	-H	-CF_3	-H	-H	-C_2H_5	MS 291(M^+)

Table 7



Reference Example No.	R_{119}	R_{120}	R_{121}	^{1}H NMR ($CDCl_3$) δppm
55	4-CF_3Ph-	-H	-H	1.30(3H, t, J = 7.1 Hz), 3.89(2H, d, J = 4.6 Hz), 3.95(2H, s), 4.20(1H, brs), 4.25(2H, q, J = 7.1 Hz), 6.62(2H, d, J = 8.9 Hz), 6.77(1H, d, J = 8.4 Hz), 6.97(2H, d, J = 8.9 Hz), 7.27 (2H, d, J = 7.9 Hz), 7.39(1H, dd, J = 8.4 Hz, 2.5 Hz), 7.54(2H, d, J = 7.9 Hz), 8.03(1H, d, J = 2.5 Hz).
56	4-CF_3PhO-	-H	-SO_2CH_3	1.30(3H, t, J = 7.1 Hz), 3.15(3H, s), 4.23(2H, q, J = 7.1 Hz), 4.45(2H, s), 5.06(2H, s), 6.99-7.04(3H, m), 7.16(2H, d, J = 8.9 Hz), 7.54(2H, d, J = 8.9 Hz), 7.56(2H, d, J = 9.2 Hz), 7.79-7.83(1H, m), 8.23(1H, d, J = 2.0 Hz).
57	4-CF_3PhO-	-CH_3	-SO_2CH_3	1.30(3H, t, J = 7.1 Hz), 2.19(3H, s), 3.16(3H, s), 4.24(2H, q, J = 7.1 Hz), 4.44(2H, s), 5.05(2H, s), 6.96-7.07(4H, m), 7.36(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.42(1H, d, J = 2.3 Hz), 7.56(2H, d, J = 8.9 Hz), 7.80(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.20(1H, d, J = 2.3 Hz).

(Ph means a benzene ring having 1 to 4 free valences. Hereinafter Ph indicates the same meaning.)

Reference Example 58

t-Butyl (3-cyano-4-hydroxyphenylamino)acetate

MS 248(M^+).

Reference Example 59

Production of 2-[4-(2-fluoro-4-nitrophenoxy)phenoxy]-1-(4-piperonylpiperazin-1-yl)ethanone

Potassium carbonate (0.350 g, 2.53 mmol) was added to a solution of 4-(2-fluoro-4-

nitrophenoxy)phenol (0.420 g, 1.69 mmol) and 1-chloroacetyl-4-piperonylpiperazine (0.500 g, 1.70 mmol) in DMF (8 mL). The resulting reaction mixtute was stirred for 40 minutes at 100°C. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated, to thereby yield 0.860 of the title compound.

Appearance: Brown oil

^{1}H NMR ($CDCl_3$) δ 2.50-2.60(4H, m), 3.43(2H, s), 3.50-3.70(4H, m), 4.71(2H, s), 5.95(2H, s), 6.65-6.75(2H, m), 6.80-7.05(6H, m), 7.94(1H, dd, J = 2.3 Hz, 9.1 Hz), 8.06(1H, dd, J = 2.3 Hz, 10.4 Hz).

The following compound was produced in the same manner as in Reference Example 59.

Reference Example 60

2-[4-(2-fluoro-4-nitrophenoxy)phenylamino]-1-(4-piperonylpiperazin-1-yl)ethanone

^{1}H NMR (DMSO-d_6) δ 2.25-2.40(4H, m), 3.43(2H, s), 3.45-3.50(4H, m), 3.90(2H, d, J = 5.1 Hz), 5.75(1H, t, J = 5.1 Hz), 5.99(2H, s), 6.70-6.75(3H, m), 6.80-7.00(5H, m), 8.05(1H, ddd, J = 1.4 Hz, 2.7 Hz, 10.5 Hz), 8.27(1H, dd, J = 2.7 Hz, 11.0 Hz).

Reference Example 61

Production of methyl 3-(4-benzyloxyphenylamino)-

propionate

Under nitrogen , 4-benzyloxyaniline (13.0 g, 65 mmol) was dissolved by heating at 70°C, and a boron trifluoride-diethyl ether complex (0.82 mL, 6.5 mmol) was added dropwise at the same temperature to the dissolved solution. Methyl acrylate (5.85 mL, 65 mmol) was then slowly added dropwise to the resulting solution. This solution was stirred for 10 hours at 70°C. After cooling with ice, ethyl acetate was added to the reaction mixture and washed with aqueous 1 N sodium hydroxide and brine. The organic layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 17.5 g of the title compound.

Appearance: Brown powder

^{1}H NMR ($CDCl_3$) δ 2.60(2H, t, J = 6.4 Hz), 3.39(2H, t, J = 6.4 Hz), 3.69(3H, s), 3.77(1H, brs), 4.98(2H, s), 6.58(2H, d, J = 8.9 Hz), 6.85(2H, d, J = 8.9 Hz), 7.30-7.44(5H, m).

Reference Example 62

Production of ethyl 3-(4-Methoxyphenylamino)propionate

3-(4-hydroxyphenylamino)propionic acid (4.00 g, 20.5 mmol) was added to 48% hydrobromic acid (50 mL), and the resulting solution was stirred for 2.5 hours at 100°C. After concentration under reduced pressure, ethanol (10 mL) was added to the residue, and

concentrated under reduced pressure. A saturated sodium bicarbonate solution was added to the residue, and extracted with dichloromethane. The dichloromethane layer was dried over anhydrous sodium sulfate and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 2 : 1), to thereby yield 1.27 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.2 Hz), 2.59(2H, t, J = 6.4 Hz), 3.38(2H, t, J = 6.4 Hz), 4.15(2H, q, J = 7.2 Hz), 6.55(2H, d, J = 8.8 Hz), 6.70(2H, d, J = 8.8 Hz).

Reference Example 63

Production of ethyl [(3-fluoro-4-hydroxyphenyl)methyl-amino]acetate

Ethyl (3-fluoro-4-hydroxyphenylamino)acetate (1.06 g, 5.1 mmol) was dissolved in methanol (150 mL) and the resulting solution was cooled with ice. To the resulting solution were added aqueous 37% formaldehyde (1.5 mL), sodium triacetoxyborohydride (1 g, 16 mmol) and acetic acid (0.9 mL, 15 mmol), and then stirred at room temperature under a nitrogen atmosphere for 14 hours. The solvent was evaporated under reduced pressure. Water was added to the residue, and the resulting solution was neutralized with a saturated sodium bicarbonate solutionand extracted with ethyl acetate. The organic layer was washed with brine, and

then dried over anhydrous sodium sulfate. The solvent was evaporated under reduced pressure, and the residue was purified by silica gel column chromatography (ethyl acetate : *n*-hexane = 1 : 2), to thereby yield 0.93 g of the title compound.

Appearance: Light brown oil

^{1}H NMR ($CDCl_3$) δ 1.24(3H, t, J = 7.1 Hz), 3.00(3H, s), 3.98(2H, s), 4.17(2H, q, J = 7.1 Hz), 4.68(1H, brs), 6.31-6.52(2H, m), 6.87(1H, t, J = 8.9 Hz).

The following compounds were produced in the same manner as in Reference Example 63.

Reference Example 64

Ethyl (methyl{4-[5-(4-trifluoromethylbenzyl)pyridin-2-yloxy]phenyl}amino)acetate

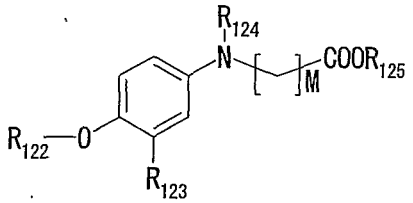
^{1}H NMR ($CDCl_3$) δ 1.25(3H, t, J = 7.1 Hz), 3.07(3H, s), 3.95(2H, s), 4.04(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.69(2H, d, J = 9.1 Hz), 6.75(1H, d, J = 8.5 Hz), 7.00(2H, d, J = 9.1 Hz), 7.27(2H, d, J = 8.1 Hz), 7.39(1H, dd, J = 8.5 Hz, 2.5 Hz), 7.54(2H, d, J = 8.1 Hz), 8.04(1H, d, J = 2.5 Hz).

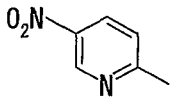
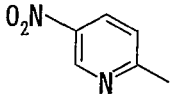
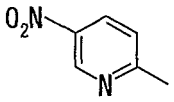
Reference Example 65

Ethyl [(4-hydroxy-2-trifluoromethylphenyl)methylamino]-acetate

MS 277(M^+).

Table 8

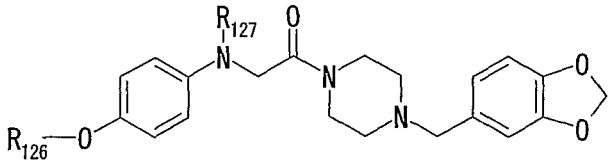


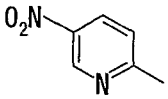
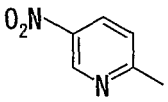
Reference Example No.	R_{122}	R_{123}	R_{124}	R_{125}	M	^{1}H NMR ($CDCl_3$) δppm
66	-H	-H	$-CH_3$	$-CH_3$	1	3.00(3H, s), 3.71(3H, s), 4.01(2H, s), 4.55(1H, brs), 6.62(2H, d, J = 9.2 Hz), 6.75(2H, d, J = 9.2 Hz).
67	Benzyl	-H	$-CH_3$	$-CH_3$	2	2.51-2.57(2H, m), 2.86(3H, s), 3.56-3.62(2H, m), 3.66(3H, s), 5.00(2H, s), 6.72(2H, d, J = 9.1 Hz), 6.91(2H, d, J = 9.1 Hz), 7.30-7.45 (5H, m).
68	-H	-F	$-C_2H_5$	$-C_2H_5$	1	1.18(3H, t, J = 7.1 Hz), 1.26(3H, t, J = 7.1 Hz), 3.38(2H, q, J = 7.1 Hz), 3.94(2H, s), 4.19 (2H, q, J = 7.1 Hz), 4.61(1H, brs), 6.30-6.35 (1H, m), 6.43(1H, dd, J = 13.7 Hz, 3.0 Hz), 6.86(1H, t, J = 8.9 Hz).
69	-H	$-OCH_3$	$-C_2H_5$	$-C_2H_5$	1	1.17(3H, t, J = 7.1 Hz), 1.25(3H, t, J = 7.1 Hz), 3.39(2H, q, J = 7.1 Hz), 3.85(3H, s), 3.95 (2H, s), 4.18(2H, q, J = 7.1 Hz), 5.30(1H, brs), 6.21(1H, dd, J = 8.6 Hz, 2.8 Hz), 6.33(1H, d, J = 2.8 Hz), 6.79(1H, d, J = 8.7 Hz).
70		$-CH_3$	$-C_2H_5$	$-C_2H_5$	1	1.23(3H, t, J = 7.1 Hz), 1.28(3H, t, J = 7.1 Hz), 2.08(3H, s), 3.47(2H, q, J = 7.1 Hz), 4.01 (2H, s), 4.22(2H, q, J = 7.1 Hz), 6.40-6.59(2H, m), 6.81-7.00(2H, m), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, d, J = 2.8 Hz).
71		$-CH_3$	$-CH_3$	$-C_2H_5$	1	1.27(3H, t, J = 7.1 Hz), 2.10(3H, s), 3.08(3H, s), 4.06(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.50-6.62(2H, m), 6.85-6.99(2H, m), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
72		$-OCH_3$	$-CH_3$	$-C_2H_5$	1	1.27(3H, t, J = 7.1 Hz), 3.11(3H, s), 3.74(3H, s), 4.07(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.27 (1H, dd, J = 8.7 Hz, 2.8 Hz), 6.34(1H, d, J = 2.8 Hz), 6.95-7.01(2H, m), 8.42(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.03(1H, d, J = 2.8 Hz).

(M means the number of the methylene groups.

Hereinafter M indicates the same meaning.)

Table 9



Reference Example No.	R_{126}	R_{127}	^{1}H NMR ($CDCl_3$) δppm
73	-H	$-CH_3$	2.41(4H, brs), 2.88(3H, s), 3.42(2H, s), 3.50(2H, brs), 3.60(2H, brs), 3.94(2H, s), 5.92(2H, s), 6.55-6.69(4H, m), 6.72(2H, s), 6.82 (1H, s), 7.47(1H, brs).
74	-H	$-C_2H_5$	1.05(3H, t, J = 7.1 Hz), 2.44(4H, brs), 3.25(2H, q, J = 7.1 Hz), 3.46(2H, s), 3.60(4H, brs), 3.91(2H, s), 5.94(2H, s), 6.63(4H, s), 6.72-6.74(2H, m), 6.82(1H, s), 7.43(1H, brs).
75		$-CH_3$	2.44(4H, brs), 3.06(3H, s), 3.44(2H, s), 3.49(2H, brs), 3.63(2H, brs), 4.11(2H, s), 5.94(2H, s), 6.69-6.77(4H, m), 6.85(1H, s), 6.92-7.02(3H, m), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 3.0 Hz).
76		$-C_2H_5$	1.20(3H, t, J = 7.1 Hz), 2.42-2.46(4H, m), 3.44-3.51(6H, m), 3.64 (2H, q, J = 7.1 Hz), 4.06(2H, s), 5.95(2H, s), 6.67(2H, d, J = 9.2 Hz), 6.74(2H, brs), 6.85(1H, brs), 6.94(1H, d, J = 9.1 Hz), 6.99(2H, d, J = 9.1 Hz), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).

Reference Example 77

Production of 1-(4-piperonylpiperazin-1-yl)-2-[cyclopropyl(4-hydroxyphenyl)amino]ethanone

To a solution of 1-(4-piperonylpiperazin-1-yl)-2-(4-hydroxyphenylamino)ethanone (1.00 g, 2.7 mmol) in methanol (10 mL) were added acetic acid (1.55 mL, 27 mmol), molecular sieves 3A1/16 (1.00 g), [(1-ethoxycyclopropyl)oxy]trimethylsilane (0.653 mL, 3.2 mmol) and sodium cyanoborohydride (770 mg, 12 mmol). The resulting solution was stirred for 16 hours at 60°C. This reaction solution was filtered and concentrated, and to the residue were added ethyl acetate and water. The aqueous layer was adjusted to pH 10 using aqueous 6

N sodium hydroxide. This layer was stirred for some time, and once insoluble matter had dissolved, the ethyl acetate layer was removed, and washed with aqueous 2 N sodium hydroxide and a saturated sodium bicarbonate solution, then dried over anhydrous magnesium sulfate. The solvent was evaporated, to thereby yield 770 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 0.54-0.59(2H, m), 0.72-0.79(2H, m), 2.39-2.45(4H, m), 2.70-2.77(1H, m), 3.44(2H, s), 3.48-3.51(2H, m), 3.57-3.60(2H, m), 4.12(2H, s), 5.95(2H, s), 6.62-6.67(2H, m), 6.74-6.85(5H, m).

The following compound was produced in the same manner as in Reference Example 77.

Reference Example 78

Ethyl {cyclopropyl[3-methyl-4-(5-nitropyridin-2-yloxy)phenyl]amino}acetate

^{1}H NMR ($CDCl_3$) δ 0.66-0.72(2H, m), 0.83-0.89(2H, m), 1.26(3H, t, J = 7.3 Hz), 2.10(3H, s), 2.71-2.79(1H, m), 4.08-4.22(4H, m), 6.77-6.82(2H, m), 6.91-6.95(2H, m), 8.40-8.45(1H, m), 9.05(1H, d, J = 2.8 Hz).

Reference Example 79

Production of ethyl [(3-hydroxyphenyl)methylamino]-acetate

Potassium bicarbonate (1.42 mL, 14.19 mmol)

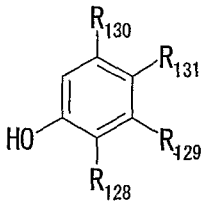
was added to a solution of ethyl (3-hydroxyphenylamino)acetate (2.77 g, 14.19 mmol) in DMF (15 mL). To the resulting solution was further added methyl iodide (1.77 mL, 28.38 mmol), and then stirred at room temperature for 18 hours. To the resulting reaction solution was added brine (150 mL), and the obtained mixture was extracted with ethyl acetate (150 mL). The ethyl acetate layer was dried over anhydrous sodium sulfate, after which solvent was evaporated, to thereby yield 2.48 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.24(3H, t, J = 7.1 Hz), 3.04(3H, s), 4.03(2H, s), 4.18(2H, q, J = 7.1 Hz), 5.17(1H, brs), 6.17-6.27(3H, m), 7.04-7.10(1H, m).

The following compounds were produced in the same manner as in Reference Example 79.

Table 10



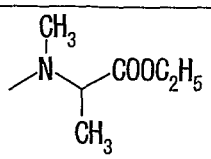
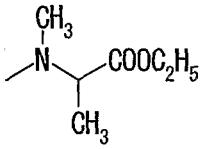
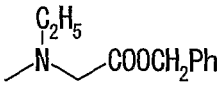
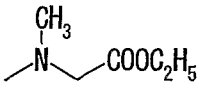
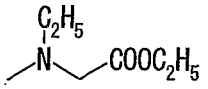
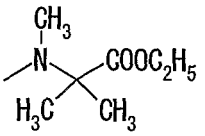
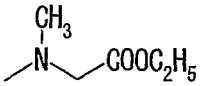
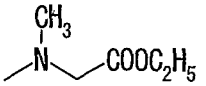
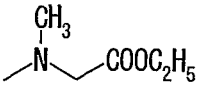
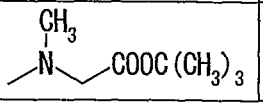
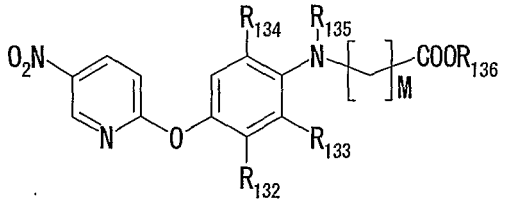
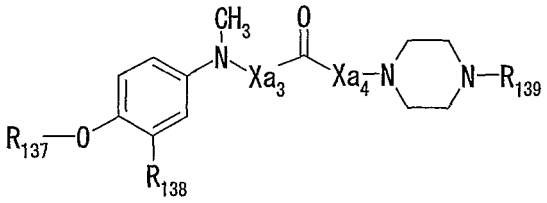
Reference Example No.	R_{128}	R_{129}	R_{130}	R_{131}	^{1}H NMR ($CDCl_3$) δppm or MS
80	-H	-H	-H		^{1}H NMR 1.22(3H, t, J = 7.1 Hz), 1.43(3H, d, J = 7.1 Hz), 2.83(3H, s), 4.16(2H, q, J = 7.1 Hz), 4.33(1H, q, J = 7.1 Hz), 4.84(1H, brs), 6.75(4H, s).
81	-CH_3	-H	-H		^{1}H NMR 1.23(3H, t, J = 7.3 Hz), 1.42(3H, d, J = 7.1 Hz), 2.22(3H, s), 2.82(3H, s), 4.08-4.21(2H, m), 4.30 (1H, s), 4.33(1H, q, J = 7.1 Hz), 6.58(1H, dd, J = 8.6 Hz, 3.0 Hz), 6.65(1H, d, J = 2.8 Hz), 6.68(1H, d, J = 8.6 Hz).
82	-OCH_3	-H	-H		^{1}H NMR 1.17(3H, t, J = 7.1 Hz), 3.39(2H, q, J = 7.1 Hz), 3.75(3H, s), 4.00(2H, brs), 5.11(1H, brs), 5.15 (2H, s), 6.21(1H, dd, J = 8.6 Hz, 2.8 Hz), 6.27(1H, d, J = 2.8 Hz), 6.77(1H, d, J = 8.6 Hz), 7.27-7.37(5H, m).
83	-F	-H	-F		^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 2.92(3H, s), 3.93(2H, s), 4.15(2H, q, J = 7.1 Hz), 4.96(1H, d, J = 2.8 Hz), 6.70(1H, d, J = 8.2 Hz, 12.9 Hz), 6.77(1H, d, J = 8.1 Hz, 12.2 Hz).
84	-CH_3	-H	-CH_3		^{1}H NMR 0.99(3H, t, J = 7.1 Hz), 1.21(3H, t, J = 7.1 Hz), 2.18(3H, s), 2.24(3H, s), 3.10(2H, q, J = 7.1 Hz), 3.68(2H, s), 4.11(2H, q, J = 7.1 Hz), 4.47(1H, s), 6.59 (1H, s), 6.94(1H, s).
85	-H	-H	-H		^{1}H NMR 1.26(3H, t, J = 7.3 Hz), 1.33(6H, s), 2.80 (3H, s), 4.18(2H, q, J = 7.3 Hz), 5.15(1H, brs), 6.71 (2H, d, J = 8.9 Hz), 7.00(2H, d, J = 8.9 Hz).
86	-H	-CH_3	-CH_3		MS 237(M^+)
87	-CH_3	-H	-CH_3		^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 2.19(3H, s), 2.24(3H, s), 2.79(3H, s), 3.64(2H, s), 4.15(2H, q, J = 7.1 Hz), 4.45(1H, brs), 6.59(1H, s), 6.89(1H, s).
88	-CF_3	-H	-H		MS 277(M^+)
89	-CN	-H	-H		MS 262(M^+)

Table 11



Reference Example No.	R_{132}	R_{133}	R_{134}	R_{135}	R_{136}	M	^{1}H NMR ($CDCl_3$) δppm
90	-H	-H	-H	-C_2H_5	-C_2H_5	1	1.24(3H, t, J = 7.1 Hz), 1.28(3H, t, J = 7.0 Hz), 3.48 (2H, q, J = 7.1 Hz), 4.02(2H, s), 4.21(2H, q, J = 7.0 Hz), 6.67(2H, d, J = 8.9 Hz), 6.95(1H, d, J = 9.1 Hz), 7.00(2H, d, J = 8.9 Hz), 8.42(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.06(1H, d, J = 2.8 Hz).
91	-H	-H	-H	-CH_3	-C_2H_5	1	1.27(3H, t, J = 7.2 Hz), 3.10(3H, s), 4.07(2H, s), 4.20(2H, q, J = 7.2 Hz), 6.71(2H, d, J = 9.2 Hz), 6.95(1H, d, J = 9.1 Hz), 7.02(2H, d, J = 9.2 Hz), 8.43(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.05(1H, d, J = 2.8 Hz).
92	-F	-H	-H	allyl	-C_2H_5	1	1.29(3H, t, J = 7.1 Hz), 4.02(4H, brs), 4.23(2H, q, J = 7.1 Hz), 5.21-5.30(2H, m), 5.84-5.94(1H, m), 6.40-6.52(2H, m), 7.01-7.08(2H, m), 8.47(1H, dd, J = 8.9 Hz, 2.8 Hz), 9.03(1H, d, J = 2.6 Hz).
93	-F	-H	-F	-C_2H_5	-C_2H_5	1	1.22(3H, t, J = 7.1Hz), 1.27(3H, t, J = 7.1 Hz), 3.37 (2H, q, J = 7.1Hz), 4.02(2H, s), 4.20(2H, q, J = 7.1 Hz), 6.77(1H, dd, J = 8.1 Hz, 12.3 Hz), 6.92(1H, dd, J = 7.3 Hz, 12.7 Hz), 7.09(1H, d, J = 9.0 Hz), 8.49 (1H, dd, J = 2.8 Hz, 9.0 Hz), 9.02(1H, d, J = 2.8 Hz).
94	-F	-F	-H	-CH_3	-$C(CH_3)_3$	0	1.45(9H, s), 3.26(3H, s), 6.90-7.11(2H, m), 7.16(1H, d, J = 9.0 Hz), 8.53(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.01 (1H, d, J = 2.8 Hz).

Table 12



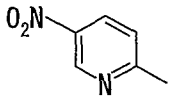
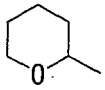
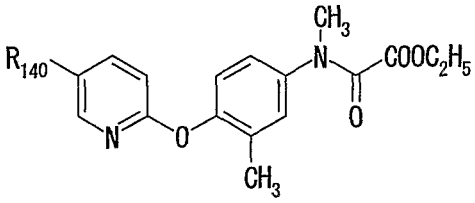
Reference Example No.	R_{137}	R_{138}	R_{139}	Xa_3	Xa_4	^{1}H NMR ($CDCl_3$) δppm
95		-H	piperonyl	none	$-CH_2-$	2.44(8H, brs), 2.96(2H, s), 3.30(3H, s), 3.38(2H, s), 5.92 (2H, s), 6.72(2H, brs), 6.82(1H, s), 7.09(1H, d, J = 9.1 Hz), 7.20(2H, d, J = 8.9 Hz), 7.29(2H, d, J = 8.9 Hz), 8.51(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
96		-H	benzyl	none	none	1.55-1.80(3H, m), 1.81-2.15(3H, m), 2.23(4H, t, J = 5.0 Hz), 3.16(3H, s), 3.20(4H, t, J = 5.0 Hz), 3.42(2H, s), 3.55-3.69(1H, m), 3.85-4.00(1H, m), 5.36(1H, t, J = 3.2 Hz), 6.99(4H, s), 7.16-7.36(5H, m).
97	-H	$-CH_3$	piperonyl	$-CH_2-$	none	2.18(3H, s), 2.38-2.42(4H, m), 2.89(3H, s), 3.41(2H, s), 3.50(2H, brs), 3.61(2H, brs), 3.95(2H, brs), 5.93(2H, s), 6.44-6.57(3H, m), 6.73-6.76(2H, m), 6.83(1H, s).

Table 13



Reference Example No.	R_{140}	^{1}H NMR ($CDCl_3$) δppm
98	$-NO_2$	1.07(3H, t, J = 7.1 Hz), 2.15(3H, s), 3.38(3H, s), 4.19(2H, q, J = 7.1 Hz), 7.06-7.20(4H, m), 8.51(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.97(1H, d, J = 2.8 Hz).
99	$4-CF_3PhOCH_2-$	1.07(3H, t, J = 7.1 Hz), 2.18(3H, s), 3.36(3H, s), 4.08(2H, q, J = 7.1 Hz), 5.04(2H, s), 6.97(1H, d, J = 8.6 Hz), 7.01-7.13(4H, m), 7.16(1H, d, J = 2.3 Hz), 7.57(2H, d, J = 8.6 Hz), 7.80(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.17(1H, d, J = 2.3 Hz).

Reference Example 100

Production of ethyl [acetyl(3-fluoro-4-hydroxyphenyl)amino]acetate

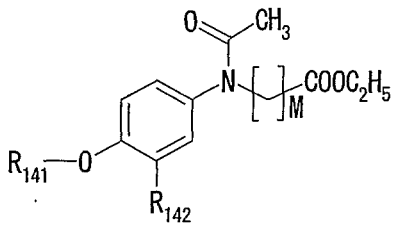
Ethyl (3-fluoro-4-hydroxyphenylamino)acetate (0.84 g, 4 mmol) was dissolved in N,N-dimethylacetamide (4 mL). To the resulting solution was added acetyl chloride (0.6 mL, 10 mmol), and the resulting solution was stirred at room temperature for 1 hour. Water (1 mL), methanol (10 mL) and saturated sodium carbonate (10 mL) were added, and the mixture was stirred at room temperature for 1 hour. Water was added to the solution. 10% hydrochloric acid was employed to turn the solution acidic, and then the solution was extracted with ethyl acetate. The organic layer was washed with water and brine, then dried over anhydrous sodium sulfate. The solvent was evaporated under reduced pressure, and the obtained residue was purified by silica gel column chromatography (ethyl acetate: *n*-hexane = 2 : 1), to thereby yield 0.84 g of the title compound.

Appearance: Colorless powder

^{1}H NMR ($CDCl_3$) δ 1.28(3H, t, J = 7.3 Hz), 1.94(3H, s), 4.20(2H, q, J = 7.3 Hz), 4.32(2H, s), 6.02(1H, brs), 6.99-7.07(2H, m), 7.13-7.18(1H, m).

The following compounds were produced in the same manner as in Reference Example 100.

Table 14



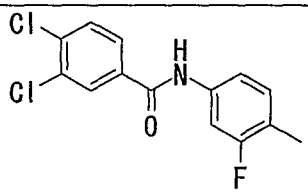
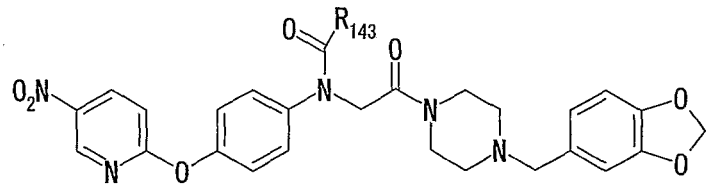
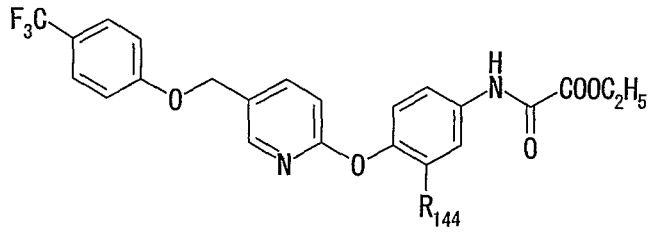
Reference Example No.	R_{141}	R_{142}	M	^{1}H NMR ($CDCl_3$) δppm
101	-H	-CH_3	1	1.26(3H, t, J = 7.1 Hz), 1.92(3H, s), 2.24(3H, s), 4.19(2H, q, J = 7.1 Hz), 4.32(2H, s), 5.38(1H, brs), 6.78(1H, d, J = 8.4 Hz), 7.04(1H, dd, J = 8.4 Hz, 2.5 Hz), 7.10(1H, d, J = 2.5 Hz).
102	-H	-H	2	1.21(3H, t, J = 7.2 Hz), 1.83(3H, s), 2.56(2H, t, J = 7.4 Hz), 3.97(2H, t, J = 7.4 Hz), 4.06(2H, q, J = 7.2 Hz), 6.05(1H, brs), 6.87(2H, d, J = 8.7 Hz), 7.03(2H, d, J = 8.7 Hz).
103	benzyl	-H	1	1.26(3H, t, J = 7.1 Hz), 1.91(3H, s), 4.18(2H, q, J = 7.1 Hz), 4.33(2H, s), 5.07(2H, s), 6.98(2H, d, J = 8.9 Hz), 7.26(2H, d, J = 8.9 Hz), 7.35-7.45 (5H, m).
104		-H	1	1.24(3H, t, J = 7.1 Hz), 1.89(3H, s), 4.15(2H, q, J = 7.1 Hz), 4.32(2H, s), 6.95(2H, d, J = 8.9 Hz), 7.12(1H, t, J = 9.0 Hz), 7.27-7.32(3H, m), 7.52-7.60(1H, m), 7.70-7.80(2H, m), 7.99(1H, s), 8.05(1H, s).

Table 15



Reference Example No.	R_{143}	^{1}H NMR ($CDCl_3$) δppm
105	$-C_2H_5$	1.09(3H, t, J = 7.4 Hz), 2.20(2H, q, J = 7.4 Hz), 2.40-2.45(4H, m), 3.43(4H, brs), 3.61(2H, brs), 4.47(2H, s), 5.94(2H, s), 6.70-6.76(2H, m), 6.84(1H, s), 7.08(1H, d, J = 9.0 Hz), 7.19(2H, d, J = 8.7 Hz), 7.52(2H, d, J = 8.7 Hz), 8.51(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz).
106	$-CH_2Cl$	2.40-2.48(4H, m), 3.43(4H, s), 3.62(2H, brs), 3.97(2H, s), 4.49(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 7.11(1H, d, J = 9.0 Hz), 7.23(2H, d, J = 8.7 Hz), 7.59(2H, d, J = 8.7 Hz), 8.52(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz).
107	cyclopropyl	0.65-1.52(5H, m), 2.43(4H, brs), 3.43(4H, brs), 3.61(2H, brs), 4.50(2H, brs), 5.95(2H, s), 6.72-6.75(2H, m), 6.84(1H, s), 7.08(1H, d, J = 9.1 Hz), 7.20(1H, d, J = 8.8 Hz), 7.59(2H, d, J = 8.8 Hz), 8.50(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.04(1H, d, J = 2.9 Hz).

Table 16



Reference Example No.	R_{144}	^{1}H NMR ($CDCl_3$) δppm
108	-H	1.44(3H, t, J = 7.1 Hz), 4.43(2H, q, J = 7.1 Hz), 5.05(2H, s), 6.93(1H, d, J = 8.6 Hz), 7.02(2H, d, J = 8.6 Hz), 7.17(2H, d, J = 8.9 Hz), 7.56(2H, d, J = 8.4 Hz), 7.69(2H, d, J = 8.9 Hz), 7.79(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.22(1H, d, J = 2.5 Hz), 8.90(1H, brs).
109	$-CH_3$	1.44(3H, t, J = 7.1 Hz), 2.19(3H, s), 4.43(2H, q, J = 7.1 Hz), 5.03(2H, s), 6.94(1H, d, J = 8.4 Hz), 7.02(2H, d, J = 8.4 Hz), 7.07(1H, d, J = 8.6 Hz), 7.51-7.58(4H, m), 7.78(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.20(1H, d, J = 2.5 Hz), 8.84(1H, brs).

Reference Example 110

Production of (6-chloropyridin-3-yl) (4-trifluoromethylphenyl)methanone

Under an argon gas flow, half of a solution of 4-bromobenzotrifluoride (1.20 g, 5.33 mmol) in THF (6 mL) was added to magnesium (156 mg, 6.41 mmol). The resulting solution was stirred, and further 1,2-dibromoethane (3 drops)was added. Once the reaction began, the balance of the 4-bromobenzotrifluoride in THF solution was added dropwise, and once dropping had finished, the resulting solution was stirred for 30 minutes at 60°C. A solution of 6-chloro-N-methoxy-N-methylnicotinamide (990 mg, 5.36 mmol) in THF (3 mL) was charged into a separate reaction vessel, into which the above reaction solution was added dropwise under an argon gas flow and ice cooling. After dropping had finished, the resulting solution was stirred for 30 minutes at room temperature, and then heated to reflux for 1 hour. The reaction solution was cooled with ice, then aqueous ammonium chloride and water were added. The resulting solution was extracted with ethyl acetate, and washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane :ethyl acetate = 10 : 1), to thereby yield 610 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 7.52(1H, d, J = 8.3 Hz), 7.80(2H, d, J

= 8.0 Hz), 7.90(2H, d, J = 8.0 Hz), 8.11(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.77(1H, d, J = 2.0 Hz).

Reference Example 111

Production of ethyl 3-[4-(4-nitrophenoxy)phenyl]-propionate

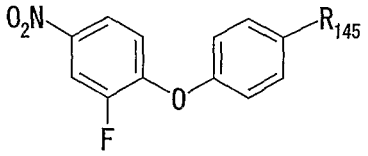
To a solution of ethyl 3-(4-hydroxyphenyl)-propionate (6.00 g, 30.9 mmol) in DMF (60 mL) were added 4-fluoronitrobenzene (6.54 g, 46.3 mmol) and potassium carbonate (5.12 g, 37.1 mmol). The resulting reaction solution was stirred for 1 hour at 80°C. To the reaction solution was added water and extracted with ethyl acetate. The resulting ethyl acetate layer was washed with water and then with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 9.64 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.23(3H, t, J = 7.1 Hz), 2.62(2H, t, J = 7.7 Hz), 2.96(2H, t, J = 7.7 Hz), 4.12(2H, q, J = 7.1 Hz), 6.93-7.06(4H, m), 7.24(2H, d, J = 8.5 Hz), 8.17(2H, d, J = 9.2 Hz).

The following compounds were produced in the same manner as in Reference Example 111.

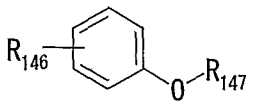
Table 17



Reference Example No.	R_{145}	^{1}H NMR (solvent) δppm
112	-Ac	(DMSO-d_6) 2.58(3H, s), 7.26(2H, d, J = 8.8 Hz), 7.40(1H, t, J = 8.4 Hz), 8.04(2H, d, J = 8.8 Hz), 8.15(1H, ddd, J = 1.4 Hz, 2.6 Hz, 8.4 Hz), 8.39(1H, dd, J = 2.6 Hz, 10.7 Hz).
113	$-CH_2COOCH_3$	(DMSO-d_6) 3.63(3H, s), 3.72(2H, s), 7.11-7.17(3H, m), 7.38(2H, d, J = 8.4 Hz), 8.09(1H, ddd, J = 1.4 Hz, 2.7 Hz, 9.1 Hz), 8.33(1H, dd, J = 2.7 Hz, 10.2 Hz).
114	$-(CH_2)_2COOC_2H_5$	($CDCl_3$) 1.22(3H, t, J = 7.1 Hz), 2.62(2H, t, J = 7.6 Hz), 2.96(2H, t, J = 7.6 Hz), 4.12(2H, q, J = 7.1 Hz), 6.92(1H, dd, J = 9.0 Hz, 8.0 Hz), 6.99(2H, d, J = 8.6 Hz), 7.24(2H, d, J = 8.6 Hz), 7.90-8.00(1H, m), 8.06(1H, dd, J = 10.3 Hz, 2.7 Hz).
115	-NHAc	(DMSO-d_6) 2.05(3H, s), 7.07(1H, t, J = 8.6 Hz), 7.16(2H, d, J = 9.0 Hz), 7.67(2H, d, J = 9.0 Hz), 8.06(1H, ddd, J = 1.4 Hz, 2.7 Hz, 8.6 Hz), 8.31(1H, dd, 2.7 Hz, 10.9 Hz), 10.06(1H, s).
116	$-SCH_2COOC_2H_5$	($CDCl_3$) 1.24(3H, t, J = 7.1 Hz), 3.62(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.95-7.05(3H, m), 7.49(2H, d, J = 8.8 Hz), 8.00(1H, ddd, J = 1.5 Hz, 2.6 Hz, 9.1 Hz), 8.08(1H, dd, J = 2.6 Hz, 10.2 Hz).
117	$-OCH_3$	(DMSO-d_6) 3.77(3H, s), 6.90-7.10(3H, m), 7.16(2H, d, J = 9.1 Hz), 8.03(1H, ddd, J = 1.4 Hz, 2.6 Hz, 9.2 Hz), 8.27(1H, dd, J = 2.6 Hz, 10.9 Hz).
118	-H	($CDCl_3$) 6.95(1H, dd, J = 9.0 Hz, 8.0 Hz), 7.07(2H, d, J = 7.9 Hz), 7.24(2H, t, J = 7.9 Hz), 7.42(2H, t, J = 7.9 Hz), 7.91-8.02(1H, m), 8.07(1H, dd, J = 10.3 Hz, 2.7 Hz).
119	$-(CH_2)_3COOC_2H_5$	($CDCl_3$) 1.25(3H, t, J = 7.1 Hz), 1.88-2.03(2H, m), 2.32(2H, t, J = 7.4 Hz), 2.66(2H, t, J = 7.4 Hz), 4.12(2H, q, J = 7.1 Hz), 6.91(1H, dd, J = 9.0 Hz, 8.0 Hz), 6.99(2H, d, J = 8.5 Hz), 7.22(2H, d, J = 8.5 Hz), 7.91-7.98(1H, m), 8.06(1H, dd, J = 10.3 Hz, 2.7 Hz)
120	-CHO	(DMSO-d_6) 7.33(2H, d, J = 8.7 Hz), 7.47(1H, t, J = 9.0 Hz), 8.00(2H, d, J = 8.7 Hz), 8.16(1H, ddd, J = 1.4 Hz, 2.7 Hz, 9.0 Hz), 8.40(1H, dd, J = 2.7 Hz, 10.6 Hz), 9.99(1H, s).
121	$-COOC_2H_5$	(DMSO-d_6) 1.32(3H, t, J = 7.1 Hz), 4.31(2H, q, J = 7.1 Hz), 7.26(2H, d, J = 8.9 Hz), 7.41(1H, t, J = 8.4 Hz), 8.03(2H, d, J = 8.9 Hz), 8.14(1H, ddd, J = 1.4 Hz, 2.6 Hz, 8.4 Hz), 8.39(1H, dd, J = 2.6 Hz, 10.6 Hz).

(Ac means an acetyl group. Hereinafter Ac indicates the same meaning.)

Table 18



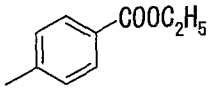
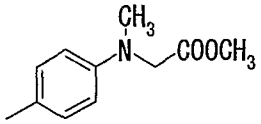
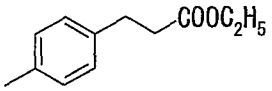
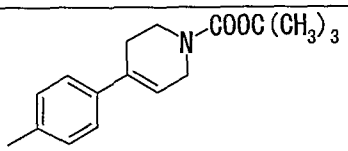
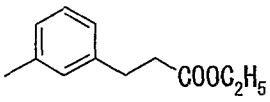
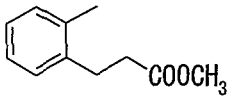
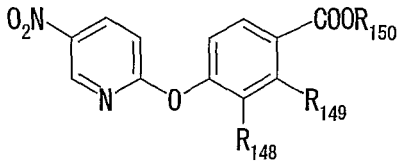
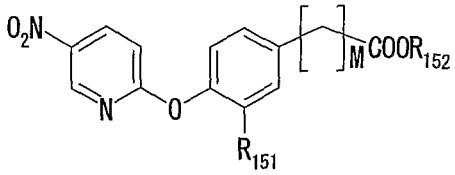
Reference Example No.	R_{146}	R_{147}	^{1}H NMR (solvent) δppm
122	4-NO_2		($DMSO-d_6$) 1.33(3H, t, J = 7.1 Hz), 4.32(2H, q, J = 7.1 Hz), 7.24-7.31(4H, m), 8.05(2H, d, J = 8.9 Hz), 8.29(2H, d, J = 9.3 Hz).
123	4-NO_2		($CDCl_3$) 3.10(3H, s), 3.75(3H, s), 4.10(2H, s), 6.71(2H, d, J = 9.2 Hz), 6.96(2H, d, J = 9.2 Hz), 6.98(2H, d, J = 9.2 Hz), 8.17(2H, d, J = 9.2 Hz).
124	2-NO_2		($CDCl_3$) 1.22(3H, t, J = 7.1 Hz), 2.60(2H, t, J = 7.7 Hz), 2.93(2H, t, J = 7.7 Hz), 4.11(2H, q, J = 7.1 Hz), 6.92-6.99(3H, m), 7.13-7.23(3H, m), 7.45(1H, dt, J = 1.6 Hz, 8.2 Hz), 7.92(1H, dd, J = 8.2 Hz, 1.6 Hz).
125	4-NO_2		($CDCl_3$) 1.50(9H, s), 2.53(2H, brs), 3.66(2H, m), 4.10 (2H, brs), 6.05(1H, brs), 7.02(2H, d, J = 9.0 Hz), 7.06 (2H, d, J = 8.5 Hz), 7.43(2H, d, J = 8.5 Hz), 8.21(2H, d, J = 9.0 Hz).
126	4-NO_2		($CDCl_3$) 1.21(3H, t, J = 7.1 Hz), 2.61(2H, t, J = 7.7 Hz), 2.95(2H, t, J = 7.7 Hz), 4.10(2H, q, J = 7.1 Hz), 6.88-6.94(2H, m), 6.98(2H, d, J = 9.2 Hz), 7.08(1H, d, J = 7.6 Hz), 7.32(1H, t, J = 7.6 Hz), 8.18(2H, d, J = 9.2 Hz).
127	4-NO_2		($CDCl_3$) 2.58(2H, t, J = 7.7 Hz), 2.87(2H, t, J = 7.7 Hz), 3.62(3H, s), 6.89-7.01(3H, m), 7.13-7.37(3H, m), 8.18(2H, d, J = 9.2 Hz).

Table 19



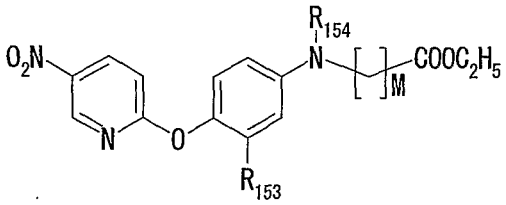
Reference Example No.	R_{148}	R_{149}	R_{150}	^{1}H NMR ($CDCl_3$) δppm
128	-H	-H	$-C_2H_5$	1.41(3H, t, J = 7.3 Hz), 4.40(2H, q, J = 7.3 Hz), 7.09(1H, d, J = 8.9 Hz), 7.22-7.26(2H, m), 8.14-8.17(2H, m), 8.52(1H, dd, J = 8.9 Hz, 3.0 Hz), 9.04(1H, d, J = 3.0 Hz).
129	-H	-H	$-CH_3$	3.94(3H, s), 7.10(1H, d, J = 8.9 Hz), 7.22-7.26(2H, m), 8.13-8.16(2H, m), 8.52(1H, dd, J = 8.9 Hz, 2.7 Hz), 9.04(1H, d, J = 2.7 Hz).
130	-F	-H	$-CH_3$	3.95(3H, s), 7.18(1H, d, J = 8.8 Hz), 7.29-7.35(1H, m), 7.87-7.96(2H, m), 8.54(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.99(1H, d, J = 2.6 Hz).
131	-F	-H	$-C_2H_5$	1.41(3H, t, J = 7.1 Hz), 4.41(2H, q, J = 7.1 Hz), 7.18(1H, d, J = 9.1 Hz), 7.29-7.35(1H, m), 7.88-7.96(2H, m), 8.54(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.99(1H, d, J = 2.8 Hz).
132	$-CH_3$	-H	$-CH_3$	2.21(3H, s), 3.93(3H, s), 7.08-7.15(2H, m), 7.97(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.02(1H, d, J = 2.2 Hz), 8.52(1H, dd, J = 8.9 Hz, 2.7 Hz), 9.01(1H, d, J = 2.7 Hz).
133	$-OCH_3$	-H	$-C_2H_5$	1.41(3H, t, J = 7.1 Hz), 3.80(3H, s), 4.40(2H, q, J = 7.1 Hz), 7.09(1H, d, J = 8.9 Hz), 7.21(1H, d, J = 8.2 Hz), 7.71-7.77(2H, m), 8.49(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.97(1H, d, J = 2.8 H).
134	-H	$-OCH_3$	$-CH_3$	3.90(3H, s), 3.91(3H, s), 6.77-6.81(2H, m), 7.11(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.91-7.95(1H, m), 8.53(1H, dd, J = 9.1 Hz, 2.7 Hz), 9.06(1H, d, J = 2.7 Hz).
135	-H	$-CH_3$	$-CH_3$	2.64(3H, s), 3.91(3H, s), 7.02-7.10(3H, m), 8.03-8.06(1H, m), 8.52(1H, dd, J = 8.9 Hz, 2.7 Hz), 9.05(1H, dd, J = 2.7 Hz, 0.5 Hz).
136	-Cl	-H	$-CH_3$	3.95(3H, s), 7.17-7.20(1H, m), 7.31(1H, d, J = 8.6 Hz), 8.03-8.07(1H, m), 8.20(1H, d, J = 2.0 Hz), 8.55(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.98(1H, dd, J = 2.8 Hz, 0.5 Hz).
137	-F	-F	$-CH_3$	3.97(3H, s), 7.06-7.16(1H, m), 7.21(1H, dd, J = 0.3 Hz, 9.0 Hz), 7.77-7.88(1H, m), 8.56(1H, dd, J = 2.8 Hz, 9.0 Hz), 8.99(1H, dd, J = 0.3 Hz, 2.8 Hz)

Table 20



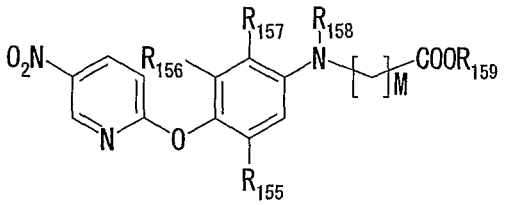
Reference Example No.	R_{151}	R_{152}	M	^{1}H NMR ($CDCl_3$) δppm
138	-H	-CH_3	2	2.64-2.70(2H, m), 2.97-3.02(2H, m), 3.69(3H, s), 7.01-7.10(3H, m), 7.26-7.30(2H, m), 8.47(1H, dd, J = 8.9 Hz, 2.6 Hz), 9.04(1H, d, J = 2.6 Hz).
139	-OCH_3	-C_2H_5	2	1.26(3H, t, J = 7.1 Hz), 2.67(2H, t, J = 7.5 Hz), 2.99(2H, t, J = 7.5 Hz), 3.74(3H, s), 4.16(2H, q, J = 7.1 Hz), 6.76-6.91(2H, m), 7.02(1H, d, J = 9.1 Hz), 7.06(1H, d, J = 8.0 Hz), 8.45(1H, dd, J = 9.1 Hz, 2.6 Hz), 9.01(1H, d, J = 2.6 Hz).
140	-H	-CH_3	1	3.67(2H, s), 3.72(3H, s), 7.04(1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.6 Hz), 7.38(2H, d, J = 8.6 Hz), 8.45-8.50(1H, m), 9.04(1H, d, J = 3.0 Hz).
141	-H	-C_2H_5	2	1.23(3H, t, J = 7.1 Hz), 2.63(2H, t, J = 7.8 Hz), 2.97(2H, t, J = 7.8 Hz), 4.11(2H, q, J = 7.1 Hz), 7.00(1H, d, J = 9.1 Hz), 7.06(2H, d, J = 8.5 Hz), 7.26(2H, d, J = 8.5 Hz), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, d, J = 2.8 Hz).
142	-OCH_3	-CH_3	2	2.66-2.71(2H, m), 2.97-3.02(2H, m), 3.70(3H, s), 3.74(3H, s), 6.83-6.88(2H, m), 7.01-7.08(2H, m), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).
143	-OC_2H_5	-C_2H_5	2	1.15(3H, t, J = 7.0 Hz), 1.26(3H, t, J = 7.1 Hz), 2.53-2.72(2H, m), 2.87-3.05(2H, m), 3.98(2H, q, J = 7.0 Hz), 4.15(2H, q, J = 7.1 Hz), 6.73-6.93(2H, m), 7.02(1H, d, J = 9.0 Hz), 7.07(1H, d, J = 8.0 Hz), 8.45(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).
144	-F	-C_2H_5	2	1.26(3H, t, J = 7.1 Hz), 2.57-2.71(2H, m), 2.89-3.06(2H, m), 4.15(2H, q, J = 7.1 Hz), 6.98-7.21(4H, m), 8.50(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).
145	-H	-C_2H_5	4	1.26(3H, t, J = 7.3 Hz), 1.60-1.80(4H, m), 2.30-2.40(2H, m), 2.60-2.75(2H, m), 4.13(2H, q, J = 7.3 Hz), 7.01(1H, d, J = 9.0 Hz), 7.06(2H, d, J = 8.6 Hz), 7.25(2H, d, J = 8.6 Hz), 8.46(1H, dd, J = 9.0 Hz, 3.0 Hz), 9.04(1H, d, J = 3.0 Hz).

Table 21



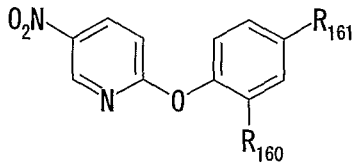
Reference Example No.	R_{153}	R_{154}	M	^{1}H NMR ($CDCl_3$) δppm or MS
146	-CH_3	-H	1	^{1}H NMR 1.32(3H, t, J = 7.1 Hz), 2.08(3H, s), 3.90(2H, d, J = 5.3 Hz), 4.15-4.39 (3H, m), 6.39-6.59(2H, m), 6.81-7.01(2H, m), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.4 Hz).
147	-CH_3	-Ac	1	^{1}H NMR 1.29(3H, t, J = 7.1 Hz), 1.99(3H, s), 2.17(3H, s), 4.22(2H, q, J = 7.1 Hz), 4.38(2H, s), 7.05-7.12(2H, m), 7.22-7.28(2H, m), 7.31(1H, s), 8.50(1H, d, J = 9.0 Hz), 9.01(1H, s).
148	-H	-H	1	^{1}H NMR 1.32(3H, t, J = 7.1 Hz), 3.91(2H, d, J = 5.4 Hz), 4.27(2H, q, J = 7.1 Hz), 4.37(1H, t, J = 5.4 Hz), 6.66(2H, d, J = 8.9 Hz), 6.96(1H, d, J = 9.1 Hz), 6.98(2H, d, J = 8.9 Hz), 8.43(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.05(1H, d, J = 2.8 Hz).
149	-H	-Ac	2	^{1}H NMR 1.23(3H, t, J = 7.1 Hz), 1.90(3H, s), 2.62(2H, t, J = 7.3 Hz), 4.03(2H, t, J = 7.3 Hz), 4.08(2H, q, J = 7.1 Hz), 7.10(1H, d, J = 9.0 Hz), 7.21-7.28(4H, m), 8.52(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz).
150	-F	-C_2H_5	1	^{1}H NMR 1.21-1.32(6H, m), 3.47(2H, q, J = 7.1 Hz), 4.01(2H, s), 4.23(2H, q, J = 7.1 Hz), 6.38-6.49(2H, m), 7.01-7.07(2H, m), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
151	-OCH_3	-C_2H_5	1	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 1.28(3H, t, J = 7.1 Hz), 3.50(2H, q, J = 7.1 Hz), 3.72(3H, s), 4.03(2H, s), 4.22(2H, q, J = 7.1 Hz), 6.23(1H, dd, J = 8.9 Hz, 2.8 Hz), 6.30(1H, d, J = 2.6 Hz), 6.95-6.99(2H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
152	-F	-CH_3	1	^{1}H NMR 1.28(3H, t, J = 7.1 Hz), 3.09(3H, s), 4.06(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.42-6.54(2H, m), 7.03-7.10(2H, m), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
153	-OCH_3	-H	1	^{1}H NMR 1.32(3H, t, J = 7.1 Hz), 3.72(3H, s), 3.92(2H, d, J = 5.3 Hz), 4.27(2H, q, J = 7.1 Hz), 4.41(1H, brt), 6.19(1H, dd, J = 8.4 Hz, 2.5 Hz), 6.29(1H, d, J = 2.5 Hz), 6.96-7.00(2H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
154	-F	-Ac	1	^{1}H NMR 1.30(3H, t, J = 7.1 Hz), 2.02(3H, s), 4.23(2H, q, J = 7.1 Hz), 4.38(2H, s), 7.16-7.33(4H, m), 8.54(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, dd, J = 2.8 Hz, 0.5 Hz).
155	-F	-H	1	^{1}H NMR 1.32(3H, t, J = 7.1 Hz), 3.89(2H, d, J = 5.3 Hz), 4.28(2H, q, J = 7.1 Hz), 4.35-4.55(1H, m), 6.31-6.50(2H, m), 6.91-7.11(2H, m), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, dd, J = 2.8 Hz, 0.4 Hz).
156	-CF_3	-CH_3	1	MS 399(M^+)
157	-CF_3	-C_2H_5	1	MS 413(M^+)

Table 22



Reference Example No.	R_{155}	R_{156}	R_{157}	R_{158}	R_{159}	M	^{1}H NMR or MS
158	-H	-H	-H	$-CH_3$	$-CH_3$	1	^{1}H NMR ($CDCl_3$) δ 3.10(3H, s), 3.74(3H, s), 4.09(2H, s), 6.72(2H, d, J = 9.1 Hz), 6.96 (1H, d, J = 9.0 Hz), 7.03(2H, d, J = 9.1 Hz), 8.43(1H, dd, J = 9.0 Hz, 2.9 Hz), 9.06(1H, d, J = 2.9 Hz).
159	-H	-H	-H	-Ac	$-C_2H_5$	1	^{1}H NMR (DMSO-d_6) δ 1.20(3H, t, J = 7.1 Hz), 1.87(3H, s), 4.12(2H, q, J = 7.1 Hz), 4.37 (2H, s), 7.28-7.35(3H, m), 7.48(2H, d, J = 8.7 Hz), 8.65(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.05 (1H, d, J = 2.9 Hz).
160	-H	-H	-H	$-CH_3$	$-CH_3$	2	^{1}H NMR ($CDCl_3$) δ 2.59-2.64(2H, m), 2.96 (3H, s), 3.67-3.72(5H, m), 6.76(2H, d, J = 9.1 Hz), 6.97(1H, d, J = 9.1 Hz), 7.05(2H, d, J = 8.9 Hz), 8.43(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.06(1H, d, J = 2.8 Hz).
161	-F	-H	-F	-H	$-C_2H_5$	1	^{1}H NMR ($CDCl_3$) δ 1.32(3H, t, J = 7.1 Hz), 3.91(2H, d, J = 5.5 Hz), 4.28(2H, q, J = 7.1 Hz), 4.57-4.71(1H, m), 6.43(1H, dd, J = 7.9 Hz, 11.6 Hz), 6.94(1H, dd, J = 7.0 Hz, 11.0 Hz), 7.08(1H, d, J = 9.0 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.01(1H, d, J = 2.8 Hz).
162	-F	-F	-H	$-CH_3$	$-C(CH_3)_3$	0	^{1}H NMR ($CDCl_3$) δ 1.51(9H, s), 3.30(3H, s), 6.95-7.10(2H, m), 7.21(1H, d, J = 9.1 Hz), 8.54(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.00(1H, d, J = 2.8 Hz).
163	$-CH_3$	-H	$-CH_3$	$-C_2H_5$	$-C_2H_5$	1	^{1}H NMR ($CDCl_3$) δ 1.08(3H, t, J = 7.1 Hz), 1.24(3H, t, J = 7.1 Hz), 2.07(3H, s), 2.28(3H, s), 3.21(2H, q, J = 7.1 Hz), 3.78(2H, s), 4.15 (2H, q, J = 7.1 Hz), 6.86(1H, s), 6.95(1H, d, J = 9.1 Hz), 7.07(1H, s), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, d, J = 2.8 Hz).
164	$-COOCH_3$	-H	-H	$-C_2H_5$	$-C(CH_3)_3$	1	MS 431(M^+)
165	$-CH_3$	-H	$-CH_3$	$-CH_3$	$-C_2H_5$	1	^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.1 Hz), 2.08(3H, s), 2.28(3H, s), 2.89(3H, s), 3.73(2H, s), 4.19(2H, q, J = 7.1 Hz), 6.85(1H, s), 6.96 (1H, d, J = 9.1 Hz), 7.01(1H, s), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, d, J = 2.8 Hz).
166	-CN	-H	-H	$-CH_3$	$-C(CH_3)_3$	1	MS 384(M^+)
167	-H	-H	$-CF_3$	$-C_2H_5$	$-C_2H_5$	1	MS 413(M^+)

Table 23



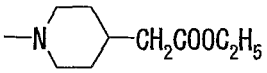
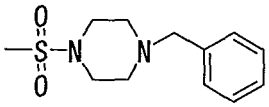
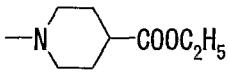
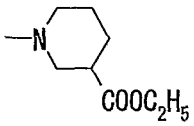
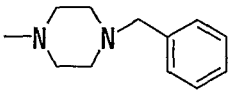
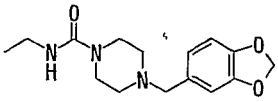
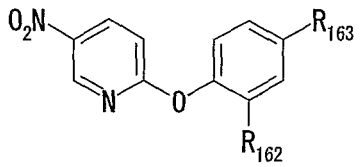
Reference Example No.	R_{160}	R_{161}	^{1}H NMR ($CDCl_3$) δppm
168	-H		1.27(3H, t, J = 7.0 Hz), 1.41-1.48(2H, m), 1.85 (2H, brd, J = 13.0 Hz), 1.95(1H, m), 2.29(2H, d, J = 7.0 Hz), 2.76(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.65 (2H, brd, J = 12.0 Hz), 4.16(2H, q, J = 7.0 Hz), 6.96-6.99(3H, m), 7.03(2H, d, J = 9.0 Hz), 8.44 (1H, dd, J = 9.0 Hz, 3.0 Hz), 9.05(1H, d, J = 3.0 Hz).
169	-H	morpholino	3.16-3.19(4H, m), 3.86-3.89(4H, m), 6.94-7.01 (3H, m), 7.05-7.11(2H, m), 8.45(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.05(1H, d, J = 3.0 Hz).
170	-H		2.47-2.62(4H, m), 2.96-3.14(4H, m), 3.49(2H, s), 7.11(1H, d, J = 9.0 Hz), 7.19-7.37(7H, m), 7.81 (2H, d, J = 8.7 Hz), 8.52(1H, dd, J = 9.0 Hz, 2.0 Hz), 9.02(1H, d, J = 2.0 Hz).
171	-H		1.28(3H, t, J = 7.0 Hz), 1.90(2H, dq, J = 4.0 Hz, 11.5 Hz), 2.04(2H, brd, J = 13.0 Hz), 2.43(1H, m), 2.82(2H, dt, J = 3.0 Hz, 12.0 Hz), 3.63(2H, dt, J = 13.0 Hz, 3.0 Hz), 4.17(2H, q, J = 7.0 Hz), 6.97-6.99(3H, m), 7.04(2H, d, J = 9.0 Hz), 8.44(1H, dd, J = 9.0 Hz, 3.0 Hz), 9.05(1H, d, J = 3.0 Hz).
172	-H		1.28(3H, t, J = 7.0 Hz), 1.70(2H, m), 1.84(1H, m), 2.04(1H, m), 2.69(1H, m), 2.86(1H, m), 3.08(1H, dd, J = 12.0 Hz, 10.0 Hz), 3.46(1H, brd, J = 12.0 Hz), 3.69(1H, dd, J = 12.0 Hz, 4.0 Hz), 4.18(2H, q, J = 7.0 Hz), 6.97-7.05(5H, m), 8.45(1H, dd, J = 9.0 Hz, 3.0 Hz), 9.06(1H, d, J = 3.0 Hz).
173	-COOCH3		2.61-2.64(4H, m), 3.24-3.28(4H, m), 3.58(2H, s), 3.68(3H, s), 7.03-7.16(3H, m), 7.26-7.36(5H, m), 7.54(1H, d, J = 2.8 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.97(1H, d, J = 2.8 Hz).
174	-H		2.43(4H, t, J = 5.1 Hz), 3.40(4H, t, J = 5.1 Hz), 3.43(2H, s), 4.46(2H, t, J = 5.5 Hz), 4.79(1H, t, J = 5.5 Hz), 5.95(2H, s), 6.74(2H, s), 6.85(1H, s), 7.05(1H, d, J = 9.1 Hz), 7.12(2H, d, J = 8.4 Hz), 7.40(2H, d, J = 8.4 Hz), 8.48(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
175	-CH3	-NHCOCOOC2H5	1.33(3H, t, J = 7.1 Hz), 2.07(3H, s), 4.32(2H, q, J = 7.1 Hz), 7.15(1H, d, J = 8.7 Hz), 7.27(1H, dd, J = 9.2 Hz, 0.5 Hz), 7.63(1H, dd, J = 8.6 Hz, 2.5 Hz), 7.71(1H, d, J = 2.5 Hz), 8.62(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, dd, J = 2.8 Hz, 0.5 Hz), 10.82(1H, brs).

Table 24



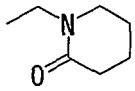
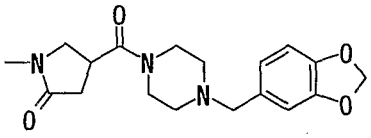
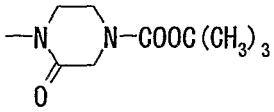
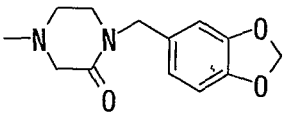
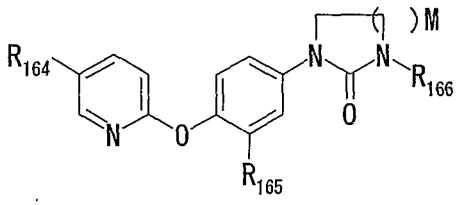
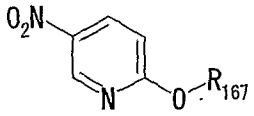
Reference Example No.	R_{162}	R_{163}	^{1}H NMR (solvent) δppm
176	-H	-Ac	($CDCl_3$) 2.60(3H, s), 7.10-9.00(7H, m).
177	-H	-CHO	($CDCl_3$) 7.14(1H, d, J = 9.0 Hz), 7.35(2H, d, J = 8.7 Hz), 8.00(2H, d, J = 8.7 Hz), 8.54(1H, dd, J = 9.0 Hz, 1.8 Hz), 9.04(1H, d, J = 1.8 Hz), 10.03(1H, s).
178	-H	$-C_2H_5$	($CDCl_3$) 1.28(3H, t, J = 7.6 Hz), 2.70(2H, q, J = 7.6 Hz), 7.01(1H, dd, J = 9.1 Hz, 0.7 Hz), 7.07(2H, d, J = 8.7 Hz), 7.28(2H, d, J = 8.7 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.7 Hz).
179	$-CH_3$	-CHO	($CDCl_3$) 2.25(3H, s), 7.14(1H, d, J = 8.9 Hz), 7.24(1H, d, J = 8.2 Hz), 7.81(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.85(1H, s), 8.53(1H, dd, J = 8.9 Hz, 2.6 Hz), 9.00(1H, d, J = 2.6 Hz), 10.00(1H, s).
180	-H		($CDCl_3$) 1.70-1.93(4H, m), 2.45-2.56(2H, m), 3.22-3.36(2H, m), 4.62(2H, s), 7.03(1H, d, J = 9.2 Hz), 7.12(2H, d, J = 8.6 Hz), 7.35(2H, d, J = 8.6 Hz), 8.47 (1H, dd, J = 9.2 Hz, 2.6 Hz), 9.04(1H, d, J = 2.6 Hz).
181	-H		($CDCl_3$) 2.46-2.47(4H, m), 2.77-2.99(2H, m), 3.46(2H, s), 3.51-3.57(4H, m), 3.64-3.73(1H, m), 3.90-3.96(1H, m), 4.30-4.36(1H, m), 5.96(2H, s), 6.75-6.86(3H, m), 7.04(1H, d, J = 9.1 Hz), 7.17(2H, d, J = 9.1 Hz), 7.70(2H, d, J = 8.9 Hz), 8.48(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.03(1H, d, J = 2.8 Hz).
182	-H		($CDCl_3$) 1.51(9H, s), 3.80(4H, m), 4.27(2H, s), 7.07(1H, d, J = 9.1 Hz), 7.21(2H, dd, J = 6.8 Hz, 2.1 Hz), 7.38(2H, dd, J = 6.8 Hz, 2.1 Hz), 8.49(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
183	-H		($CDCl_3$) 3.35-3.55(4H, m), 3.96(2H, s), 4.58(2H, s), 5.96(2H, s), 6.73-6.78(2H, m), 6.81(1H, s), 6.91(2H, d, J = 9.1 Hz), 7.00(1H, d, J = 9.1 Hz), 7.09(2H, d, J = 9.1 Hz), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
184	-H	-NHCONHPh	(DMSO-d_6) 6.96(1H, t, J = 6.5 Hz), 7.14(2H, d, J = 8.8 Hz), 7.21(1H, d, J = 9.1 Hz), 7.27(2H, t, J = 8.3Hz), 7.45(2H, d, J = 8.3 Hz), 7.52(2H, d, J = 8.8 Hz), 8.60(1H, dd, J = 2.8 Hz, 9.1 Hz), 8.70(1H, s), 8.77(1H, s), 9.02(1H, d, J = 2.8 Hz).

Table 25



Reference Example No.	R_{164}	R_{165}	R_{166}	M	mp (°C) or ^{1}H NMR (solvent) δppm
185	-NO_2	-CH_3	piperonyl	2	mp 142.0 - 143.0
186	-NO_2	-H	benzyl	1	^{1}H NMR (DMSO-d_6) 3.36(2H, t, J = 8.1 Hz), 3.84(2H, t, J = 8.1 Hz), 4.40(2H, s), 7.15-7.25(3H, m), 7.26-7.34(3H, m), 7.35-7.41(2H, m), 7.61-7.71(2H, m), 8.59(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.02(1H, d, J = 9.1 Hz).
187	-NO_2	-CH_3	piperonyl	1	^{1}H NMR (DMSO-d_6) 2.05(3H, s), 3.29-3.41(2H, m), 3.71-3.88(2H, m), 4.29(2H, s), 5.60(2H, s), 6.74-6.81(1H, m), 6.82-6.92(2H, m), 7.09(1H, d, J = 8.8 Hz), 7.21(1H, d, J = 9.1 Hz), 7.49(1H, d, J = 2.6 Hz, 8.8 Hz), 7.51-7.57(1H, m), 8.60(1H, d, J = 9.1 Hz), 9.00(1H, d, J = 2.9 Hz).
188	-NO_2	-CH_3	3,4-$(CH_3O)_2PhCH_2$-	2	^{1}H NMR ($CDCl_3$) 2.00-2.15(2H, m), 2.14(3H, s), 3.31(2H, t, J = 6.0 Hz), 3.73(2H, d, J = 6.0 Hz), 3.88(3H, s), 3.89(3H, s), 4.57(2H, s), 6.83(1H, d, J = 8.1 Hz), 6.87(1H, dd, J = 1.9 Hz, 8.1 Hz), 6.91(1H, d, J = 1.9 Hz), 6.98-7.06(2H, m), 7.20(1H, dd, J = 2.4 Hz, 8.6 Hz), 7.29(1H, d, J = 2.4 Hz), 8.46(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.04(1H, d, J = 2.8 Hz).
189	-NO_2	-CH_3	-$CH_2COOC(CH_3)_3$	2	^{1}H NMR ($CDCl_3$) 1.48(9H, s), 2.12(3H, s), 2.12-2.24(2H, m), 3.48(2H, t, J = 5.9 Hz), 3.77(2H, t, J = 5.9 Hz), 4.05(2H, s), 6.92-7.06(2H, m), 7.17(1H, dd, J = 2.6 Hz, 8.6 Hz), 8.45(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.04(1H, d, J = 2.9 Hz).
190	-Br	-CH_3	piperonyl	2	^{1}H NMR ($CDCl_3$) 1.94-2.18(2H, m), 2.15(3H, s), 3.30(2H, d, J = 6.0 Hz), 3.71(2H, d, J = 6.0 Hz), 4.52(2H, s), 5.95(2H, s), 6.69-6.82(3H, m), 6.88(1H, s), 7.00(1H, d, J = 8.6 Hz), 7.15(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.24(1H, d, J = 2.6 Hz), 7.73(1H, dd, J = 2.5 Hz, 8.6 Hz), 8.20(1H, d, J = 2.5 Hz).
191	-Br	-CH_3	3,4-$(CH_3O)_2PhCH_2$-	2	^{1}H NMR ($CDCl_3$) 1.95-2.11(2H, m), 2.14(3H, s), 3.30(2H, t, J = 5.9 Hz), 3.70(2H, t, J = 5.9 Hz), 3.88(3H, s), 3.88(3H, s), 4.56(2H, s), 6.74-6.92(4H, s), 7.00(1H, d, J = 8.5 Hz), 7.15(1H, dd, J = 2.4 Hz, 8.5 Hz), 7.24(1H, d, J = 2.4 Hz), 7.73(1H, dd, J = 2.6 Hz, 8.8 Hz), 8.19(1H, dd, J = 0.5 Hz, 2.6 Hz).

Table 26



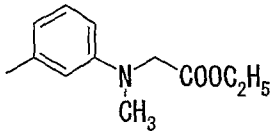
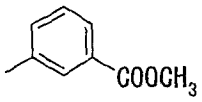
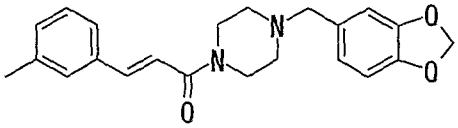
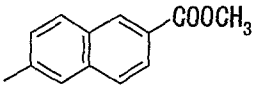
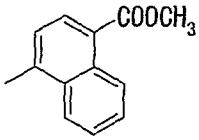
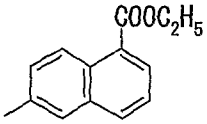
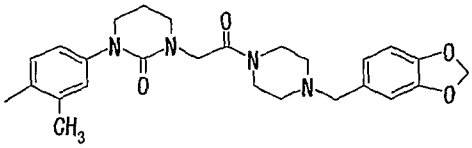
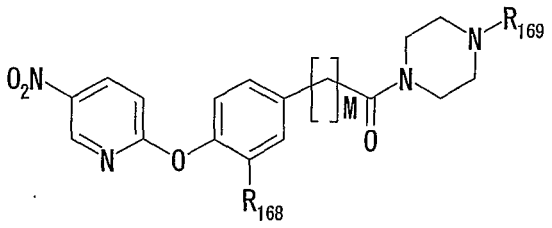
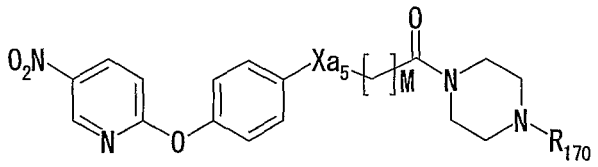
Reference Example No.	R_{167}	^{1}H NMR ($CDCl_3$) δppm or MS
192		^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 3.07(3H, s), 4.05(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.44-6.45(1H, m), 6.49-6.53(1H, m), 6.57-6.61(1H, m), 6.97(1H, d, J = 9.1 Hz), 7.25-7.31(1H, m), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.07(1H, d, J = 2.8 Hz).
193		^{1}H NMR 3.93(3H, s), 7.08-7.11(1H, m), 7.26-7.40(1H, m), 7.51-7.57(1H, m), 7.83-7.84(1H, m), 7.96-8.00(1H, m), 8.49-8.53(1H, m), 9.02-9.03(1H, m).
194		MS 488(M^+)
195		^{1}H NMR 4.00(3H, s), 7.14(1H, d, J = 8.9 Hz), 7.37(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.67 (1H, d, J = 2.3 Hz), 7.87(1H, d, J = 8.6 Hz), 8.04(1H, d, J = 8.9 Hz), 8.11(1H, dd, J = 8.6 Hz, 1.7 Hz), 8.51-8.55(1H, m), 8.64(1H, brs), 9.05 (1H, d, J = 2.8 Hz).
196		^{1}H NMR 4.03(3H, s), 7.20(1H, d, J = 9.1 Hz), 7.31(1H, d, J = 8.1 Hz), 7.51-7.57(1H, m), 7.65-7.71(1H, m), 7.94(1H, d, J = 8.4 Hz), 8.29(1H, d, J = 8.1 Hz), 8.55(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.99(1H, d, J = 2.8 Hz), 9.05(1H, d, J = 8.7 Hz).
197		^{1}H NMR 1.47(3H, t, J = 7.1 Hz), 4.49(2H, t, J = 7.1 Hz), 7.11(1H, d, J = 8.9 Hz), 7.42 (1H, dd, J = 9.4 Hz, 2.5 Hz), 7.52-7.58(1H, m), 7.67(1H, d, J = 2.5 Hz), 7.99(1H, d, J = 8.2 Hz), 8.21(1H, dd, J = 7.3 Hz, 1.2 Hz), 8.51 (1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04-9.08 (2H, m).
198		^{1}H NMR ($CDCl_3$) 2.11(3H, s), 2.19(2H, t, J = 5.9 Hz), 2.34-2.50(4H, m), 3.42(2H, s), 3.40-3.47(2H, m), 3.51(2H, t, J = 5.9 Hz), 3.56-3.76(2H, m), 3.78(2H, t, J = 5.7 Hz), 4.20(2H, s), 5.94(2H, s), 6. 69-6.77(2H, m), 6.84(1H, d, J = 1.0 Hz), 6.96-7.02(2H, m), 7.17(1H, dd, J = 2.6 Hz, 8.5 Hz), 7.24-7.28 (1H, m), 8.45(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.04(1H, d, J = 2.8 Hz).

Table 27



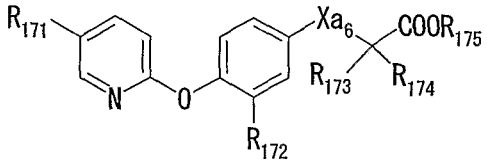
Reference Example No.	R_{168}	R_{169}	M	^{1}H NMR (solvent) δppm
199	-H	benzyl	2	($CDCl_3$) 2.36-2.45(4H, m), 2.63-2.68(2H, m), 2.99-3.05(2H, m), 3.41-3.45(2H, m), 3.52(2H, s), 3.64-3.67(2H, m), 7.01-7.11(3H, m), 7.29-7.34(7H, m), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
200	-H	piperonyl	2	($CDCl_3$) 2.33-2.41(4H, m), 2.62-2.67(2H, m), 2.98-3.04(2H, m), 3.39-3.43(4H, m), 3.62-3.65(2H, m), 5.94(2H, s), 6.73-6.77(2H, m), 6.84(1H, s), 7.00-7.10(3H, m), 7.26-7.31(2H, m), 8.44-8.48 (1H, m), 9.03(1H, dd, J = 3.0 Hz, 0.5 Hz).
201	-F	benzyl	0	($CDCl_3$) 2.49(4H, brs), 3.49-3.56(4H, m), 3.79(2H, brs), 7.15(1H, d, J = 8.9 Hz), 7.24-7.38(8H, m), 8.53(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.99(1H, d, J = 2.8 Hz).
202	-H	benzyl	0	(DMSO-d_6) 2.41(4H, brs), 3.33(2H, brs), 3.52(4H, brs), 7.24-7.27(8H, m), 7.50(2H, d, J = 7.9 Hz), 8.64(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
203	-H	4-CH_3OPhCH_2-	0	($CDCl_3$) 2.46(4H, brs), 3.44-3.90(4H, m), 3.49(2H, s), 3.81(3H, s), 6.85-6.89(2H, m), 7.06(1H, d, J = 8.9 Hz), 7.18-7.27(4H, m), 7.48-7.53(2H, m), 8.48-8.52(1H, m), 9.03(1H, d, J = 2.8 Hz).
204	-H	piperonyl	0	($CDCl_3$) 2.46(4H, brs), 3.46(2H, s), 3.52(2H, brs), 3.77(2H, brs), 5.95(2H, s), 6.75(2H, s), 6.86(1H, s), 7.07(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.20(2H, d, J = 8.6 Hz), 7.51(2H, d, J = 8.6 Hz), 8.50(1H, dd, J = 8.9 Hz, 2.8 Hz), 9.03(1H, dd, J = 2.8 Hz, 0.5 Hz).
205	-H	3-pyridyl	0	($CDCl_3$) 3.27(4H, brs), 3.84(4H, brs), 7.08-7.12(1H, m), 7.21-7.27(4H, m), 7.54-7.59(2H, m), 8.16-8.18(1H, m), 8.34(1H, brs), 8.52(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.5 Hz).

Table 28



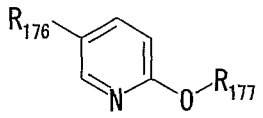
Reference Example No.	Xa_5	R_{170}	M	^{1}H NMR ($CDCl_3$) δppm
206	-O-	piperonyl	1	2.43(4H, brs), 3.42(2H, s), 3.58(2H, t, J = 5.0 Hz), 3.64 (2H, t, J = 5.0 Hz), 4.70(2H, s), 5.95(2H, s), 6.70-6.79(2H, m), 6.84(1H, d, J = 0.6 Hz), 7.01(3H, d, J = 9.1 Hz), 7.09(2H, d, J = 9.1 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
207	-CH(OH)-	benzyl	0	1.90-2.05(1H, m), 2.21-2.68(3H, m), 3.11-3.25(1H, m), 3.28-3.40(1H, m), 3.45(2H, s), 3.73(2H, t, J = 5.1 Hz), 4.77(1H, d, J = 6.3 Hz), 5.24(1H, d, J = 6.3 Hz), 7.04(1H, d, J = 8.9 Hz), 7.16(2H, d, J = 8.7 Hz), 7.21-7.35(5H, m), 7.38(2H, d, J = 8.7 Hz), 8.48(1H, dd, J = 8.9 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
208		piperonyl	1	0.65-0.70(2H, m), 0.81-0.88(2H, m), 2.41-2.48(4H, m), 2.77-2.85(1H, m), 3.45(2H, s), 3.49-3.52(2H, m), 3.60-3.63(2H, m), 4.20(2H, s), 5.95(2H, s), 6.71-6.78(2H, m), 6.86(1H, brs), 6.90-7.02(5H, m), 8.39-8.44(1H, m), 9.06(1H, d, J = 2.8 Hz).
209	-O-	benzyl	1	2.45(4H, t, J = 4.5 Hz), 3.52(2H, s), 3.59(2H, t, J = 4.9 Hz), 3.65(2H, t, J = 4.9 Hz), 4.70(2H, s), 7.00(2H, d, J = 9.2 Hz), 7.01(1H, d, J = 9.0 Hz), 7.08(2H, d, J = 9.2 Hz), 7.21-7.40(5H, m), 8.46(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
210	-N(CH_3)-	benzyl	0	2.32(4H, brs), 3.24(3H, s), 3.28(4H, brs), 3.48(2H, brs), 7.04(1H, d, J = 9.1 Hz), 7.11(2H, d, J = 9.0 Hz), 7.15(2H, d, J = 9.0 Hz), 7.22-7.40(5H, m), 8.48(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).

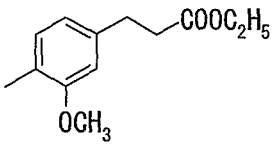
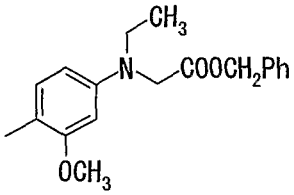
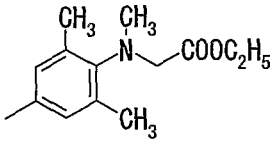
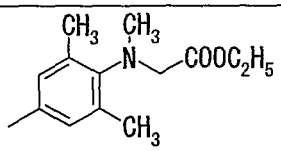
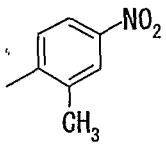
Table 29



Reference Example No.	R_{171}	R_{172}	Xa_6	R_{173}	R_{174}	R_{175}	^{1}H NMR ($CDCl_3$) δppm or MS
211	$-NO_2$	-H	$-N(CH_3)-$	$-CH_3$	-H	$-C_2H_5$	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 1.50(3H, d, J = 7.1 Hz), 2.93(3H, s), 4.18(2H, q, J = 7.1 Hz), 4.48(1H, q, J = 7.3 Hz), 6.82(2H, d, J = 9.2 Hz), 6.97(1H, d, J = 9.1 Hz), 7.03(2H, d, J = 9.0 Hz), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, d, J = 2.8 Hz).
212	$-NO_2$	-H	$-N(CH_3)-$	$-CH_3$	$-CH_3$	$-C_2H_5$	^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 1.46(6H, s), 2.94(3H, s), 4.18(2H, q, J = 7.1 Hz), 6.97(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.00-7.08(4H, m), 8.45(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.5 Hz).
213	$-NO_2$	$-CH_3$	$-N(CH_3)-$	$-CH_3$	-H	$-C_2H_5$	^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 1.49(3H, d, J = 7.3 Hz), 2.10(3H, s), 2.91(3H, s), 4.13-4.24(2H, m), 4.48(1H, q, J = 7.3 Hz), 6.64-6.68(2H, m), 6.91-6.96(2H, m), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, dd, J = 2.8 Hz, 0.5 Hz).
214	$-NO_2$	-H	none	$-CH_3$	$-CH_3$	$-CH_3$	MS 316(M^+)
215	-Br	$-OCH_3$	$-CH_2-$	-H	-H	$-C_2H_5$	^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 2.63-2.68 (2H, m), 2.94-3.00(2H, m), 3.75(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.80-6.86(3H, m), 7.03(1H, d, J = 7.9 Hz), 7.73(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.16(1H, dd, J = 2.6 Hz, 0.7 Hz).
216	$3,4-Cl_2PhCH_2NHCO-$	-H	$-CH_2-$	-H	-H	$-C_2H_5$	MS 472(M^+)
217	$4-CF_3PhCH_2NHCO-$	-H	$-CH_2-$	-H	-H	$-C_2H_5$	MS 472(M^+)

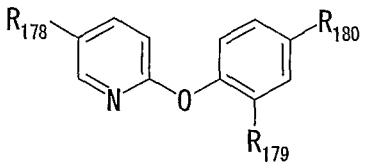
Table 30



Reference Example No.	R_{176}	R_{177}	^{1}H NMR ($CDCl_3$) δppm or MS
218	4-CF_3PhCO-		^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 2.64-2.69(2H, m), 2.95-3.01(2H, m), 3.76(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.83-6.89(2H, m), 7.03-7.10(2H, m), 7.73-7.76(2H, m), 7.86-7.89(2H, m), 8.21(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.55(1H, dd, J = 2.5 Hz, 0.7 Hz).
219	3,4-Cl_2PhNHCO-		^{1}H NMR 1.20(3H, t, J = 7.1 Hz), 3.44(2H, q, J = 7.1 Hz), 3.56(3H, s), 4.04(2H, s), 5.17(2H, s), 6.15-6.18(2H, m), 6.83(1H, d, J = 8.7 Hz), 6.88(1H, d, J = 8.9 Hz), 7.29-7.35(6H, m), 7.44(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.82(1H, d, J = 2.3 Hz), 8.10(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.59(1H, d, J = 2.5 Hz), 8.72(1H, brs).
220	3,4-Cl_2PhNHCO-		MS 501(M^+)
221	4-CF_3PhNHCO-		MS 501(M^+)
222	-$COOC_2H_5$	4-NO_2Ph-	^{1}H NMR 1.40(3H, t, J = 7.1 Hz), 4.40(2H, q, J = 7.1 Hz), 7.08(1H, d, J = 8.6 Hz), 7.32(2H, d, J = 9.0 Hz), 8.31(2H, d, J = 9.0 Hz), 8.37(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.82(1H, d, J = 2.3 Hz).
223	4-CF_3PhNHCO-	4-CHOPh-	MS 386(M^+)
224	-$COOC_2H_5$		^{1}H NMR 1.39(3H, t, J = 7.1 Hz), 2.28(3H, s), 4.39(2H, q, J = 7.1 Hz), 7.07(1H, dd, J = 8.6 Hz, 0.5 Hz), 7.21(1H, d, J = 8.9 Hz), 8.13(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.20(1H, d, J = 2.8 Hz), 8.36(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.78(1H, dd, J = 2.8 Hz, 0.5 Hz).

(CHOPh means a formylphenyl group. Hereinafter CHOPh indicates the same meaning.)

Table 31



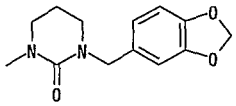
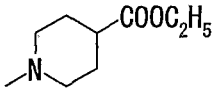
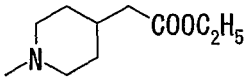
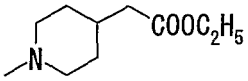
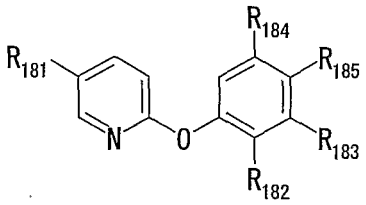
Reference Example No.	R_{178}	R_{179}	R_{180}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
225	4-CF_3PhNHCO-	-CH_3	-NHCOCOOC$_2$H$_5$	free	^{1}H NMR (DMSO-d$_6$) 1.33(3H, t, J = 7.1 Hz), 2.08(3H, s), 4.33(2H, q, J = 7.1 Hz), 7.12 (1H, d, J = 8.7 Hz), 7.17 (1H, d, J = 8.6 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.72-7.75(3H, m), 7.98(2H, d, J = 8.7 Hz), 8.37(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.69(1H, d, J = 2.5 Hz), 10.62(1H, brs), 10.81(1H, brs).
226	3,4-Cl_2PhNHCO-	-CH_3		hydro-bromide	mp 132.0 - 134.0
227	-NO_2	-CH_3		free	^{1}H NMR ($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 1.86-1.95(2H, m), 2.02-2.06(2H, m), 2.10(3H, s), 2.40-2.48(1H, m), 2.76-2.85(2H, m), 3.61-3.65(2H, m), 4.17(2H, q, J = 7.1 Hz), 6.79-6.97(4H, m), 8.43(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.04(1H, d, J = 2.8 Hz).
228	-NO_2	-OCH_3		free	^{1}H NMR ($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 1.41-1.50(2H, m), 1.84-2.04(3H, m), 2.30(2H, d, J = 6.9 Hz), 2.78(2H, dd, J = 12. 0 Hz, 9.7 Hz), 3.65(2H, d, J = 12.4 Hz), 3.73(3H, s), 4.16(2H, q, J = 7.3 Hz), 6.53(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.59 (1H, d, J = 2.6 Hz), 6.96-7.02(2H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
229	-NO_2	-CH_3		free	^{1}H NMR ($CDCl_3$) 1.27(3H, t, J = 7.1 Hz), 1.37-1.49(2H, m), 1.83-2.03(3H, m), 2.10(3H, s), 2.29(2H, d, J = 6.9 Hz), 2.74(2H, dd, J = 12.2 Hz, 10.1 Hz), 3.64(2H, d, J = 12.4 Hz), 4.15 (2H, q, J = 7.3 Hz), 6.77-6.83(2H, m), 6.91-6.97(2H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, d, J = 2.8 Hz).

Table 32



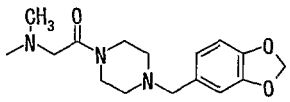
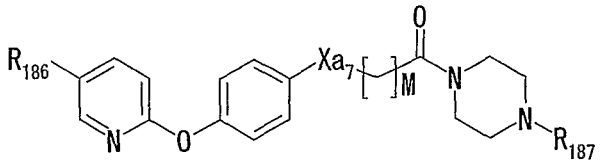
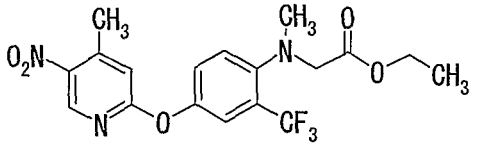
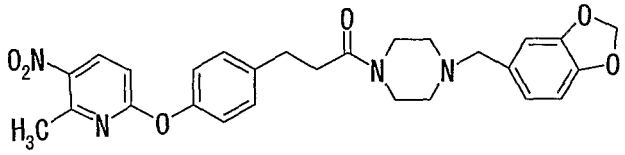
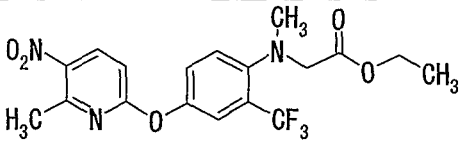
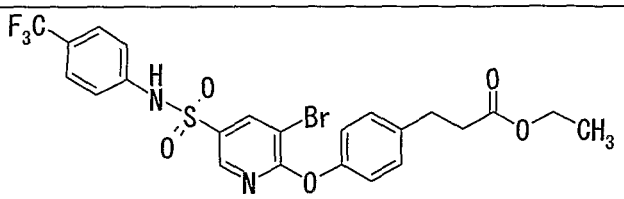
Reference Example No.	R_{181}	R_{182}	R_{183}	R_{184}	R_{185}	^{1}H NMR ($CDCl_3$) δppm or MS
230	-Br	$-CH_3$	-H	-H		^{1}H NMR 2.09(3H, s), 2.41-2.45(4H, m), 3.01(3H, s), 3.43(2H, s), 3.49(2H, brs), 3.63(2H, brs), 4.07 (2H, brs), 5.93(2H, s), 6.51-6.56(2H, m), 6.68-6.77(3H, m), 6.85-6.91(2H, m), 7.68(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.19(1H, d, J = 2.5 Hz).
231	3,4-Cl_2PhNHCO-	-H	$-CF_3$	-H	$-N(CH_3)CH_2COOC_2H_5$	MS 541(M^+)
232	4-CF_3PhNHCO-	-H	$-CF_3$	-H	$-N(CH_3)CH_2COOC_2H_5$	MS 541(M^+)
233	3,4-Cl_2PhCH_2NHCO-	-H	$-CF_3$	-H	$-N(CH_3)CH_2COOC_2H_5$	MS 555(M^+)
234	4-CF_3CH_2NHCO-	-H	$-CF_3$	-H	$-N(CH_3)CH_2COOC_2H_5$	MS 555(M^+)
235	-Br	-F	-H	-F	$-N(CH_3)CH_2COOC_2H_5$	^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 2.99(3H, s), 4.03(2H, s), 4.18 (2H, q J = 7.1 Hz), 6.76(1H, d, J = 8.2 Hz, 12.1 Hz), 6.84-6.95(2H, m), 7.77(1H, dd, J = 2.6 Hz, 8.7 Hz), 8.17(1H, d, J = 2.6 Hz).

Table 33



Reference Example No.	R_{186}	Xa_7	R_{187}	M	^{1}H NMR (solvent) δppm
236	-$COOC_2H_5$	-CH_2-	piperonyl	1	(DMSO-d_6) 1.31(3H, t, J = 7.0 Hz), 2.28(4H, brs), 2.60-2.66(2H, m), 2.80-2.86(2H, m), 3.38(2H, s), 3.40-3.46(4H, m), 4.31(2H, q, J = 7.0 Hz), 5.98(2H, s), 6.72-6.76(1H, m), 6.84(2H, d, J = 8.4 Hz), 7.06-7.11(3H, m), 7.30(2H, d, J = 8.4 Hz), 8.30(1H, dd, J = 8.6 Hz, 2.4 Hz), 8.68(1H, d, J = 2.4 Hz).
237	-$COOC_2H_5$	none	benzyl	0	($CDCl_3$) 1.39(3H, t, J = 7.3 Hz), 2.48(4H, brs), 3.55-3.91(6H, m), 4.38(2H, q, J = 7.3 Hz), 6.97(1H, d, J = 8.6 Hz), 7.17-7.19(2H, m), 7.20-7.34(5H, m), 7.46-7.49(2H, m), 8.31(1H, dd, J = 8.6 Hz, 2.4 Hz), 8.82(1H, d, J = 2.4 Hz).
238	-Br	-N(CH_3)-	piperonyl	1	($CDCl_3$) 2.41-2.45(4H, m), 3.03(3H, s), 3.43(2H, s), 3.47-3.51(2H, m), 3.61-3.65(2H, m), 4.09(2H, s), 5.95(2H, s), 6.68-6.85(6H, m), 6.96-7.02(2H, m), 7.70(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.20(1H, d, J = 2.5 Hz).
239	-Br	-CH_2-	piperonyl	1	($CDCl_3$) 2.31-2.41(4H, m), 2.59-2.65(2H, m), 2.95-3.00(2H, m), 3.38-3.42(4H, m), 3.61-3.65(2H, m), 5.95(2H, s), 6.70-6.77(2H, m), 6.81-6.84(2H, m), 7.01-7.06(2H, m), 7.22-7.27(2H, m), 7.76(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.20-8.21(1H, m).
240	-Br	none	benzyl	0	($CDCl_3$) 2.47(4H, brs), 3.49-3.55(6H, m), 6.86(1H, d, J = 8.6 Hz), 7.14(2H, d, J = 8.6 Hz), 7.28-7.33(5H, m), 7.45(2H, d, J = 8.6 Hz), 7.80(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.22(1H, d, J = 2.5 Hz).
241	-$COOCH_3$	-N(CH_3)-	piperonyl	1	($CDCl_3$) 2.41-2.45(4H, m), 3.04(3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.63(2H, s), 3.91(3H, s), 4.10(2H, s), 5.95(2H, s), 6.69-6.75(4H, m), 6.84(1H, dd, J = 8.7 Hz, 0.7 Hz), 6.85(1H, brs), 7.02(2H, d, J = 9.2 Hz), 8.21(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.82(1H, dd, J = 2.5 Hz, 0.7 Hz).
242	-$COOC_2H_5$	none	piperonyl	0	($CDCl_3$) 1.39(3H, t, J = 7.1 Hz), 2.45(4H, brs), 3.45(2H, s), 3.54-3.75(4H, m), 4.38(2H, q, J = 7.1 Hz), 5.95(2H, s), 6.71-6.75(2H, m), 6.86(1H, s), 6.97(1H, d, J = 8.6 Hz), 7.19(2H, d, J = 8.6 Hz), 7.48(2H, d, J = 8.7 Hz), 8.30(1H, dd, J = 2.3 Hz, 8.6 Hz), 8.82(1H, d, J = 2.3 Hz).

Table 34

Reference Example No.	Chemical Structure	MS (M+)
243		413
244		504
245		413
246		574

Reference Example 247

Production of 4-(5-nitropyridin-2-yloxy)phenylamine

To a solution of sodium hydroxide (730 mg, 18.25 mmol) in methanol was added 4-aminophenol (2.00 g, 18.32 mmol). After the resulting mixture was made to dissolve, methanol was evaporated under reduced pressure. To the residue was added DMF (20 mL), and then 2-chloro-5-nitropyridine (2.91 g, 18.35 mmol). The reaction solution was stirred for 1.5 hours at 70°C, and then concentrated under reduced pressure. Water was added to the residue, and the resulting solution was extracted with ethyl acetate. The ethyl acetate layer was washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, after which

solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 1), to thereby yield 3.37 g of the title compound.

Appearance: Black-red powder

^{1}H NMR (DMSO-d_6) δ 5.10(2H, s), 6.61(2H, d, J = 8.9 Hz), 6.85(2H, d, J = 8.9 Hz), 7.08(1H, d, J = 9.0 Hz), 8.55(1H, dd, J = 9.0 Hz, 3.0 Hz), 9.01(1H, d, J = 3.0 Hz).

The following compounds were produced in the same manner as in Reference Example 247.

Table 35

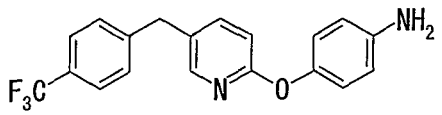
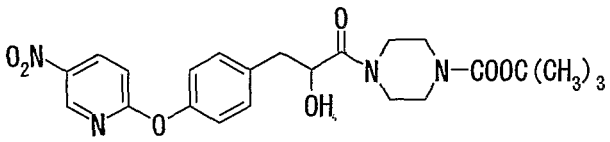
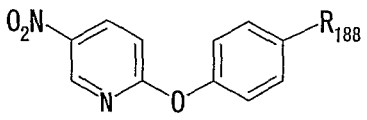
Reference Example No.	Chemical Structure	^{1}H NMR (solvent) δppm
248		(DMSO-d_6) 4.03(2H, s), 6.96(1H, d, J = 8.4 Hz), 7.10(2H, d, J = 8.9 Hz), 7.17(2H, d, J = 8.9 Hz), 7.48(2H, d, J = 8.1 Hz), 7.66(2H, d, J = 8.1 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.08(1H, d, J = 2.5 Hz), 9.12(2H, brs).
249		($CDCl_3$) 1.47(9H, s), 2.94(2H, d, J = 5.1 Hz), 3.10-3.80(9H, m), 4.62(1H, d, J = 5.1 Hz), 7.03(1H, d, J = 9.1 Hz), 7.10(2H, d, J = 8.5 Hz), 7.31(2H, d, J = 8.5 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).

Table 36



Reference Example No.	R_{188}	^{1}H NMR (solvent) δppm
250	-CH_2OH	($CDCl_3$) 4.74(2H, s), 7.04(1H, d, J = 8.9 Hz), 7.13-7.18(2H, m), 7.46(2H, d, J = 8.3 Hz), 8.48(1H, dd, J = 8.9 Hz, 2.6 Hz), 9.03(1H, d, J = 2.6 Hz).
251	-$(CH_2)_2OH$	($CDCl_3$) 2.91(2H, t, J = 6.6 Hz), 3.91(2H, t, J = 6.6 Hz), 7.03(1H, d, J = 9.2 Hz), 7.09-7.13(2H, m), 7.32(2H, d, J = 8.6 Hz), 8.47(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.04(1H, d, J = 3.0 Hz).
252	-$(CH_2)_2COOH$	($CDCl_3$) 2.73(2H, t, J = 7.9 Hz), 3.01(2H, t, J = 7.9 Hz), 7.03(1H, d, J = 8.9 Hz), 7.09(2H, d, J = 8.6 Hz), 7.30(2H, d, J = 8.6 Hz), 8.47(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.04(1H, d, J = 2.6 Hz).
253	-$(CH_2)_3COOH$	(DMSO-d_6) 2.01(2H, dq, J = 15.0 Hz, 7.2 Hz), 2.46(2H, t, J = 7.2 Hz), 2.72(2H, t, J = 7.2 Hz), 7.02(1H, d, J = 8.6 Hz), 7.08(2H, d, J = 8.6 Hz), 7.27(2H, d, J = 8.6 Hz), 8.46(1H, dd, J = 8.6 Hz, 3.0 Hz), 9.04(1H, d, J = 3.0 Hz).

Reference Example 254

Production of ethyl 3-[4-(3-nitrophenoxy)phenyl]-propionate

Under argon, to a solution of 3-iodonitrobenzene (3.00 g, 12.0 mmol) in pyridine (15 mL) were added ethyl 3-(4-hydroxyphenyl)propionate (2.81 g, 14.5 mmol), copper oxide (3.35 g, 42.2 mmol), and potassium carbonate (4.16 g, 30.1 mmol), and the resulting solution was heated to reflux for 40 hours. The reaction solution was concentrated under reduced pressure. Water and ethyl acetate were added to the residue, and once insoluble matter had been filtered off, and the filtrate was extracted with ethyl acetate out. The ethyl acetate layer was washed with 1 M hydrochloric acid, water and a saturated sodium

bicarbonate solution, and then washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 9 : 1 → 6 : 1), to thereby yield 1.12 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.23(3H, t, J = 7.1 Hz), 2.62(2H, t, J = 7.7 Hz), 2.95(2H, t, J = 7.7 Hz), 4.12(2H, q, J = 7.1 Hz), 6.96(2H, d, J = 8.6 Hz), 7.22(2H, d, J = 8.6 Hz), 7.29(1H, dd, J = 8.2 Hz, 2.3 Hz), 7.43(1H, t, J = 8.2 Hz), 7.74(1H, s), 7.90(1H, dd, J = 8.2 Hz, 2.3 Hz).

Reference Example 255

Production of 1-(*t*-butoxycarbonyl)-4-[4-(4-nitrophenoxy)phenyl]piperazine

Potassium carbonate (15.7 g, 114 mmol) was added to a solution of 2-chloro-5-nitropyridine (4.50 g, 28.4 mmol) and 1-(4-hydroxyphenyl)piperazine dihydrochloride (7.13 g, 28.4 mmol) in DMF (80 mL). The resulting solution was stirred at room temperature for 8 hours. To this reaction solution was added di-*t*-butyl dicarbonate (6.81 g, 31.2 mmol), and stirred at room temperature for 2.5 days. To the reaction solution was charged with ethyl acetate, washed with water, and dried with anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (ethyl acetate : *n*-hexane = 1 :

3), to thereby yield 7.05 g of the title compound.

Appearance: Yellow needles

^{1}H NMR ($CDCl_3$) δ 1.49(9H, s), 3.15(4H, t, J = 5.0 Hz), 3.59(4H, t, J = 5.0 Hz), 6.98(2H, d, J = 9.0 Hz), 7.00(1H, d, J = 9.0 Hz), 7.07(2H, d, J = 9.0 Hz), 8.45(1H, dd, J = 9.0 Hz, 2.5 Hz), 9.05(1H, d, J = 2.5 Hz).

Reference Example 256

Production of (ethyl{3-methoxy-4-[5-(4-trifluoromethylphenylcarbamoyl)pyridin-2-yloxy]phenyl}amino)acetate

Benzyl [ethyl (4-hydroxy-3-methoxyphenyl)amino]acetate (9.46 g, 30 mmol) and 6-chloro-N-(4-trifluoromethylphenyl)nicotinamide (9.02 g, 30 mmol) were dissolved in DMF (100 mL). To the resulting solution was added potassium carbonate (6.22 g, 45 mmol), and then stirred for 12 hours at 120°C. The reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate and extracted with water. The pH of the aqueous layer was adjusted from 3 to 4 with 1 M hydrochloric acid, after which the mixture was extracted with ethyl acetate. The organic layer was washed with brine and dried over anhydrous magnesium sulfate, and evaporated to thereby yield 4.2 g of the title compound.

Appearance: Brown powder

^{1}H NMR (DMSO-d_6) δ 1.19(3H, t, J = 7.1 Hz), 3.40(2H, q,

J = 7.1 Hz), 3.63(3H, s), 4.01(2H, s), 6.17(1H, d, J = 8.9 Hz), 6.22(1H, brs), 6.25(1H, d, J = 2.5 Hz), 6.87-6.90(2H, m), 7.53(2H, d, J = 8.6 Hz), 7.76(2H, d, J = 8.4 Hz), 8.18(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.67(1H, d, J = 2.1 Hz), 8.88(1H, brs).

Reference Example 257

Production of ethyl methyl [2,5-difluoro-4-(5-nitropyridin-2-yloxy)phenyl]aminoacetate

To a solution of ethyl (2,5-difluoro-4-hydroxyphenyl)aminoacetate (1.1 g, 4.8 mmol) in DMF (25 mL) were added sodium bicarbonate (0.44 g, 5.2 mmol) and methyl iodide (1.69 mL, 28.6 mmol), and the resulting reaction solution was stirred for 2 days at room temperature. Water was added to the reaction mixture, and extracted with ethyl acetate. Once the ethyl acetate layer had been washed with water, the ethyl acetate layer was dried with anhydrous magnesium sulfate, and evaporated. The residue was dissolved in DMF (30 mL), and to this resulting solution were added potassium carbonate (0.72 g, 5.2 mmol) and 2-chloro-5-nitropyridine (0.79 g, 5.0 mmol). The reaction solution was stirred for 2.5 days at room temperature. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, and dried over anhydrous magnesium sulfate. The solvent was then evaporated, and the residue was purified by silica gel chromatography (*n*-hexane : ethyl

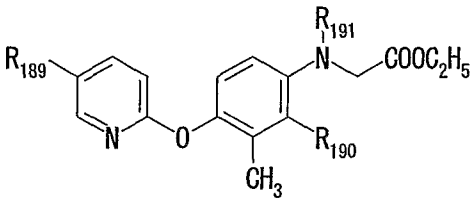
acetate = 8 : 1), to thereby yield 1.41 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.1 Hz), 3.01(3H, s), 4.05(2H, s), 4.19(2H, q, J = 7.1 Hz), 6.77(1H, dd, J = 8.2 Hz, 12.2 Hz), 6.92(1H, dd, J = 7.2 Hz, 12.8 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.02(1H, d, J = 2.8 Hz).

The following compounds were produced in the same manner as in Reference Example 257.

Table 37



Reference Example No.	R_{189}	R_{190}	R_{191}	^{1}H NMR ($CDCl_3$) δppm
258	$-NO_2$	$-CH_3$	$-CH_3$	1.27(3H, t, J = 7.1 Hz), 2.05(3H, s), 2.29(3H, s), 2.87(3H, s), 3.71(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.87(1H, d, J = 8.7 Hz), 6.97(1H, dd, J = 9.1 Hz, 0.3 Hz), 7.08(1H, d, J = 8.7 Hz), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, dd, J = 2.8 Hz, 0.3 Hz).
259	4-CF_3PhCO-	-H	$-C_2H_5$	1.23(3H, t, J = 7.1 Hz), 1.28(3H, t, J = 7.1 Hz), 2.12(3H, s), 3.46(2H, q, J = 7.1 Hz), 4.01(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.49-6.53(2H, m), 6.92-6.96(2H, m), 7.73-7.77(2H, m), 7.86-7.89(2H, m), 8.17(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.59(1H, dd, J = 2.5 Hz, 0.7 Hz).

Reference Example 260

Production of ethyl 4-{3-[3-methyl-4-(5-nitropyridin-2-

yloxy)phenyl]-2-oxotetrahydropyrimidin-1-yl}benzoate

Under a nitrogen atmosphere, to a solution of ethyl 4-[3-(4-benzyloxy-3-methyl)phenyl-2-oxotetrahydropyrimidin-1-yl]benzoate (1.82 g, 3.1 mmol) in ethanol-DMF (70 mL-30 mL) was added 10% palladium-carbon (0.4 g), and the resulting solution was stirred under a hydrogen atmosphere for 4 hours at room temperature. The resulting solution was filtered through Celite, and ethanol was evaporated under reduced pressure so as to give a DMF (30 mL) solution. To this solution was addde 2-chloro-5-nitropyridine (0.52 g, 3.3 mmol) and stirred under a nitrogen atmosphere for 14 hours at room temperature, and then for 3 hours at 40°C. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel chromatography (*n*-hexane : ethyl acetate = 10 : 1), to thereby yield 1.8 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.39(3H, t, J = 7.1 Hz), 2.14(3H, s), 2.21-2.40(2H, m), 3.75-3.97(4H, m), 4.36(2H, q, J = 7.1 Hz), 7.01(1H, d, J = 9.1 Hz), 7.06(1H, d, J = 8.6 Hz), 7.23(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.32(1H, d, J = 2.6 Hz), 7.40-7.49(2H, m), 7.97-8.07(2H, m), 8.46(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.04(1H, d, J = 2.8 Hz).

Reference Example 261

Production of 3-[4-(5-nitropyridin-2-ylsulfanyl)phenyl]propionic acid

To a solution of 2-chloro-5-nitropyridine (1.74 g, 11.0 mmol) and 4-mercaptohydrocinnamic acid (2.00 g, 11.0 mmol) in DMF (30 mL) was added potassium carbonate (4.55 g, 32.9 mmol), and the resulting solution was stirred for 1 hour at 80°C. To the reaction solution were added water and concentrated hydrochloric acid, and then cooled with ice. The precipitated solid matter was collected by filtration, to thereby yield 3.29 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR (DMSO-d_6) δ 2.60(2H, t, J = 7.5 Hz), 2.91(2H, t, J = 7.5 Hz), 7.07(1H, d, J = 9.0 Hz), 7.43(2H, d, J = 8.2 Hz), 7.57(2H, d, J = 8.2 Hz), 8.39(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.17(1H, d, J = 2.8 Hz), 12.19(1H, s).

Reference Example 262

Production of ethyl 3-[3-methoxy-4-(5-nitropyridin-2-ylamino)phenyl]propionate

To 2-chloro-5-nitropyridine (3.11 g, 20 mmol) were added ethyl 3-(4-amino-3-methoxyphenyl)propionate (4.38 g, 20 mmol) and acetic acid (10 mL), and the resulting solution was stirred for 13 hours at 100°C. To the reaction solution were added ethyl acetate and water. The ethyl acetate layer was separated, washed with brine, a saturated sodium bicarbonate solution and

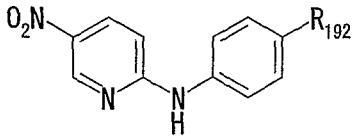
brine, and dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 2 : 1), to thereby yield 3.78 g of the title compound.

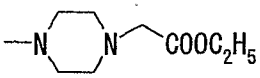
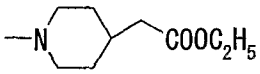
Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 1.26(3H, t, J = 7.1 Hz), 2.61-2.67(2H, m), 2.93-2.99(2H, m), 3.89(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.73(1H, d, J = 9.2 Hz), 6.81-6.87(2H, m), 7.43(1H, brs), 7.92(1H, d, J = 8.1 Hz), 8.23(1H, dd, J = 9.2 Hz, 2.8 Hz), 9.11(1H, d, J = 2.8 Hz).

The following compounds were produced in the same manner as in Reference Example 262.

Table 38



Reference Example No.	R_{192}	^{1}H NMR (solvent) δppm
263	$-COOC_2H_5$	(DMSO-d_6) 1.32(3H, t, J = 7.1 Hz), 4.29(2H, q, J = 7.1 Hz), 7.01(1H, d, J = 9.3 Hz), 7.89(2H, d, J = 8.9 Hz), 8.36(1H, dd, J = 2.9 Hz, 9.3 Hz), 9.09(1H, d, J = 2.9 Hz), 10.43(1H, s).
264	$-(CH_2)_2COOC_2H_5$	($CDCl_3$) 1.25(3H, t, J = 7.1 Hz), 2.64(2H, t, J = 7.6 Hz), 2.97(2H, t, J = 7.6 Hz), 4.14(2H, q, J = 7.1 Hz), 6.73(1H, d, J = 9.3 Hz), 7.20-7.40(4H, m), 8.23(1H, dd, J = 2.7 Hz, 9.3 Hz), 9.07(1H, d, J = 2.7 Hz).
265		($CDCl_3$) 1.30(3H, t, J = 7.1 Hz), 2.77(4H, t, J = 5.0 Hz), 3.28(4H, t, J = 5.0 Hz), 3.28(2H, s), 4.22(2H, q, J = 7.1 Hz), 6.61(1H, d, J = 9.4 Hz), 6.95(2H, d, J = 9.0 Hz), 7.11(1H, brs), 7.22(2H, d, J = 9.0 Hz), 8.18(1H, dd, J = 9.4 Hz, 2.5 Hz), 9.05(1H, d, J = 2.5 Hz).
266		($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 1.32-1.60(2H, m), 1.75-2.12(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.77(2H, td, J = 12.4 Hz, 2.4 Hz), 3.68(2H, d, J = 12.4 Hz), 4.16(2H, q, J = 7.1 Hz), 6.60(1H, d, J = 9.2 Hz), 6.96(2H, d, J = 8.9 Hz), 7.16(1H, brs), 7.20(2H, d, J = 8.9 Hz), 8.18(1H, dd, J = 9.2 Hz, 2.6 Hz), 9.05(1H, d, J = 2.6 Hz).

Reference Example 267

Production of 4-[(5-nitro-2-pyridyl)oxy]benzaldehyde ethylene acetal

To a solution of 4-[(5-nitro-2-pyridyl)oxy]benzaldehyde (5.00 g, 20.5 mmol) in benzene (100 mL) were added ethylene glycol (2.28 mL, 41.0 mmol) and *p*-toluenesulfonic acid (0.50 g), and the resulting solution was heated to reflux for 3 hours while removing water with a Dean-Stark. The reaction solution was washed with a saturated sodium bicarbonate solution, and subsequently washed with brine. The benzene layer was dried over anhydrous magnesium

sulfate, and evaporated, to thereby yield 5.88 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 4.00-4.19(4H, m), 5.83(1H, s), 7.00(1H, d, J = 9.0 Hz), 7.15(2H, d, J = 8.5 Hz), 7.55(2H, d, J = 8.5 Hz), 8.45(1H, dd, J = 9.0 Hz, 2.0 Hz), 9.01(1H, d, J = 2.0 Hz).

The following compound was produced in the same manner as in Reference Example 267.

Reference Example 268

4-(2-Fluoro-4-nitrophenoxybenzaldehyde ethylene acetal

^{1}H NMR (DMSO-d_6) δ 3.90-4.10(4H, m), 5.76(1H, s), 7.15-7.25(3H, m), 7.54(2H, d, J = 8.7 Hz), 8.10(1H, ddd, J = 1.3 Hz, 2.7 Hz, 9.1 Hz), 8.35(1H, dd, J = 2.7 Hz, 10.8 Hz).

Reference Example 269

Production of *t*-butyl [4-(5-nitropyridin-2-yloxy)phenyl]carbamate

To a solution of 4-(5-nitropyridin-2-yloxy)phenylamine (2.97 g, 12.85 mmol) in THF was added di-*t*-butyl dicarbonate (5.60 g, 25.66 mmol), and the resulting solution was stirred under reflux for 4 hours. The reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer

was washed with brine, dried over anhydrous magnesium sulfate, evaporated, and to the resulting product was added diethyl ether. The obtained white powder was filtered, and the resulting product was washed with diethyl ether, to thereby yield 3.04 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 1.53(9H, s), 6.53(1H, brs), 7.00(1H, d, J = 9.2 Hz), 7.09(2H, d, J = 8.9 Hz), 7.45(2H, d, J = 8.9 Hz), 8.46(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.03(1H, d, J = 3.0 Hz).

Reference Example 270

Production of 5-[3-methyl-4-(5-nitropyridin-2-yloxy)benzylidene]thiazolidine-2,4-dione

To a solution of 3-methyl-4-(5-nitropyridin-2-yloxy)benzaldehyde (600 mg, 2.32 mmol) in toluene (35 mL) were added 2,4-thiazolidinedione (270 mg, 2.31 mmol) and piperidine acetate (135 mg, 0.93 mmol). The resulting solution was attached to a Dean Stark, and stirred under reflux for 1.5 hours. After being left to cool for 17 hours at room temperature, the precipitated yellow powder was filtered, to thereby yield 600 mg of the title compound.

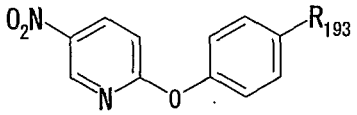
Appearance: Yellow powder

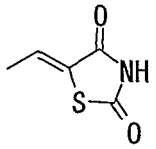
^{1}H NMR (DMSO-d_6) δ 2.15(3H, s), 7.33(1H, d, J = 8.4 Hz), 7.35(1H, d, J = 9.1 Hz), 7.52(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.59(1H, d, J = 2.0 Hz), 7.79(1H, s), 8.65(1H, dd,

J = 9.1 Hz, 3.0 Hz), 9.02(1H, d, J = 3.0 Hz), 12.63(1H, brs).

The following compounds were produced in the same manner as in Reference Example 270.

Table 39



Reference Example No.	R_{193}	^{1}H NMR (solvent) δppm
271		(DMSO-d_6) 7.35(1H, d, J = 9.0 Hz), 7.42(2H, d, J = 8.6 Hz), 7.71 (2H, d, J = 8.6 Hz), 7.84(1H, s), 8.65(1H, dd, J = 9.0 Hz, 2.9 Hz), 9.04(1H, d, J = 2.9 Hz), 12.64(1H, brs).
272	-CH=C(COOCH$_3$)$_2$	($CDCl_3$) 3.87(6H, s), 7.09(1H, d, J = 9.0 Hz), 7.20(2H, d, J = 8.5 Hz), 7.53(2H, d, J = 8.5 Hz), 7.77(1H, s), 8.51(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).

Reference Example 273

Production of N-[4-(2-fluoro-4-nitrophenoxy)phenyl]-N-[2-(4-piperonylpiperazin-1-yl)-2-oxyethyl]acetamide

To a solution of N-[4-(2-fluoro-4-nitrophenoxy)phenyl]acetamide (0.800 g, 2,76 mmol) in DMF (5 mL) was added 60% sodium hydride (0.118 g, 2.95 mmol). The resulting solution was stirred for 10 minutes at room temperature, after which a solution of 1-chloroacetyl-4-piperonylpiperazine (0.870 g, 2.96 mmol) in DMF (4 mL) was added to the reaction solution. The reaction solution was stirred for 2 hours at 60°C, and then for 1 hour at 100°C. Water was added to the

reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 5 : 1), to thereby yield 0.730 g of the title compound.

Appearance: Yellow oil

^{1}H NMR (DMSO-d_6) δ 1.82(3H, s), 2.20-2.40(4H, m), 3.30-3.50(6H, m), 4.43(2H, s), 5.98(2H, s), 6.70-6.85(3H, m), 7.20-7.30(3H, m), 7.48(2H, d, J = 8.8 Hz), 8.12(1H, ddd, J = 1.4 Hz, 2.7 Hz, 10.5 Hz), 8.36(1H, dd, J = 2.7 Hz, 10.7 Hz).

The following compound was produced in the same manner as in Reference Example 273.

Reference Example 274

3-(4-Benzyloxy-3-methylphenyl)-1-[2-oxo-2-(4-piperonylpiperazin-1-yl)ethyl]tetrahydropyrimidin-2-one

^{1}H NMR (DMSO-d_6) δ 1.92-2.08(2H, m), 2.15(3H, s), 2.22-2.40(4H, m), 3.25-3.49(8H, m), 3.56(2H, d, J = 5.6 Hz), 4.08(2H, s), 5.09(2H, s), 5.97(2H, s), 6.74(1H, dd J = 1.3 Hz, 7.9 Hz), 6.84(1H, d, J = 7.9 Hz), 6.85(1H, d, J = 1.3 Hz), 6.91(1H, d, J = 8.7 Hz), 6.95(1H, dd, J = 2.5 Hz, 8.6 Hz), 7.01(1H, d, J = 2.5 Hz), 7.28-7.34(1H, m), 7.36-7.41(2H, m), 7.42-7.48(2H, m).

Reference Example 275

Production of 2-dimethylamino-N-[4-(5-nitropyridin-2-yloxy)phenyl]-N-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]acetamide

To a solution of 2-chloro-N-[4-(5-nitropyridin-2-yloxy)phenyl]-N-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]acetamide (0.300 g, 0.528 mmol) in acetonitrile (3 mL) was added at room temperature dimethylamine (0.150 mL, 1.63 mmol), and the resulting solution was stirred for 2 hours at 50°C. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 10 : 1), to thereby yield 0.270 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 2.29(6H, s), 2.40-2.45(4H, m), 3.02(2H, s), 3.40-3.46(4H, m), 3.61(2H, s), 4.48(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 7.09(1H, d, J = 9.0 Hz), 7.19(2H, d, J = 8.7 Hz), 7.51(2H, d, J = 8.7 Hz), 8.51(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz).

Reference Example 276

Production of methyl 2-[4-(5-nitropyridin-2-yloxy)phenyl]propionate

To a solution of methyl 2-[4-(5-nitropyridin-2-yloxy)phenyl]acetate (0.50 g, 1.7 mmol) in DMF (10 mL) were added 60% sodium hydride (0.153 g, 3.8 mmol) and methyl iodide (0.13 mL, 2.1 mmol), and the resulting reaction solution was stirred for 1 hour at 0°C. To the reaction solution was added saturated aqueous ammonium chloride, and extracted with ethyl acetate. The ethyl acetate layer was washed with water and saturated aqueous sodium chloride. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel chromatography (*n*-hexane : ethyl acetate = 8 : 1), to thereby yield 0.32 g of the title compound.

Appearance: Colorless oil

^{1}H NMR ($CDCl_3$) δ 1.54(3H, d, J = 7.4 Hz), 3.69(3H, s), 3.78(1H, q, J = 7.2 Hz), 7.03(1H, d, J = 9.1 Hz), 7.09-7.15(2H, m), 7.36-7.41(2H, m), 8.48(1H, dd, J = 9.1, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).

Reference Example 277

Production of ethyl 3-{3-methoxy-4-[methyl (5-nitropyridin-2-yl)amino]phenyl}propionate

To a solution of ethyl 3-[3-methoxy-4-(5-nitropyridin-2-ylamino)phenyl]propionate (3.70 g, 11 mmol) in DMF (60 mL) were added under ice-cooling sodium hydride (60%, 490 mg, 12 mmol) and methyl iodide (0.77 mL, 12 mmol), and the resulting reaction solution was stirred for 2 hours gradually warming up to room

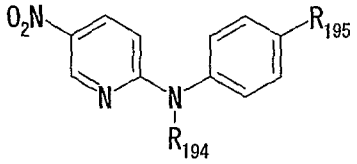
temperature. The reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate, washed with water and brine, and then dried with anhydrous magnesium sulfate. The solvent was evaporated, to thereby yield 4.27 g of the title compound.

Appearance: Yellow oil substance

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.1 Hz), 2.66-2.71(2H, m), 2.98-3.04(2H, m), 3.46(3H, s), 3.78(3H, s), 4.17(2H, q, J = 7.1 Hz), 6.12(1H, brd, J = 9.5 Hz), 6.87-6.90(2H, m), 7.11-7.14(1H, m), 7.97-8.02(1H, m), 9.11(1H, d, J = 2.7 Hz).

The following compounds were produced in the same manner as in Reference Example 277.

Table 40



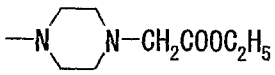
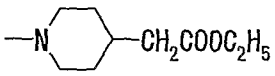
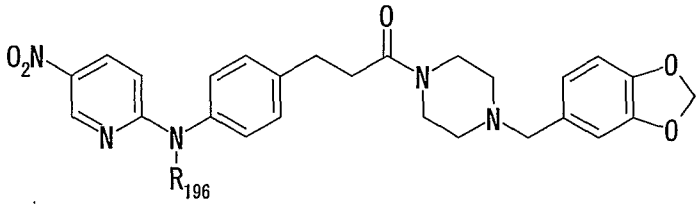
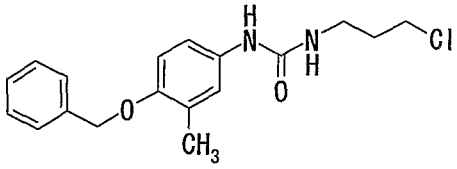
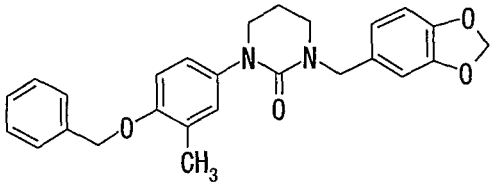
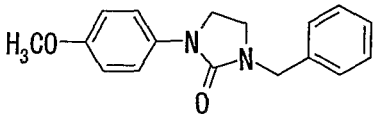
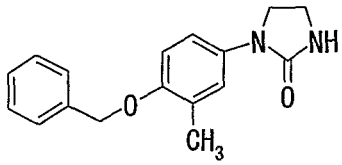
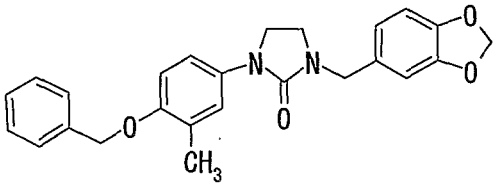
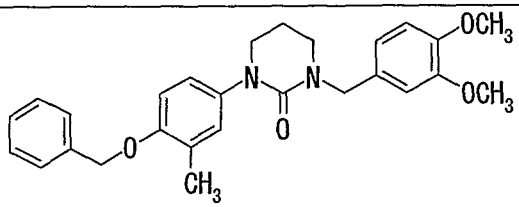
Reference Example No.	R_{194}	R_{195}	^{1}H NMR (solvent) δppm
278	$-CH_3$	$-COOC_2H_5$	(DMSO-d_6) 1.34(3H, t, J = 7.1 Hz), 3.56(3H, s), 4.34(2H, q, J = 7.1 Hz), 6.70(1H, d, J = 9.5 Hz), 7.55(2H, d, J = 8.6 Hz), 8.06(2H, d, J = 8.6 Hz), 8.21(1H, dd, J = 2.8 Hz, 9.5 Hz), 9.05(1H, d, J = 2.8 Hz).
279	$-CH_3$	$-(CH_2)_2COOC_2H_5$	($CDCl_3$) 1.26(3H, t, J = 7.1 Hz), 2.67(2H, t, J = 7.6 Hz), 3.01(2H, t, J = 7.6 Hz), 3.55(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.32(1H, d, J = 9.5 Hz), 7.17(2H, d, J = 8.3 Hz), 7.32(2H, d, J = 8.3 Hz), 8.01(1H, dd, J = 2.7 Hz, 9.5 Hz), 9.11(1H, d, J = 2.7 Hz).
280	benzyl	$-(CH_2)_2COOC_2H_5$	($CDCl_3$) 1.24(3H, t, J = 7.2 Hz), 2.64(2H, t, J = 7.7 Hz), 2.97(2H, t, J = 7.7 Hz), 4.14(2H, q, J = 7.2 Hz), 5.27(2H, s), 6.26(1H, d, J = 9.5 Hz), 7.06(2H, d, J = 8.3 Hz), 7.20-7.30(7H, m), 8.02(1H, dd, J = 2.7 Hz, 9.5 Hz), 9.12(1H, d, J = 2.7 Hz).
281	$-CH_3$		($CDCl_3$) 1.30(3H, t, J = 7.1 Hz), 2.78(4H, t, J = 5.0 Hz), 3.30(2H, s), 3.31(4H, t, J = 5.0 Hz), 3.53(3H, s), 4.22(2H, q, J = 7.1 Hz), 6.30(1H, d, J = 9.5 Hz), 6.99(2H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.9 Hz), 7.99 (1H, dd, J = 9.5 Hz, 2.8 Hz), 9.10(1H, d, J = 2.8 Hz).
282	$-CH_3$		($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 1.45(2H, qd, J = 12.2 Hz, 3.7 Hz), 1.80-2.17(3H, m), 2.30(2H, d, J = 6.9 Hz), 2.80(2H, td, J = 12.2 Hz, 2.3 Hz), 3.52(3H, s), 3.72(2H, d, J = 12.4 Hz), 4.16(2H, q, J = 7.1 Hz), 6.30(1H, d, J = 9.5 Hz), 6.98(2H, d, J = 8.9 Hz), 7.10(2H, d, J = 8.9 Hz), 7.98(1H, dd, J = 9.5 Hz, 2.8 Hz), 9.10(1H, d, J = 2.8 Hz).

Table 41



Reference Example No.	R_{196}	^{1}H NMR ($CDCl_3$) δppm
283	$-(CH_2)_2CH_3$	0.93(3H, t, J = 7.4 Hz), 1.60-1.70(2H, m), 2.35-2.43(4H, m), 2.66(2H, t, J = 8.1 Hz), 3.03(2H, t, J = 8.1 Hz), 3.42(2H, s), 3.43-3.45(2H, m), 3.62-3.65(2H, m), 3.96(2H, t, J = 7.7 Hz), 5.95(2H, s), 6.16(1H, d, J = 9.5 Hz), 6.70-6.80(2H, m), 6.84(1H, d, J = 1.3 Hz), 7.14(2H, d, J = 8.3 Hz), 7.33(2H, d, J = 8.3 Hz), 7.96(1H, dd, J = 2.8 Hz, 9.5 Hz), 9.08(1H, d, J = 2.8 Hz).
284	cyclopentyl	1.30-1.40(2H, m), 1.55-1.65(4H, m), 1.95-2.00(2H, m), 2.35-2.45(4H, m), 2.67(2H, t, J = 7.4 Hz), 3.04(2H, t, J = 7.4 Hz), 3.42(2H, s), 3.43-3.47(2H, m), 3.55-3.68(2H, m), 5.18-5.28(1H, m), 5.88(1H, d, J = 9.5 Hz), 5.95(2H, s), 6.70-6.78(2H, m), 6.84(1H, s), 7.04(2H, d, J = 8.2 Hz), 7.34(2H, d, J = 8.2 Hz), 7.92(1H, dd, J = 2.8 Hz, 9.5 Hz), 9.09(1H, d, J = 2.8 Hz).

Table 42

Reference Example No.	Chemical Structure	^{1}H NMR (solvent) δppm
285		($CDCl_3$) 1.91-2.06(2H, m), 2.27(3H, s), 3.31-3.44 (2H, m), 3.58(2H, t, J = 6.3 Hz), 4.69-4.85(1H, m), 5.07(2H, s), 6.04(1H, s), 6.84(1H, d, J = 10.1 Hz), 7.01(1H, dd, J = 8.5 Hz, 2.5 Hz), 7.04 (1H, d, J = 2.5 Hz), 7.30-7.36(1H, m), 7.37-7.46(4H, m).
286		($CDCl_3$) 1.96-2.11(2H, m), 2.27(3H, s), 3.20-3.34 (2H, m), 3.56-3.68(2H, m), 4.50(2H, s), 5.07(2H, s), 5.94(2H, s), 6.72-6.80(2H, m), 6.84(1H, d, J = 8.6 Hz), 6.88(1H, d, J = 1.2 Hz), 7.04(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.11(1H, d, J = 2.6 Hz), 7.28-7.34(1H, m), 7.35-7.41(2H, m), 7.42-7.48(2H, m).
287		(DMSO-d_6) 3.20-3.40(2H, m), 3.71(3H, s), 3.64-3.83(2H, m), 4.36(2H, s), 6.84-6.95(2H, m), 7.22-7.41(5H, m), 7.42-7.53(2H, m).
288		(DMSO-d_6) 2.18(3H, s), 3.35(2H, t, J = 8.7 Hz), 3.69-3.84(2H, m), 5.05(2H, s), 6.74(1H, s), 6.93(1H, d, J = 8.9 Hz), 7.23(1H, dd, J = 2.8 Hz, 8.9 Hz), 7.27-7.48(6H, m).
289		($CDCl_3$) 2.29(3H, s), 3.28-3.39(2H, m), 3.68-3.81 (2H, m), 4.36(2H, s), 5.06(2H, s), 5.95(2H, s), 6.77(2H, s), 6.78-6.91(2H, m), 7.20-7.35(2H, m), 7.36-7.51(5H, m).
290		($CDCl_3$) 1.93-2.12(2H, m), 2.27(3H, s), 3.28(2H, t, J = 5.9 Hz), 3.63(2H, t, J = 5.9 Hz), 3.88(6H, s), 4.55 (2H, s), 5.07(2H, s), 6.71-6.92(4H, m), 6.96-7.08 (1H, m), 7.11(1H, d, J = 2.1 Hz), 7.25-7.51(5H, m).

Reference Example 291

Production of N-[4-(5-nitropyridin-2-yloxy)phenyl]-2-(4-piperonylpiperazin-1-yl)acetamide

A solution of (4-piperonylpiperazin-1-yl)acetic acid (13.9 g, 50 mmol) was suspended in DMF (400 mL), and to the resulting suspension were added 1-hydroxybenzotriazole monohydrate (8.42 g, 55 mmol), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (10.5 g, 55 mmol) and 4-(5-nitropyridin-2-yloxy)phenylamine (11.6 g, 50 mmol) under ice cooling. The resulting solution was stirred for 6 hours at room temperature. The reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate, and washed with a saturated sodium bicarbonate solution and brine. The organic layer was left for standing overnight at room temperature, and the resulting precipitated crystals were collected by suction filtration, to thereby yield 12.8 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.53(4H, brs), 2.64-2.65(4H, m), 3.15(2H, s), 3.46(2H, s), 5.95(2H, s), 6.76(2H, brs), 6.86(1H, s), 7.04(1H, d, J = 9.1 Hz), 7.14(2H, d, J = 8.7 Hz), 7.67(2H, d, J = 8.9 Hz), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz), 9.24(1H, brs).

Reference Example 292

Production of ethyl {methanesulfonyl[3-methoxy-4-(5-nitropyridin-2-yloxy)phenyl]amino}acetate

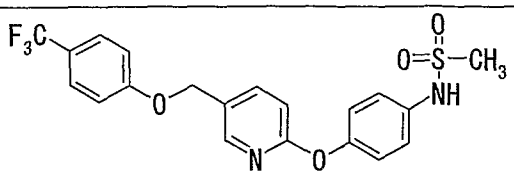
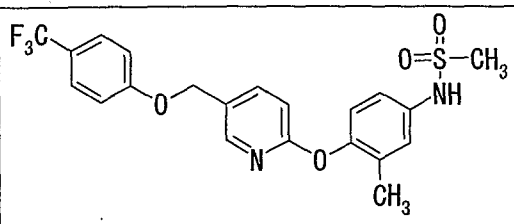
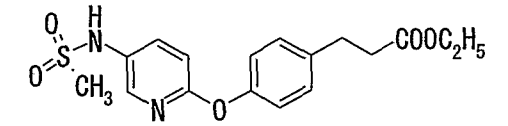
A solution of ethyl [3-methoxy-4-(5-nitropyridin-2-yloxy)phenylamino]acetate (2.43 g, 7.00 mmol) was dissolved in THF (15 mL), dichloromethane (20 mL) and DMF (10 mL), and to the resulting solution were added triethylamine (1.95 mL, 13.99 mmol), 4-dimethylaminopyridine (0.86 g, 7.00 mmol) and methanesulfonyl chloride (1.08 mL, 13.99 mmol) under ice cooling. The resulting solution was stirred for 14 hours at 30°C. Water was added to the reaction mixture, and extracted with dichloromethane. The dichloromethane layer was washed with water and brine. The dichloromethane layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (ethyl acetate : *n*-hexane = 1 : 2), to thereby yield 1.10 g of the title compound.

Appearance: Yellow oil

1H NMR ($CDCl_3$) δ 1.32(3H, t, J = 7.3 Hz), 3.18(3H, s), 3.75(3H, s), 4.26(2H, q, J = 7.3 Hz), 4.49(2H, s), 7.09(1H, d, J = 9.1 Hz), 7.15(2H, d, J = 1.2 Hz), 7.25(1H, s), 8.48(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.98(1H, d, J = 2.8 Hz).

The following compounds were produced in the same manner as in Reference Example 292.

Table 43

Reference Example No.	Chemical Structure	^{1}H NMR (solvent) δppm or MS
293		^{1}H NMR (DMSO-d_6) 3.00(3H, s), 5.17(2H, s), 7.05(1H, d, J = 8.4 Hz), 7.12(2H, d, J = 8.9 Hz), 7.19-7.26(4H, m), 7.67(2H, d, J = 8.9 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.25(1H, d, J = 2.3 Hz), 9. 69(1H, brs).
294		^{1}H NMR ($CDCl_3$) 2.18(3H, s), 3.04(3H, s), 5.04(2H, s), 6.56(1H, brs), 6.96(1H, d, J = 8.6 Hz), 7.01-7.09(4H, m), 7.15(1H, d, J = 2.6 Hz), 7.56(2H, d, J = 8.4 Hz), 7.79(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.19(1H, d, J = 2.5 Hz).
295		MS 364(M^+)

Reference Example 296

Production of 3-[4-(5-nitropyridin-2-yloxy)phenyl]-*n*-propanol

To a solution of 3-[4-(5-nitropyridin-2-yloxy)phenyl]propionic acid (2.64 g, 9.2 mmol) in THF (50 mL) was added dropwise a 1 M borane-THF complex THF solution (38.4 mL, 38.4 mmol) under ice cooling. The reaction solution was stirred for 2 hours at room temperature. Water was added to the reaction mixture, and extracted with ethyl acetate, and the ethyl acetate layer was washed with water and then brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, after which solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 1), to

thereby yield 1.17 g of the title compound.

Appearance: Green oil

^{1}H NMR ($CDCl_3$) δ 1.90-1.96(2H, m), 2.73-2.79(2H, m), 3.69-3.74(2H, m), 7.00-7.09(3H, m), 7.26-7.30(2H, m), 8.44-8.49(1H, m), 9.05(1H, d, J = 2.6 Hz).

Reference Example 297

Production of 2-{4-[3-(*t*-butyldimethylsilanyloxy)-propyl]phenoxy}-5-nitropyridine

To a solution of 3-[4-(5-nitropyridin-2-yloxy)phenyl]-*n*-propanol (1.17 g, 4.3 mmol) in DMF (10 mL) were added imidazole (580 mg, 8.5 mmol) and *t*-butylchlorodimethylsilane (640 mg, 4.2 mmol), and the resulting solution was stirred for 13 hours at room temperature. Water was added to the reaction mixture, and extracted with diethyl ether, and the diethyl ether layer was washed with water and then brine. The diethyl ether layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 1.14 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 0.07(6H, s), 0.92(9H, s), 1.84-1.89(2H, m), 2.69-2.75(2H, m), 3.66(2H, t, J = 6.3 Hz), 6.99-7.08(3H, m), 7.27(2H, d, J = 7.6 Hz), 8.46(1H, dd, J = 8.9 Hz, 3.0 Hz), 9.05(1H, d, J = 3.0 Hz).

The following compound was produced in the same manner as in Reference Example 297.

Reference Example 298

2-{4-[2-(*t*-Butyldimethylsilanyloxy)ethyl]phenoxy}-5-nitropyridine

^{1}H NMR ($CDCl_3$) δ 0.00(6H, s), 0.88(9H, s), 2.86(2H, t, J = 6.9 Hz), 3.84(2H, t, J = 6.9 Hz), 7.00(1H, d, J = 9.2 Hz), 7.05-7.08(2H, m), 7.26-7.31(2H, m), 8.46(1H, dd, J = 9.2 Hz, 3.0 Hz), 9.05(1H, d, J = 3.0 Hz).

Reference Example 299

Production of ethyl 4-[4-(5-nitropyridin-2-yloxy)phenyl]butanoate

To a solution of 4-[4-(5-nitropyridin-2-yloxy)phenyl]butanoic acid (9.98 g, 33.01 mmol) in dichloromethane were added ethanol (5.59 mL, 99.01 mmol), 4-dimethylaminopyridine (400 mg, 3.27 mmol), triethylamine (13.81 mL, 99.08 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (7.6 g, 39.65 mmol) under ice cooling, and the resulting solution was stirred for 20 minutes under ice cooling and then for 1 hour at room temperature. The reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate, and the ethyl acetate layer was washed with 1 N hydrochloric acid, a saturated sodium bicarbonate solution and brine. The ethyl acetate

layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 6.77 g of the title compound.

Appearance: Colorless oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.0 Hz), 1.99(2H, dt, J = 15.0 Hz, 7.5 Hz), 2.36(2H, t, J = 7.5 Hz), 2.70(2H, t, J = 7.5 Hz), 4.14(2H, q, J = 7.0 Hz), 7.01(1H, d, J = 9.0 Hz), 7.08(2H, d, J = 8.5 Hz), 7.26(2H, d, J = 8.5 Hz), 8.46(1H, dd, J = 9.0 Hz, 3.0 Hz), 9.04(1H, d, J = 3.0 Hz).

Reference Example 300

Production of methyl 3-[4-(5-nitropyridin-2-ylsulfanyl)phenyl]propionate

To a solution of 3-[4-(5-nitropyridin-2-ylsulfanyl)phenyl]propionic acid (86.0 g, 0.283 mmol) in DMF (1 mL) were added potassium carbonate (59.0 mg, 0.424 mmol) and methyl iodide (0.0260 mL, 0.424 mmol), and the resulting solution was stirred for 1 hour at room temperature. Water was added to the reaction mixture, and then cooled with ice. The precipitated solid matter was collected by filtration, to thereby yield 76.9 mg of the title compound.

Appearance: Light brown powder

^{1}H NMR (DMSO-d_6) δ 2.70(2H, t, J = 7.6 Hz), 2.94(2H, t, J = 7.6 Hz), 3.60(3H, s), 7.07(1H, d, J = 8.9 Hz), 7.43(2H, d, J = 8.1 Hz), 7.57(2H, d, J = 8.1 Hz),

8.39(1H, dd, J = 2.7 Hz, 8.9 Hz), 9.17(1H, d, J = 2.7 Hz).

Reference Example 301

Production of ethyl (*Z*)-3-[4-(5-nitro-2-pyridyloxy)phenyl]-2-butenoate

To a suspension of 60% sodium hydride (1.28 g, 32.0 mmol) in THF (80 mL) was added dropwise a solution of triethyl phosphonoacetate (8.71 g, 38.8 mmol) in THF (40 mL) under ice cooling, and the resulting solution was stirred for 10 minutes at the same temperature. To the reaction solution was added 4-[(5-nitro-2-pyridyl)oxy]acetophenone (5.90 g, 22.8 mmol) and the resulting solution was stirred at the same temperature for 10 minutes, and then stirred at room temperature for 60 hours. To the reaction solution was added saturated ammonium chloride and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution, and then washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 1.17 g of the title compound.

Appearance: Colorless needles

^{1}H NMR ($CDCl_3$) δ 1.13(3H, t, J = 7.1 Hz), 2.20(3H, d, J = 1.4 Hz), 4.02(2H, q, J = 7.1 Hz), 5.93(1H, q, J = 1.4

Hz), 7.02(1H, d, J = 9.0 Hz), 7.12(2H, d, J = 8.6 Hz), 7.29(2H, d, J = 8.6 Hz), 8.45(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).

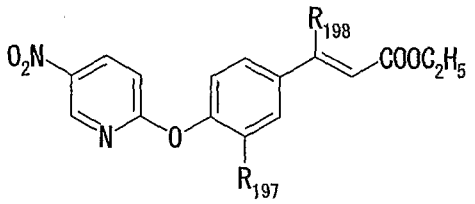
The following compounds were produced in the same manner as in Reference Example 301.

Reference Example 302

Ethyl (*E*)-3-{4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]phenyl}acrylate

Melting point: 166-167°C

Table 44



Reference Example No.	R_{197}	R_{198}	^{1}H NMR ($CDCl_3$) δppm or MS
303	-H	-H	^{1}H NMR 1.35(3H, t, J = 7.1 Hz), 4.28(2H, q, J = 7.1 Hz), 6.43(1H, d, J = 16.0 Hz), 7.09(1H, d, J = 8.9 Hz), 7.20(2H, d, J = 8.7 Hz), 7.62(2H, d, J = 8.7 Hz), 7.70(1H, d, J = 16.0 Hz), 8.50(1H, dd, J = 8.9 Hz, 2.5 Hz), 9.04(1H, d, J = 2.5 Hz).
304	-H	$-CH_3$	^{1}H NMR 1.31(3H, t, J = 7.1 Hz), 2.58(3H, d, J = 1.2 Hz), 4.21(2H, q, J = 7.1 Hz), 6.14(1H, q, J = 1.2 Hz), 7.05(1H, d, J = 9.0 Hz), 7.16(2H, d, J = 8.7 Hz), 7.55(2H, d, J = 8.7 Hz), 8.48(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
305	$-CH_3$	-H	MS 328(M^+)

Reference Example 306

Production of ethyl 3-[4-(5-nitropyridine-2-carbonyl)phenyl]propionate

A solution of bis(tributyltin) (1.37 g, 2.36

mmol) in toluene (7 mL) was added under an argon atmosphere to 2-chloro-5-nitropyridine (0.325 g, 2.05 mmol), bis(dibenzylideneacetone)palladium (0) (18.1 mg, 0.0315 mmol), tri(2-furyl)phosphine (29.3 mg, 0.126 mmol) and molecular sieves 4A (1.90 g), and the resulting solution was heated to reflux for 1 hour. To the reaction solution was added bis(dibenzylideneacetone)palladium (0) (27.2 mg, 0.0472 mmol) and tri(2-furyl)phosphine (43.9 mg, 0.189 mmol), and subsequently added a solution of 4-[2-ethoxycarbonyl]ethyl]benzoyl chloride (0.379 g, 1.57 mmol) in toluene (5 mL). The resulting reaction solution was stirred for 4 hours at 80°C. To the reaction solution was added saturated aqueous potassium fluoride and stirred for 0.5 hours at room temperature. Insoluble matter was then filtered off. The filtrate was extracted with ethyl acetate, and the ethyl acetate layer was washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane → *n*-hexane : ethyl acetate = 4 : 1), to thereby yield 0.323 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 1.22(3H, t, J = 7.1 Hz), 2.65(2H, t, J = 7.7 Hz), 3.03(2H, t, J = 7.7 Hz), 4.12(2H, q, J = 7.1 Hz), 7.34(2H, d, J = 8.3 Hz), 8.00(2H, d, J = 8.3 Hz), 8.18(1H, d, J = 8.5 Hz), 8.65(1H, dd, J = 8.5 Hz, 2.6 Hz), 9.49(1H, d, J = 2.6 Hz).

Reference Example 307

Production of ethyl 3-[4-(4-aminophenoxy)phenyl]propionate

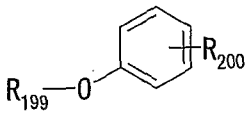
To a suspension of 5% palladium-carbon (0.50 g) in ethanol (50 mL) was added ethyl 3-[4-(4-nitrophenoxy)phenyl]propionate (5.00 g, 15.9 mmol), and the resulting solution was subjected to catalytic reduction at atmospheric pressure and at room temperature. Once the absorption of hydrogen had stopped, the catalyst was removed by filtration, and the filtrate was concentrated under reduced pressure, to thereby yield 4.52 g of the title compound.

Appearance: Light brown oil

^{1}H NMR ($CDCl_3$) δ 1.22(3H, t, J = 7.1 Hz), 2.57(2H, t, J = 7.8 Hz), 2.88(2H, t, J = 7.8 Hz), 3.55(2H, brs), 4.10(2H, q, J = 7.1 Hz), 6.64(2H, d, J = 8.8 Hz), 6.78-6.86(4H, m), 7.08(2H, d, J = 8.6 Hz).

The following compounds were produced in the same manner as in Reference Example 307.

Table 45



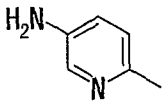
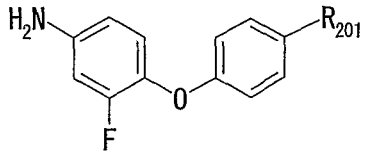
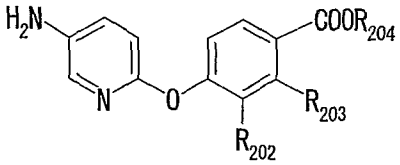
Reference Example No.	R_{199}	R_{200}	^{1}H NMR ($CDCl_3$) δppm
308	4-NH_2Ph-	2-$(CH_2)_2COOCH_3$	2.66(2H, t, J = 7.8 Hz), 3.00(2H, t, J = 7.8 Hz), 3.54 (2H, brs), 3.63(3H, s), 6.65(2H, d, J = 8.8 Hz), 6.70 (1H, d, J = 8.1 Hz), 6.79(2H, d, J = 8.8 Hz), 6.94(1H, t, J = 8.1 Hz), 7.08(1H, t, J = 8.1 Hz), 7.19(1H, d, J = 8.1 Hz).
309	4-NH_2Ph-	3-$(CH_2)_2COOC_2H_5$	1.21(3H, t, J = 7.2 Hz), 2.56(2H, t, J = 7.9 Hz), 2.87 (2H, t, J = 7.9 Hz), 3.54(2H, brs), 4.10(2H, q, J = 7.2 Hz), 6.66(2H, d, J = 8.8 Hz), 6.70-6.76(2H, m), 6.79-6.87(3H, m), 7.16(1H, t, J = 7.8 Hz).
310	2-NH_2Ph-	4-$(CH_2)_2COOC_2H_5$	1.22(3H, t, J = 7.2 Hz), 2.56(2H, t, J = 7.8 Hz), 2.89 (2H, t, J = 7.8 Hz), 3.55(2H, brs), 4.11(2H, q, J = 7.2 Hz), 6.72(1H, t, J = 7.8 Hz), 6.79-6.92(4H, m), 6.93 (1H, t, J = 7.8 Hz), 7.12(2H, d, J = 8.5 Hz).
311	4-NH_2Ph-	4-$COOC_2H_5$	1.37(3H, t, J = 7.1 Hz), 4.36(2H, q, J = 7.1 Hz), 4.00-4.50(2H, m), 6.78(2H, d, J = 8.9 Hz), 6.89-6.95 (4H, m), 7.97(2H, d, J = 8.9 Hz).
312	3-NH_2Ph-	4-$(CH_2)_2COOC_2H_5$	1.22(3H, t, J = 7.2 Hz), 2.59(2H, t, J = 7.8 Hz), 2.91 (2H, t, J = 7.8 Hz), 3.65(2H, brs), 4.12(2H, q, J = 7.2 Hz), 6.29(1H, t, J = 2.2 Hz), 6.32-6.41(2H, m), 6.92 (2H, d, J = 8.6 Hz), 7.06(1H, t, J = 8.0 Hz), 7.13(2H, d, J = 8.6 Hz).
313		3-$COOCH_3$	3.56(2H, brs), 3.89(3H, s), 6.80(1H, dd, J = 8.6 Hz, 0.7 Hz), 7.11(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.25-7.29 (1H, m), 7.39-7.44(1H, m), 7.69-7.72(2H, m), 7.78-7.82(1H, m).

Table 46



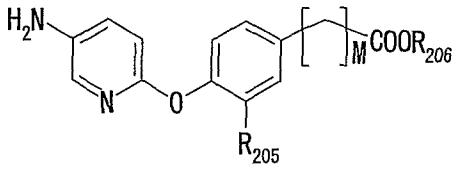
Reference Example No.	R_{201}	Form	^{1}H NMR (solvent) δppm
314	-Ac	hydrochloride	(DMSO-d_6) 2.53(3H, s), 3.30-4.20(3H, m), 6.88(1H, d, J = 8.8 Hz), 6.99-7.05(3H, m), 7.22(1H, t, J = 8.8 Hz), 7.96(1H, d, J = 8.9 Hz).
315	-CH_2COOCH_3	free	($CDCl_3$) 3.57(2H, s), 3.60-3.80(5H, m), 6.41(1H, ddd, J = 1.2 Hz, 2.6 Hz, 8.6 Hz), 6.50(1H, dd, J = 2.6 Hz, 12.0 Hz), 6.80-6.95(3H, m), 7.18(2H, d, J = 8.4 Hz).
316	-$(CH_2)_2COOC_2H_5$	free	($CDCl_3$) 1.21(3H, t, J = 7.1 Hz), 2.56(2H, t, J = 7.8 Hz), 2.87(2H, t, J = 7.8 Hz), 3.66(2H, brs), 4.10(2H, q, J = 7.1 Hz), 6.34-6.43(1H, m), 6.48(1H, dd, J = 12.0 Hz, 2.7 Hz), 6.77-6.93(3H, m), 7.08(2H, d, J = 8.7 Hz).
317	-H	free	($CDCl_3$) 3.66(2H, brs), 6.35-6.44(1H, m), 6.49(1H, dd, J = 12.0 Hz, 2.7 Hz), 6.83-6.96(3H, m), 7.01(1H, dd, J = 9.0 Hz, 8.0 Hz), 7.26(2H, t, J = 8.0 Hz).
318	-$(CH_2)_3COOC_2H_5$	free	($CDCl_3$) 1.23(3H, t, J = 7.1 Hz), 1.83-1.97(2H, m), 2.28(2H, t, J = 7.5 Hz), 2.57(2H, t, J = 7.6 Hz), 3.66(2H, brs), 4.09(2H, q, J = 7.1 Hz), 6.34-6.43(1H, m), 6.48(1H, dd, J = 12.0 Hz, 2.7 Hz), 6.81(2H, d, J = 8.5 Hz), 6.88(1H, dd, J = 9.0 Hz, 8.0 Hz), 7.05(2H, d, J = 8.5 Hz).
319	-$COOC_2H_5$	free	(DMSO-d_6) 1.29(3H, t, J = 7.1 Hz), 4.27(2H, q, J = 7.1 Hz), 5.42(2H, brs), 6.41(1H, dt, J = 1.6 Hz, 8.6 Hz), 6.50(1H, dd, J = 2.5 Hz, 13.3 Hz), 6.90-7.00(3H, m), 7.91(2H, d, J = 9.7 Hz).
320	-$NHCH_2COOC_2H_5$	free	($CDCl_3$) 1.29(3H, t, J = 7.1 Hz), 3.62(2H, s), 3.86(2H, s), 4.12(1H, s), 4.23(2H, q, J = 7.1 Hz), 6.35-6.39(1H, m), 6.48(1H, dd, J = 2.7 Hz, 12.1 Hz), 6.55(2H, d, J = 8.9 Hz), 6.80-6.85(3H, m).
321		free	($CDCl_3$) 3.70(2H, brs), 3.95-4.15(4H, m), 5.76(1H, s), 6.38-6.42(1H, m), 6.49(1H, dd, J = 2.7 Hz, 14.7 Hz), 6.85-6.93(3H, m), 7.39(2H, d, J = 8.7 Hz).

Table 47



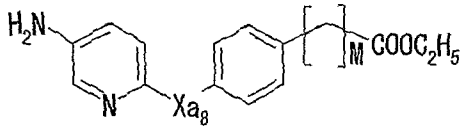
Reference Example No.	R_{202}	R_{203}	R_{204}	^{1}H NMR ($CDCl_3$) δppm
322	-H	-H	$-C_2H_5$	1.38(3H, t, J = 7.3 Hz), 4.35(2H, q, J = 7.3 Hz), 6.82(1H, d, J = 8.6 Hz), 7.04-7.14(3H, m), 7.75(1H, d, J = 3.0 Hz), 8.01-8.04(2H, m).
323	-H	-H	$-CH_3$	3.30(2H, brs), 3.89(3H, s), 6.82(1H, d, J = 8.6 Hz), 7.04-7.13(3H, m), 7.75(1H, d, J = 3.0 Hz), 8.02(2H, dd, J = 6.6 Hz, 2.0 Hz).
324	-F	-H	$-CH_3$	3.57(2H, brs), 3.91(3H, s), 6.87(1H, d, J = 8.6 Hz), 7.10-7.23(2H, m), 7.64(1H, d, J = 3.0 Hz), 7.80-7.82(1H, m), 7.83-7.85(1H, m).
325	-F	-H	$-C_2H_5$	1.38(3H, t, J = 7.1 Hz), 4.37(2H, q, J = 7.1 Hz), 6.87(1H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.15-7.22(1H, m), 7.64(1H, d, J = 3.0 Hz), 7.81-7.86(2H, m).
326	$-CH_3$	-H	$-CH_3$	2.29(3H, s), 3.56(2H, brs), 3.89(3H, s), 6.79(1H, d, J = 8.6 Hz), 6.92(1H, d, J = 8.6 Hz), 7.11(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.71(1H, d, J = 3.0 Hz), 7.85(1H, dd, J = 8.6 Hz, 2.4 Hz), 7.94(1H, d, J = 2.4 Hz).
327	$-OCH_3$	-H	$-C_2H_5$	1.38(3H, t, J = 7.1 Hz), 3.55(2H, brs), 3.85(3H, s), 4.37(2H, q, J = 7.1 Hz), 6.79-6.83(1H, m), 7.02-7.10(2H, m), 7.63-7.67(3H, m).
328	-H	$-OCH_3$	$-CH_3$	3.63(2H, brs), 3.86(6H, s), 6.54-6.58(1H, m), 6.68(1H, d, J = 2.2 Hz), 6.81-6.84(1H, m), 7.13(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.77(1H, dd, J = 3.0 Hz, 0.5 Hz), 7.83(1H, d, J = 8.9 Hz).
329	-H	$-CH_3$	$-CH_3$	2.58(3H, s), 3.63(2H, brs), 3.86(3H, s), 6.80-6.88(3H, m), 7.13(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.75(1H, d, J = 3.0 Hz), 7.92-7.96(1H, m).
330	-Cl	-H	$-CH_3$	3.62(2H, brs), 3.91(3H, s), 6.88(1H, d, J = 8.6 Hz), 7.08-7.15(2H, m), 7.68(1H, d, J = 3.0 Hz), 7.91(1H, dd, J = 8.6 Hz, 2.1 Hz), 8.13(1H, d, J = 2.1 Hz).

Table 48



Reference Example No.	R_{205}	R_{206}	M	^{1}H NMR ($CDCl_3$) δppm or MS
331	-H	-CH_3	2	MS 272(M^+)
332	-OCH_3	-C_2H_5	2	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 2.63(2H, t, J = 7.5 Hz), 2.94(2H, t, J = 7.5 Hz), 3.43(2H, brs), 3.77(3H, s), 4.14(2H, q, J = 7.1 Hz), 6.71-6.86(3H, m), 6.98(1H, d, J = 8.0 Hz), 7.06(1H, dd, J = 8.6 Hz, 2.9 Hz), 7.65(1H, d, J = 2.9 Hz).
333	-H	-CH_3	1	^{1}H NMR 3.60(2H, s), 3.69(3H, s), 6.76(1H, d, J = 8.6 Hz), 6.99-7.10 (3H, m), 7.24-7.27(2H, m), 7.71(1H, d, J = 3.0 Hz).
334	-H	-C_2H_5	2	^{1}H NMR 1.21(3H, t, J = 7.1 Hz), 2.58(2H, t, J = 7.7 Hz), 2.90(2H, t, J = 7.7 Hz), 4.11(2H, q, J = 7.1 Hz), 6.72(1H, d, J = 8.6 Hz), 6.95(2H, d, J = 8.5 Hz), 7.05(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.14(2H, d, J = 8.5 Hz), 7.68(1H, d, J = 3.0 Hz).
335	-OCH_3	-CH_3	2	^{1}H NMR 2.62-2.68(2H, m), 2.91-2.97(2H, m), 3.45(2H, brs), 3.69(3H, s), 3.77(3H, s), 6.74-6.79(2H, m), 6.82(1H, d, J = 1.8 Hz), 6.98(1H, d, J = 7.9 Hz), 7.04-7.26(1H, m), 7.64(1H, d, J = 3.0 Hz).
336	-OC_2H_5	-C_2H_5	2	^{1}H NMR 1.20(3H, t, J = 7.0 Hz), 1.25(3H, t, J = 7.1 Hz), 2.51-2.68 (2H, m), 2.81-3.01(2H, m), 3.19-3.63(2H, m), 3.98(2H, q, J = 7.0 Hz), 4.14(2H, q, J = 7.1 Hz), 6.69-6.83(3H, m), 6.95-7.09(2H, m), 7.60-7.67(1H, m).
337	-F	-C_2H_5	2	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 2.52-2.71(2H, m), 2.86-3.02(2H, m), 3.47(2H, brs), 4.14(2H, q, J = 7.1 Hz), 6.81(1H, d, J = 8.6 Hz), 6.93-7.04(2H, m), 7.05-7.13(2H, m), 7.63(1H, d, J = 2.9 Hz).
338	-H	-C_2H_5	4	^{1}H NMR 1.25(3H, t, J = 7.2 Hz), 1.55-1.80(4H, m), 2.32(2H, t, J = 7.0 Hz), 2.60(2H, t, J = 7.0 Hz), 3.49(2H, brs), 4.12(2H, q, J = 7.2 Hz), 6.74(1H, d, J = 8.5 Hz), 6.97(2H, d, J = 8.5 Hz), 7.06(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.14(2H, d, J = 8.5 Hz), 7.71(1H, d, J = 3.0 Hz).
339	-H	-C_2H_5	3	^{1}H NMR 1.26(3H, t, J = 7.5 Hz), 1.94(2H, dt, J = 15.0 Hz, 7.5 Hz), 2.33(2H, t, J = 7.5 Hz), 2.63(2H, t, J = 7.5 Hz), 3.50(2H, brs), 4.13 (2H, q, J = 7.0 Hz), 6.75(1H, d, J = 8.5 Hz), 6.98(2H, d, J = 8.5 Hz), 7.07(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.15(2H, d, J = 8.5 Hz), 7.72(1H, d, J = 3.0 Hz).

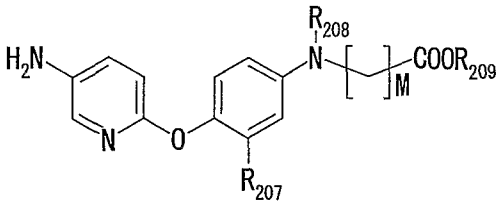
Table 49



Reference Example No.	Xa8	M	Form	^{1}H NMR (solvent) δppm
340	-NH-	2	free	($CDCl_3$) 1.24(3H, t, J = 7.1 Hz), 2.60(2H, t, J = 7.6 Hz), 2.90(2H, t, J = 7.6 Hz), 3.35(2H, brs), 4.13(2H, q, J = 7.1 Hz), 6.16(1H, brs), 6.77(1H, d, J = 8.6 Hz), 6.98(1H, dd, J = 2.9 Hz, 8.6 Hz), 7.00-7.15(4H, m), 7.78(1H, d, J = 2.9 Hz).
341	-N(CH_3)-	0	hydrochloride	(DMSO-d_6) 1.30(3H, t, J = 7.1 Hz), 3.43(3H, s), 4.28 (2H, q, J = 7.1 Hz), 7.03(1H, d, J = 9.1 Hz), 7.30(2H, d, J = 8.6 Hz), 7.55(1H, d, J = 9.1 Hz), 7.93(2H, d, J = 8.6 Hz), 8.05(1H, s).
342	-N(CH_3)-	2	free	($CDCl_3$) 1.24(3H, t, J = 7.2 Hz), 2.63(2H, t, J = 7.7 Hz), 2.95(2H, t, J = 7.7 Hz), 3.53(3H, s), 4.14(2H, q, J = 7.2 Hz), 6.52(1H, d, J = 9.5 Hz), 7.07(1H, dd, J = 2.7 Hz, 9.5 Hz), 7.10(2H, d, J = 8.3 Hz), 7.22(2H, d, J = 8.3 Hz), 7.83(1H, d, J = 2.7 Hz).
343	-N(CH_3Ph)-	2	dihydrochloride	($CDCl_3$) 1.22(3H, t, J = 7.1 Hz), 2.57(2H, t, J = 7.7 Hz), 2.90(2H, t, J = 7.7 Hz), 4.11(2H, q, J = 7.1 Hz), 5.28 (2H, s), 6.65(1H, d, J = 8.8 Hz), 7.08(2H, d, J = 7.8 Hz), 7.15-7.24(7H, m), 8.27(1H, d, J = 8.8 Hz), 8.80(1H, s).
344	-CO-	2	free	($CDCl_3$) 1.21(3H, t, J = 7.1 Hz), 2.63(2H, t, J = 7.7 Hz), 2.98(2H, t, J = 7.7 Hz), 4.10(2H, q, J = 7.1 Hz), 7.18 (2H, brs), 7.27(2H, d, J = 8.1 Hz), 7.32(1H, d, J = 8.3 Hz), 7.88-7.99(3H, m), 8.27(1H, s).

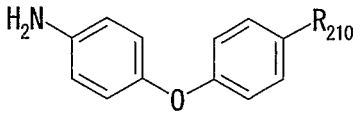
(-CO- means a group of . Hereinafter -CO- indicates the same meaning.)

Table 50



Reference Example No.	R_{207}	R_{208}	R_{209}	M	^{1}H NMR (solvent) δppm
345	-H	-H	-C(CH$_3$)$_3$	0	(CDCl$_3$) 1.51(9H, s), 3.49(2H, brs), 6.41(1H, brs), 6.72(1H, d, J = 8.6 Hz), 7.00(2H, d, J = 8.9 Hz), 7.06(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.32(2H, d, J = 8.9 Hz), 7.69(1H, d, J = 3.0 Hz).
346	-H	-Ac	-C$_2$H$_5$	1	(CDCl$_3$) 1.27(3H, t, J = 7.1 Hz), 1.94(3H, s), 3.60(2H, brs), 4.18(2H, q, J = 7.1 Hz), 4.35(2H, s), 6.82(1H, d, J = 8.6 Hz), 7.07(2H, d, J = 8.8 Hz), 7.12(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.31(2H, d, J = 8.8 Hz), 7.73(1H, d, J = 3.0 Hz).
347	-H	-Ac	-C$_2$H$_5$	2	(CDCl$_3$) 1.23(3H, t, J = 7.1 Hz), 1.85(3H, s), 2.57(2H, t, J = 7.4 Hz), 3.60(2H, s), 3.98(2H, t, J = 7.4 Hz), 4.07(2H, q, J = 7.1 Hz), 6.82(1H, d, J = 8.6 Hz), 7.08(2H, d, J = 8.8 Hz), 7.10-7.15 (3H, m), 7.74(1H, d, J = 3.0 Hz).
348	-CH$_3$	-Ac	-C$_2$H$_5$	1	(CDCl$_3$) 1.28(3H, t, J = 7.1 Hz), 1.95(3H, s), 2.23(3H, s), 3.52(2H, s), 4.19(2H, q, J = 7.1 Hz), 4.34(2H, s), 6.73(1H, d, J = 8.6 Hz), 6.91(1H, d, J = 8.4 Hz), 7.05-7.15(2H, m), 7.20(1H, s), 7.66(1H, s).
349	-H	-CH$_3$	-CH$_3$	1	(CDCl$_3$) 3.05(3H, s), 3.45(2H, brs), 3.72(3H, s), 4.05(2H, s), 6.67(3H, d, J = 9.0 Hz), 6.98(2H, d, J = 2.0 Hz), 7.04(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.69(1H, d, J = 2.0 Hz).
350	-H	-CH$_3$	-C$_2$H$_5$	1	(CDCl$_3$) 1.25(3H, t, J = 7.1 Hz), 3.05(3H, s), 3.45(2H, brs), 4.03(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.65-6.69(3H, m), 6.96 (2H, d, J = 9.0 Hz), 7.04(1H, dd, J = 2.9 Hz, 8.6 Hz), 7.69(1H, d, J = 2.9 Hz).
351	-H	-C$_2$H$_5$	-C$_2$H$_5$	1	(CDCl$_3$) 1.20(3H, t, J = 7.2 Hz), 1.26(3H, t, J = 7.2 Hz), 3.40-3.46(4H, m), 3.99(2H, s), 4.19(2H, q, J = 7.2 Hz), 6.63 (2H, d, J = 9.1 Hz), 6.67(1H, d, J = 8.6 Hz), 6.95(2H, d, J = 9.1 Hz), 7.04(1H, dd, J = 3.2 Hz, 8.6 Hz), 7.69(1H, d, J = 3.2 Hz).
352	-CH$_3$	-CH$_3$	-C$_2$H$_5$	1	(CDCl$_3$) 1.26(3H, t, J = 7.1 Hz), 2.13(3H, s), 3.05(3H, s), 3.41(2H, brs), 4.02(2H, s), 4.19(2H, q, J = 7.1 Hz), 6.46-6.68 (3H, m), 6.89(1H, d, J = 8.6 Hz), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.67(1H, d, J = 3.0 Hz).
353	-OCH$_3$	-CH$_3$	-C$_2$H$_5$	1	(CDCl$_3$) 1.26(3H, t, J = 7.1 Hz), 3.07(3H, s), 3.42(2H, brs), 3.75(3H, s), 4.04(2H, s), 4.19(2H, q, J = 7.1 Hz), 6.24(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.33(1H, d, J = 2.8 Hz), 6.67(1H, d, J = 8.6 Hz), 6.95(1H, d, J = 8.7 Hz), 7.02(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.63(1H, d, J = 2.8 Hz).
354	-OCH$_3$	-C$_2$H$_5$	-C$_2$H$_5$	1	(DMSO-d$_6$) 1.13(3H, t, J = 7.1 Hz), 1.20(3H, t, J = 7.1 Hz), 3.41(2H, q, J = 7.1 Hz), 3.63(3H, s), 4.09-4.17(4H, m), 4.81 (2H, brs), 6.11(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.26(1H, d, J = 2.8 Hz), 6.55(1H, d, J = 8.6 Hz), 6.79(1H, d, J = 8.7 Hz), 6.99(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.40(1H, d, J = 2.3 Hz).

Table 51



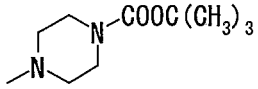
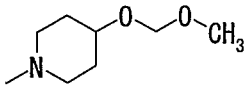
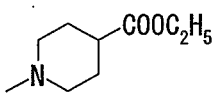
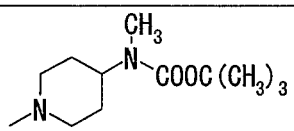
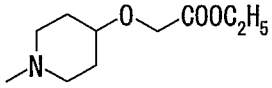
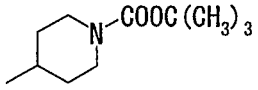
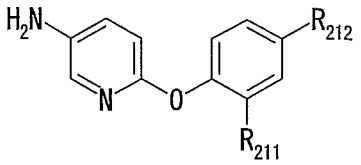
Reference Example No.	R_{210}	^{1}H NMR ($CDCl_3$) δppm
355		1.48(9H, s), 3.04(4H, t, J = 5.0 Hz), 3.54(2H, brs), 3.57(4H, t, J = 5.0 Hz), 6.65(2H, d, J = 9.0 Hz), 6.82(2H, d, J = 9.0 Hz), 6.88(4H, ABq, J = 9.0 Hz).
356		1.78(2H, m), 2.03(2H, m), 2.86(2H, m), 3.39(3H, s), 3.42(2H, m), 3.52(2H, brs), 3.70(1H, m), 4.72(2H, s), 6.64(2H, d, J = 9.0 Hz), 6.82(2H, d, J = 9.0 Hz), 6.88(4H, ABq, J = 9.0 Hz).
357		1.27(3H, t, J = 7.0 Hz), 1.88(2H, dq, J = 3.5 Hz, 12.5 Hz), 2.03(2H, dd, J = 12.5 Hz, 3.0 Hz), 2.40(1H, m), 2.72(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.51-3.53(4H, m), 4.16(2H, q, J = 7.0 Hz), 6.65(2H, d, J = 8.5 Hz), 6.82(2H, d, J = 8.5 Hz), 6.88(4H, s).
358		1.48(9H, s), 1.74(2H, brd, J = 11.5 Hz), 1.85(2H, m), 2.74(2H, m), 2.77(3H, s), 3.53(2H, brs), 3.60(2H, brd, J = 12.0 Hz), 4.12(1H, brs), 6.65(2H, d, J = 8.5 Hz), 6.82(2H, d, J = 8.5 Hz), 6.87(4H, s).
359		1.30(3H, t, J = 7.0 Hz), 1.81(2H, m), 2.03(2H, m), 2.84(1H, m), 2.95(1H, m), 3.35(1H, m), 3.44(1H, m), 3.54(3H, m), 4.15(2H, s), 4.23(2H, q, J = 7.0 Hz), 6.65(2H, d, J = 9.0 Hz), 6.82(2H, d, J = 9.0 Hz), 6.88(4H, s).
360		1.48(9H, s), 1.60(2H, m), 1.80(2H, m), 2.59(1H, m), 2.78(2H, brs), 3.57(2H, brs), 4.23(2H, brs), 4.12(1H, brs), 6.67(2H, d, J = 9.0 Hz), 6.86(2H, d, J = 9.0 Hz), 6.87(2H, d, J = 9.0 Hz), 7.09(2H, d, J = 9.0 Hz).

Table 52



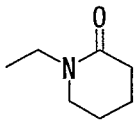
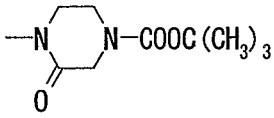
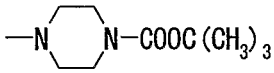
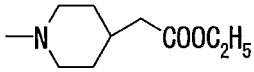
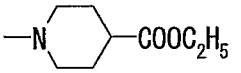
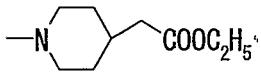
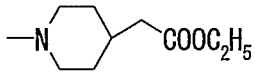
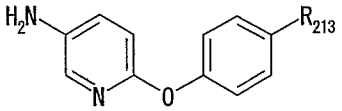
Reference Example No.	R_{211}	R_{212}	^{1}H NMR ($CDCl_3$) δppm or MS
361	-H	-Ac	^{1}H NMR 2.50(3H, s), 3.60(2H, brs), 6.80-7.90(7H, m).
362	-H	-NHCONHPh	^{1}H NMR 3.55(2H, s), 6.76(1H, d, J = 8.6 Hz), 6.89(1H, s), 6.95-7.02(3H, m), 7.03-7.12(2H, m), 7.21-7.36(6H, m), 6.68(1H, d, J = 2.9 Hz).
363	-H		^{1}H NMR 1.70-1.90(4H, m), 2.18(2H, brs), 2.40-2.50(2H, m), 3.13-3.29(2H, m), 4.56(2H, s), 6.76(1H, d, J = 8.6 Hz), 7.01(2H, d, J = 8.6 Hz), 7.09(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.23(2H, d, J = 8.6 Hz), 7.72(1H, d, J = 3.0 Hz).
364	-H	$-CH(CH_3)COOCH_3$	MS 272(M^+)
365	-H	$-C(CH_3)_2COOCH_3$	MS 286(M^+)
366	-H		^{1}H NMR 1.50(9H, s), 3.55(2H, brs), 3.72(2H, m), 3.78(2H, m), 4.25(2H, s), 6.80(1H, d, J = 8.6 Hz), 7.08(2H, d, J = 8.9 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.24(2H, d, J = 8.9 Hz), 7.72(1H, d, J = 3.0 Hz).
367	-H		^{1}H NMR 1.48(9H, s), 3.07(4H, brs), 3.47(2H, brs), 3.57(4H, t, J = 5.0 Hz), 6.72(1H, d, J = 8.5 Hz), 6.92(2H, d, J = 9.0 Hz), 7.00(2H, d, J = 9.0 Hz), 7.06(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.70(1H, d, J = 3.0 Hz).
368	-H		^{1}H NMR 1.27(3H, t, J = 7.0 Hz), 1.44(2H, dq, J = 4.0 Hz, 12.5 Hz), 1.83(2H, brd, J = 13.0 Hz), 1.91(1H, m), 2.28(2H, d, J = 7.0 Hz), 2.70(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.46(2H, brs), 3.57(2H, brd, J = 12.0 Hz), 4.15(2H, q, J = 7.0 Hz), 6.69(1H, d, J = 8.5 Hz), 6.92(2H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.05(2H, dd, J = 8.5 Hz, 3.0 Hz), 7.70(1H, d, J = 3.0 Hz).
369	$-CH_3$		^{1}H NMR 1.27(3H, t, J = 7.1 Hz), 1.86-2.05(4H, m), 2.14(3H, s), 2.35-2.44(1H, m), 2.69-2.79(2H, m), 3.43(2H, brs), 3.55-3.59(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.62(1H, d, J = 8.6 Hz), 6.74-6. 82(2H, m), 6.89(1H, d, J = 8.6 Hz), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.68(1H, d, J = 3.0 Hz).
370	$-OCH_3$		^{1}H NMR 1.27(3H, t, J = 7.1 Hz), 1.38-1.50(2H, m), 1.87-2.06(3H, m), 2.29(2H, d, J = 7.1 Hz), 2.69-2.77(2H, m), 3.42(2H, brs), 3.58(2H, d, J = 12.2 Hz), 3.75(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.49(1H, dd, J = 8.6 Hz, 2.6 Hz), 6.59(1H, d, J = 2.6 Hz), 6.70(1H, d, J = 8.6 Hz), 6.96(1H, d, J = 8.6 Hz), 7.04(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.65(1H, d, J = 3.0 Hz).
371	$-CH_3$		^{1}H NMR 1.27(3H, t, J = 7.1 Hz), 1.37-1.49(2H, m), 1.80-2.04(3H, m), 2.13(3H, s), 2.28(2H, d, J = 6.9 Hz), 2.69(2H, dd, J = 12.0 Hz, 9.9 Hz), 3.41-3.59(4H, m), 4.15(2H, q, J = 7.3 Hz), 6.60(1H, d, J = 8.6 Hz), 6.73-6.81(2H, m), 6.88(1H, d, J = 8.6 Hz), 7.02(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.66(1H, d, J = 2.8 Hz).

Table 53



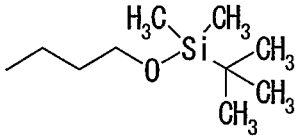
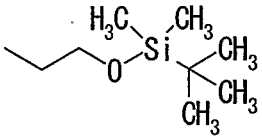
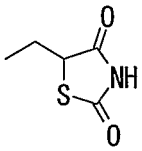
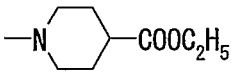
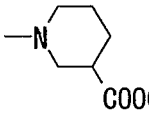
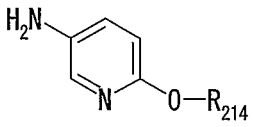
Reference Example No.	R_{213}	^{1}H NMR ($CDCl_3$) δppm
372		3.51(2H, brs), 3.94-4.12(4H, m), 5.78(1H, s), 6.73(1H, d, J = 8.6 Hz), 6.99-7.09(3H, m), 7.43(2H, d, J = 8.5 Hz), 7.70(1H, d, J = 2.7 Hz).
373		0.05(6H, s), 0.91(9H, s), 1.77-1.88(2H, m), 2.62-2.68(2H, m), 3.62-3.66(2H, m), 6.73(1H, d, J = 8.9 Hz), 6.95-7.17(5H, m), 7.72(1H, d, J = 3.0 Hz).
374		-0.07(6H, s), 0.81(9H, s), 2.73(2H, t, J = 7.3 Hz), 3.72(2H, t, J = 7.3 Hz), 6.66(1H, dd, J = 8.6 Hz, 0.7 Hz), 6.88-6.92(2H, m), 6.99(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.10(2H, d, J = 8.6 Hz), 7.64(1H, d, J = 3.0 Hz).
375	morpholino	3.09-3.13(4H, m), 3.84-3.87(4H, m), 6.71(1H, d, J = 8.6 Hz), 6.90(2H, d, J = 8.9 Hz), 7.02(2H, d, J = 9.2 Hz), 7.05(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.69(1H, d, J = 3.0 Hz)
376		3.12(1H, dd, J = 14.2 Hz, 9.8 Hz), 3.52(1H, dd, J = 14.2 Hz, 3.8 Hz), 3.70(2H, s), 4.51(1H, dd, J = 9.8 Hz, 3.8 Hz), 6.78 (1H, d, J = 8.6 Hz), 7.02(2H, d, J = 8.6 Hz), 7.09(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.20(2H, d, J = 8.6 Hz), 7.71(1H, d, J = 3.1 Hz), 7.98(1H, brs).
377	$-CH=C(COOCH_3)_2$	3.84(3H, s), 3.85(3H, s), 6.82(1H, d, J = 8.3 Hz), 7.03(2H, d, J = 8.9 Hz), 7.02-7.10(1H, m), 7.42(2H, d, J = 8.9 Hz), 7.70-7.76(2H, m).
378		1.27(3H, t, J = 7.0 Hz), 1.88(2H, m), 2.02(2H, m), 2.40(1H, m), 2.75(2H, dt, J = 3.0 Hz, 12.0 Hz), 3.46(2H, brs), 3.56(2H, dt, J = 13.0 Hz, 3.0 Hz), 4.15(2H, q, J = 7.0 Hz), 6.70(1H, d, J = 8.5 Hz), 6.92(2H, d, J = 9.0 Hz), 6.98(2H, d, J = 9.0 Hz), 7.05(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.70(1H, d, J = 3.0 Hz).
379		1.28(3H, t, J = 7.0 Hz), 1.66-1.72(2H, m), 1.82(1H, m), 2.01 (1H, m), 2.68(1H, m), 2.78(1H, m), 2.99(1H, dd, J = 12.0 Hz, 10.0 Hz), 3.39(1H, brd, J = 12.0 Hz), 3.47(2H, brs), 3.62(1H, dd, J = 12.0 Hz, 4.0 Hz), 4.17(2H, q, J = 7.0 Hz), 6.70(1H, d, J = 8.5 Hz), 6.94(2H, d, J = 9.0 Hz), 6.98(2H, d, J = 9.0 Hz), 7.06(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.70(1H, d, J = 3.0 Hz).
380	$-CH(CH_3)CH_2COOC_2H_5$	1.18(3H, t, J = 7.2 Hz), 1.27(3H, d, J = 7.0 Hz), 2.43-2.60 (2H, m), 3.19-3.29(1H, m), 3.48(2H, brs), 4.06(2H, q, J = 7.2 Hz), 6.72(1H, d, J = 8.7 Hz), 6.96(2H, d, J = 8.6 Hz), 7.05 (1H, dd, J = 8.7 Hz, 3.0 Hz), 7.16(2H, d, J = 8.6 Hz), 7.70 (1H, d, J = 3.0 Hz).

Table 54



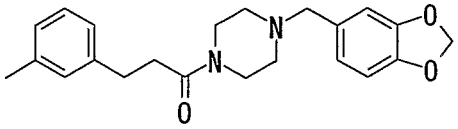
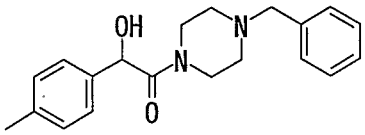
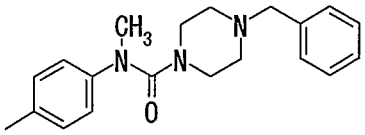
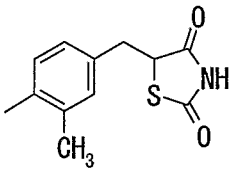
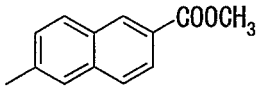
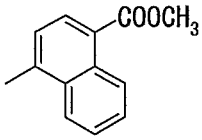
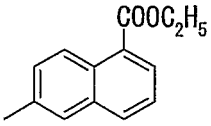
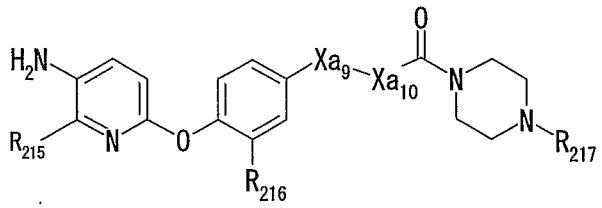
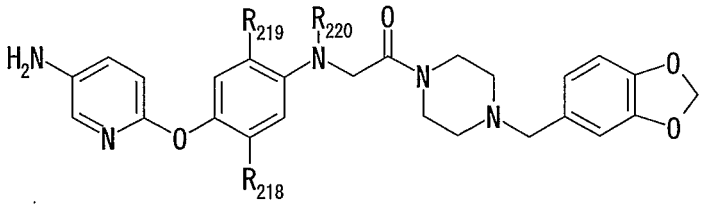
Reference Example No.	R_{214}	^{1}H NMR ($CDCl_3$) δppm or MS
381		MS 460(M^+)
382		^{1}H NMR 1.90-2.03(1H, m), 2.20-2.55(3H, m), 3.11-3.25(1H, m), 3.25-3.38(1H, m), 3.43(2H, s), 3.57(2H, s), 3.60-3.88(2H, m), 4.70(1H, d, J = 6.5 Hz), 5.18(1H, d, J = 6.5 Hz), 6.76(1H, d, J = 8.6 Hz), 7.02(2H, d, J = 8.5 Hz), 7.08(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.20-7.35(7H, m), 7.73(1H, dd, J = 3.1 Hz, 0.5 Hz).
383		^{1}H NMR 2.25(4H, t, J = 5.0 Hz), 3.19(3H, s), 3.22(4H, t, J = 5.0 Hz), 3.43(2H, s), 3.56(2H, brs), 6.77(1H, d, J = 8.6 Hz), 7.00(2H, d, J = 9.2 Hz), 7.05(2H, d, J = 9.2 Hz), 7.09(1H, dd, J = 8.6 Hz, 2.8 Hz), 7.17-7.35(5H, m), 7.72(1H, d, J = 2.8 Hz).
384		^{1}H NMR 2.20(3H, s), 3.07(1H, dd, J = 14.2 Hz, 10.1 Hz), 3.50(2H, brs), 3.52(1H, dd, J = 14.2 Hz, 3.8 Hz), 4.51(1H, dd, J = 10.1 Hz, 3.8 Hz), 6.73(1H, d, J = 8.5 Hz), 6.90(1H, d, J = 8.5 Hz), 7.03(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.08(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.10(1H, d, J = 3.0 Hz), 7.67(1H, d, J = 3.0 Hz), 8.10(1H, brs).
385		^{1}H NMR 3.62(2H, brs), 3.97(3H, s), 6.86(1H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.32 (1H, dd, J = 8.9 Hz, 2.5 Hz), 7.41(1H, d, J = 2.1 Hz), 7.72-7.75(2H, m), 7.92(1H, d, J = 8.9 Hz), 8.02(1H, dd, J = 8.6 Hz, 1.7 Hz), 8.56(1H, s).
386		^{1}H NMR 3.63(2H, brs), 3.98(3H, s), 6.90(1H, d, J = 8.6 Hz), 6.94(1H, d, J = 8.2 Hz), 7.15(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.54-7.57(1H, m), 7.62-7.68 (1H, m), 7.77(1H, d, J = 3.0 Hz), 8.18(1H, d, J = 8.2 Hz), 8.32-8.35(1H, m), 9.03(1H, d, J = 8.7 Hz).
387		^{1}H NMR 1.45(3H, t, J = 7.1 Hz), 3.57(2H, brs), 4.47(2H, q, J = 7.1 Hz), 6.83(1H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.38(1H, dd, J =9.4 Hz, 2.6 Hz), 7.43-7.49(2H, m), 7.75(1H, d, J = 3.0 Hz), 7.89(1H, d, J = 8.2 Hz), 8.10(1H, dd, J = 7.3 Hz, 1.3 Hz), 8.93(1H, d, J = 9.4 Hz).

Table 55



Reference Example No.	R_{215}	R_{216}	R_{217}	Xa_9	Xa_{10}	^{1}H NMR ($CDCl_3$) δppm or MS
388	-H	-CH_3	piperonyl	-CH_2-	-CH_2-	MS 474(M^+)
389	-H	-F	benzyl	none	none	^{1}H NMR 2.46(4H, brs), 3.54(6H, brs), 6.83(1H, d, J = 8.7 Hz), 7.09 (1H, dd, J = 8.6 Hz, 3.0 Hz), 7.16-7.36(8H, m), 7.61(1H, d, J = 3.0 Hz).
390	-H	-OCH_3	piperonyl	-CH_2-	-CH_2-	^{1}H NMR 2.31-2.41(4H, m), 2.59-2.65(2H, m), 2.92-2.98(2H, m), 3.41 (4H, brs), 3.62-3.65(2H, m), 3.76(3H, s), 5.95(2H, s), 6.71-6.79(4H, m), 6.83-6.85(2H, m), 6.97(1H, d, J = 8.1 Hz), 7.06(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.63(1H, d, J = 2.8 Hz).
391	-H	-H	-$COOC(CH_3)_3$	-CH_2-	-CH(OH)-	^{1}H NMR 1.47(9H, s), 2.81-2.98(2H, m), 3.01-3.20(1H, m), 3.29(3H, brs), 3.39(2H, brs), 3.51(2H, brs), 3.58-3.78(3H, m), 4.58(1H, q, J = 7.0 Hz), 6.75(1H, d, J = 8.8 Hz), 6.99(2H, d, J = 8.6 Hz), 7.07(1H, dd, J = 8.8 Hz, 3.0 Hz), 7.19(2H, d, J = 8.6 Hz), 7.67(1H, d, J = 3.0 Hz).
392	-CH_3	-H	piperonyl	-CH_2-	-CH_2-	MS 474(M^+)

Table 56



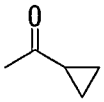
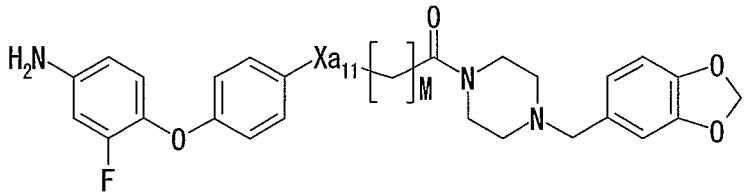
Reference Example No.	R_{218}	R_{219}	R_{220}	^{1}H NMR ($CDCl_3$) δppm or MS
393	-H	-H	-H	^{1}H NMR 2.42-2.49(4H, m), 3.42-3.48(4H, m), 3.66-3.72(2H, m), 3.86(2H, d, J = 4.3 Hz), 4.82(1H, t, J = 4.3 Hz), 5.96(2H, s), 6.62(2H, d, J = 8.8 Hz), 6.68(1H, d, J = 8.6 Hz), 6.73-6.78(2H, m), 6.86(1H, d, J = 1.0 Hz), 6.95(1H, d, J = 8.8 Hz), 7.05(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.69(1H, d, J = 3.0 Hz)
394	-H	-H	-Ac	^{1}H NMR 1.94(3H, s), 2.45-2.55(4H, m), 3.45-3.70(8H, m), 4.42(2H, s), 5.95(2H, s), 6.75-6.85(3H, m), 6.92 (1H, s), 7.04(2H, d, J = 8.8 Hz), 7.12(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.36(2H, d, J = 8.8 Hz), 7.72(1H, d, J = 3.0 Hz).
395	-H	-H	$-COC_2H_5$	^{1}H NMR 1.06(3H, t, J = 7.5 Hz), 2.17(2H, q, J = 7.5 Hz), 2.40-2.45(4H, m), 3.41(4H, s), 3.59(2H, s), 4.42 (2H, s), 5.94(2H, s), 6.70-6.75(2H, m), 6.80-6.85(2H, m), 7.04(2H, d, J = 8.7 Hz), 7.11(1H, dd, J = 3.1 Hz, 8.6 Hz), 7.36(2H, d, J = 8.7 Hz), 7.72(1H, d, J = 3.1 Hz).
396	-H	-H		^{1}H NMR 0.60-1.55(5H, m), 2.39(4H, brs), 3.42(4H, brs), 3.55(2H, brs), 4.46(2H, brs), 5.94(2H, s), 6.69-6.75(2H, m), 6.77-6.85(2H, m), 7.00-7.15(2H, m), 7.40-7.46(2H, m), 7.72(1H, s).
397	-H	-H	cyclopropyl	^{1}H NMR 0.60-0.66(2H, m), 0.77-0.83(2H, m), 2.42-2.44(4H, m), 2.77-2.79(1H, m), 3.43-3.52(6H, m), 3.59-3.62(2H, m), 4.16(2H, s), 5.95(2H, s), 6.66(1H, d, J = 8.6 Hz), 6.75(2H, s), 6.86-6.97(5H, m), 7.03(1H, dd, J = 8.6 Hz, 2.8 Hz), 7.70(1H, d, J = 2.8 Hz).
398	$-CH_3$	$-CH_3$	$-C_2H_5$	MS 517(M^+)
399	$-COOCH_3$	-H	$-C_2H_5$	MS 547(M^+)

Table 57



Reference Example No.	Xa_{11}	M	^{1}H NMR ($CDCl_3$) δppm
400	-NH-	0	2.40-2.50(4H, m), 3.40-3.55(6H, m), 3.68(2H, brs), 5.95(2H, s), 6.27(1H, s), 6.30-6.55(2H, m), 6.65-6.95(5H, m), 7.20-7.30(2H, m).
401	-NH-	1	2.40-2.50(4H, m), 3.35-3.45(4H, m), 3.55-3.70(4H, m), 3.83(2H, d, J = 4.4 Hz), 4.72(1H, t, J = 4.4 Hz), 5.95(2H, s), 6.30-6.40(1H, m), 6.45-6.60(3H, m),
402	-N(Ac)-	1	1.91(3H, s), 2.40-2.50(4H, m), 3.45-3.75(8H, m), 4.41(2H, s), 5.94 (2H, s), 6.40-6.52(2H, m), 6.70-6.75(2H, m), 6.80-6.95(4H, m), 7.28 (2H, d, J = 9.0 Hz).
403	-O-	1	2.41(4H, brs), 3.42(2H, s), 3.50-3.80(6H, m), 4.63(2H, s), 5.94(2H, s), 6.40(1H, ddd, J = 1.2 Hz, 2.6 Hz, 7.4 Hz), 6.50(1H, dd, J = 2.6 Hz, 12.1 Hz), 6.65-6.75(2H, m), 6.80-6.95(6H, m).

Reference Example 404

Production of methyl 3-[(4-hydroxyphenyl)methylamino]-propionate

Methyl 3-[(4-benzyloxyphenyl)methylamino]-propionate (27.3 g, 91.1 mmol) was dissolved in ethanol (300 mL), and the resulting solution was cooled with ice and 10% palladium-carbon (3.0 g) was added. The resulting solution was stirred for 4.5 hours at room temperature under a hydrogen atmosphere. The reaction solution was filtered through Celite to remove insoluble matter, and the filtrate was concentrated

under reduced pressure to thereby yield 19.1 g of the title compound.

Appearance: Red oil

^{1}H NMR ($CDCl_3$) δ 2.51-2.56(2H, m), 2.83(3H, brs), 3.57(2H, brs), 3.66(3H, s), 4.99(1H, brs), 6.71-6.74(4H, m).

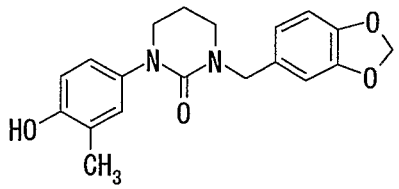
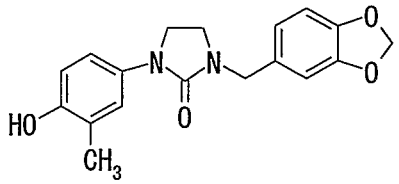
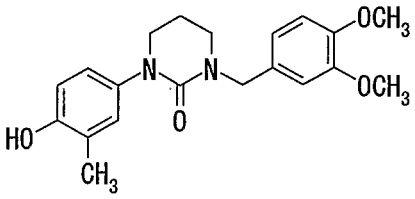
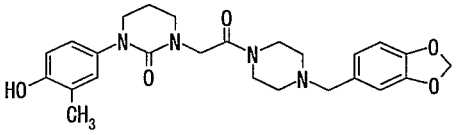
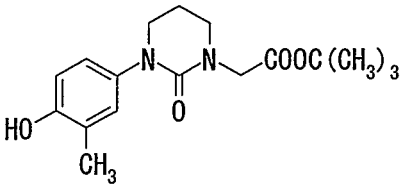
The following compounds were produced in the same manner as in Reference Example 404.

Reference Example 405

Ethyl [acetyl(4-hydroxyphenyl)amino]acetate

^{1}H NMR ($CDCl_3$) δ 1.26(3H, t, J = 7.1 Hz), 1.92(3H, s), 4.19(2H, q, J = 7.1 Hz), 4.34(2H, s), 6.16(1H, s), 6.87(2H, d, J = 8.8 Hz), 7.21(2H, d, J = 8.8 Hz).

Table 58

Reference Example No.	Chemical Structure	mp (℃) or ^{1}H NMR ($CDCl_3$) δppm
406		mp 172.0 - 173.0
407		^{1}H NMR 2.24(3H, s), 3.25-3.39(2H, m), 3.66-3.81 (2H, m), 4.36(2H, s), 4.93(1H, s), 5.95(2H, s), 6.71(1H, d, J = 8.6 Hz), 6.77(2H, d, J = 0.6 Hz), 6.83(1H, s), 7.15(1H, dd, J = 2.8 Hz, 8.6 Hz), 7.32(1H, d, J = 2.8 Hz).
408		^{1}H NMR 1.94-2.12(2H, m), 2.08(3H, s), 3.29(2H, t, J = 6.0 Hz), 3.58(2H, t, J = 6.0 Hz), 3.89(3H, s), 3.93(3H, s), 4.57(2H, s), 6.34(1H, d, J = 8.4 Hz), 6.71(1H, dd, J = 2.6 Hz, 8.4 Hz), 6.75-6.93(3H, m), 6.96(1H, d, J = 1.3 Hz), 7.61(1H, s).
409		^{1}H NMR 2.07(3H, s), 2.09-2.18(2H, m), 2.37-2.50 (4H, m), 3.41(2H, s), 3.43-3.54(4H, m), 3.54-3.68 (4H, m), 4.22(2H, s), 5.94(2H, s), 6.35(1H, d, J = 8.4 Hz), 6.62-6.77(3H, m), 6.83(1H, d, J = 1.1 Hz), 6.88(1H, d, J = 2.4 Hz).
410		^{1}H NMR 1.49(9H, s), 2.07(3H, s), 2.07-2.21(2H, m), 3.45(2H, t, J = 5.9 Hz), 3.61(2H, t, J = 5.9 Hz), 4.07(2H, s), 6.33(1H, d, J = 8.4 Hz), 6.71(1H, dd, J = 2.6 Hz, 8.4 Hz), 6.87(1H, d, J = 2.6 Hz), 7.26(1H, s).

Reference Example 411

Production of [4-(5-aminopyridin-2-yloxy)phenyl](4-piperonylpiperazin-1-yl)methanone

[4-(5-nitropyridin-2-yloxy)phenyl](4-piperonylpiperazin-1-yl)methanone (0.36 g, 0.78 mmol) was dissolved in a mixed solvent consisting of ethanol (5 mL) and THF (5 mL). To the resulting solution was added 5% platinum-carbon (0.06 g), and stirred at room

temperature under a hydrogen atmosphere. Two hours later, the 5% platinum-carbon was removed by filtration, and the solvent was evaporated under reduced pressure, to thereby yield 0.32 g of the title compound.

Appearance: Pale yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.43(4H, brs), 3.44(2H, s), 3.58(6H, brs), 5.95(2H, s), 6.74(2H, s), 6.80(1H, d, J = 8.6 Hz), 6.85(1H, s), 7.05(2H, d, J = 8.6 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.40(2H, d, J = 8.7 Hz), 7.74(1H, d, J = 2.6 Hz).

The following compounds were produced in the same manner as in Reference Example 411.

Reference Example 412

4-[5-(4-Trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenylamine

^{1}H NMR ($CDCl_3$) δ 3.63(2H, brs), 5.02(2H, s), 6.70(2H, d, J = 8.9 Hz), 6.88(1H, d, J = 8.4 Hz), 6.94(2H, d, J = 8.9 Hz), 7.01(2H, d, J = 8.6 Hz), 7.55(2H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.22(1H, d, J = 2.3 Hz).

Reference Example 413

3-Methyl-4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenylamine

^{1}H NMR ($CDCl_3$) δ 2.08(3H, s), 3.58(2H, brs), 5.02(2H,

s), 6.65(1H, dd, J = 8.2 Hz, 2.8 Hz), 6.60(1H, d, J = 2.8 Hz), 6.83-6.87(2H, m), 7.02(2H, d, J = 8.9 Hz), 7.56(2H, d, J = 9.1 Hz), 7.72(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.21(1H, d, J = 2.5 Hz).

Reference Example 414

2-{[4-(4-Aminophenoxy)phenyl]methylamino}-1-(4-piperonylpiperazin-1-yl)ethanone

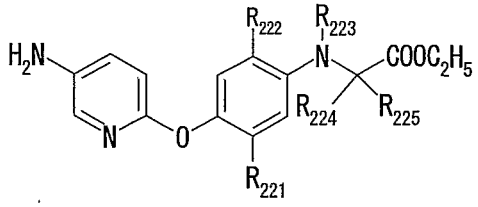
^{1}H NMR ($CDCl_3$) δ 2.41(4H, t, J = 5.1 Hz), 2.99(3H, s), 3.42(2H, s), 3.48(2H, t, J = 4.8 Hz), 3.50(2H, brs), 3.62(2H, t, J = 4.8 Hz), 4.04(2H, s), 5.95(2H, s), 6.61-6.68(4H, m), 6.73-6.88(7H, m).

Reference Example 415

2-{[3-(5-Aminopyridin-2-yloxy)phenyl]methylamino}-1-(4-piperonylpiperazin-1-yl)ethanone

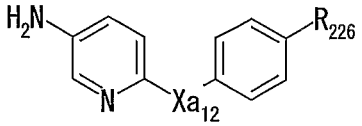
^{1}H NMR ($CDCl_3$) δ 2.40(4H, t, J = 4.9 Hz), 3.00(3H, s), 3.41(2H, s), 3.44-3.46(2H, m), 3.51(2H, brs), 3.59-3.61(2H, m), 4.06(2H, s), 5.95(2H, s), 6.35-6.45(3H, m), 6.70-6.74(3H, m), 6.85(1H, s), 7.05(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.12-7.18(1H, m), 7.73(1H, d, J = 3.1 Hz).

Table 59



Reference Example No.	R_{221}	R_{222}	R_{223}	R_{224}	R_{225}	^{1}H NMR ($CDCl_3$) δppm or MS
416	-H	-H	-CH_3	-CH_3	-CH_3	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 1.38(6H, s), 2.86(3H, s), 3.50 (2H, brs), 4.17(2H, q, J = 7.1 Hz), 6.73(1H, dd, J = 8.6 Hz, 0.3 Hz), 6.93(2H, d, J = 9.1 Hz), 7.02-7.09(3H, m), 7.73(1H, d, J = 3.0 Hz).
417	-F	-H	-CH_3	-H	-H	^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 3.05(3H, s), 3.44(2H, brs), 4.02 (2H, s), 4.19(2H, q, J = 7.1 Hz), 6.38-6.51(2H, m), 6.75 (1H, d, J = 8.6 Hz), 7.01-7.13(2H, m), 7.63(1H, d, J = 3.0 Hz).
418	-F	-H	-C_2H_5	-H	-H	^{1}H NMR 1.16-1.30(6H, m), 3.43(2H, brs), 3.43(2H, q, J = 7.1 Hz), 3.98(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.33-6.47(2H, m), 6.75(1H, d, J = 8.6 Hz), 6.99-7.09(2H, m), 7.64(1H, d, J = 3.0 Hz).
419	-F	-H	-$(CH_2)_2CH_3$	-H	-H	^{1}H NMR 0.95(3H, t, J = 7.4 Hz), 1.27(3H, t, J = 7.3 Hz), 1.59-1.70(2H, m), 3.31(2H, t, J = 7.6 z), 3.45(2H, brs), 3.99(2H, s), 4.20(2H, q, J = 7.1 Hz), 6.32-6.45(2H, m), 6.75(1H, dd, J = 8.7 Hz, 0.7 Hz), 7.04(1H, t, J = 9.1 Hz), 7.05(1H, dd, J = 7.4 Hz, 5.8 Hz), 7.64(1H, dd, J = 3.0 Hz, 0.7 Hz).
420	-F	-H	-Ac	-H	-H	^{1}H NMR 1.29(3H, t, J = 7.1 Hz), 1.98(3H, s), 3.55(2H, brs), 4.21(2H, q, J = 7.1 Hz), 4.35(2H, s), 6.87(1H, d, J = 8.7 Hz), 7.10-7.29(4H, m), 7.63(1H, d, J = 3.0 Hz).
421	-H	-CF3	-C_2H_5	-H	-H	MS 383(M^+)

Table 60



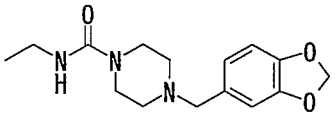
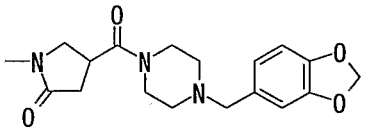
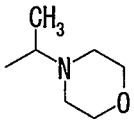
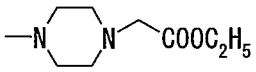
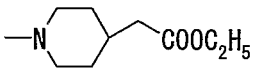
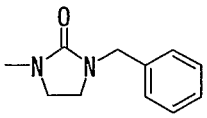
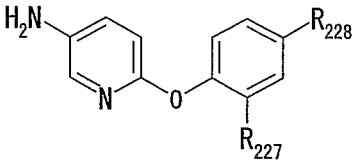
Reference Example No.	Xa_{12}	R_{226}	^{1}H NMR ($CDCl_3$) δppm
422	-O-	$-CH_2CN$	3.54(2H, brs), 3.72(2H, s), 6.79(1H, d, J = 8.5 Hz), 7.06(2H, d, J = 8.9 Hz), 7.09(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.30(2H, d, J = 8.9 Hz), 7.71(1H, d, J = 3.0 Hz).
423	-O-		2.41(4H, t, J = 5.1 Hz), 3.38(4H, t, J = 5.1 Hz), 3.42(2H, s), 3.54(2H, brs), 4.37(2H, d, J = 5.1 Hz), 4.72(1H, t, J = 5.1 Hz), 5.94(2H, s), 6.74(2H, s), 6.77(1H, d, J = 8.7 Hz), 6.85(1H, s), 7.01(2H, d, J = 8.5 Hz), 7.08(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.28 (2H, d, J = 8.5 Hz), 7.68(1H, d, J = 2.8 Hz).
424	-O-		2.45-2.47(4H, m), 2.73-2.98(2H, m), 3.45(2H, s), 3.49-3.72(7H, m), 3.85-3.91(1H, m), 4.24-4.30 (1H, m), 5.96(2H, s), 6.74-6.78(3H, m), 6.86(1H, s), 7.05-7.11(3H, m), 7.53-7.58(2H, m), 7.70(1H, d, J = 3.0 Hz).
425	-O-		1.35(3H, d, J = 6.6 Hz), 2.37-2.52(4H, m), 3.31 (1H, q, J = 6.6 Hz), 3.67-3.72(4H, m), 6.76(1H, d, J = 8.6 Hz), 6.99(2H, d, J = 8.3 Hz), 7.08(1H, dd, J = 8.6 Hz, 2.3 Hz), 7.27(2H, d, J = 8.4 Hz), 7.72 (1H, d, J = 3.0 Hz).
426	$-N(CH_3)-$		1.30(3H, t, J = 7.1 Hz), 2.76(4H, t, J = 5.0 Hz), 3.24(4H, t, J = 5.0 Hz), 3.28(3H, s), 3.35(4H, s), 4.21(2H, q, J = 7.1 Hz), 6.42(1H, dd, J = 8.8 Hz, 0.7 Hz), 6.83(1H, dd, J = 8.8 Hz, 2.9 Hz), 6.92(2H, d, J = 8.9 Hz), 7.10(2H, d, J = 8.9 Hz), 7.79(1H, dd, J = 2.9 Hz, 0.7 Hz).
427	$-N(CH_3)-$		1.28(3H, t, J = 7.1 Hz), 1.46(2H, qd, J = 12.3 Hz, 3.6 Hz), 1.77-2.10(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.73(2H, td, J = 12.3 Hz, 2.4 Hz), 3.23(2H, brs), 3.35(3H, s), 3.63(2H, d, J = 12.3 Hz), 4.15(2H, q, J = 7.1 Hz), 6.41(1H, d, J = 8.9 Hz), 6.82(1H, dd, J = 8.9 Hz, 3.0 Hz), 6.92(2H, d, J = 8.9 Hz), 7.09(2H, d, J = 8.9 Hz), 7.79(1H, d, J = 2.5 Hz).
428	-O-		3.28-3.42(2H, m), 3.43-3.59(2H, m), 3.71-3.88 (2H, m), 4.47(2H, s), 6.73(1H, d, J = 8.6 Hz), 7.01-7.11(3H, m), 7.25-7.39(5H, m), 7.51-7.59 (2H, m), 7.70(1H, d, J = 2.9 Hz).

Table 61



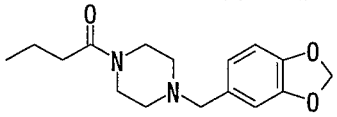
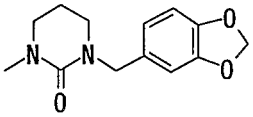
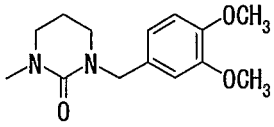
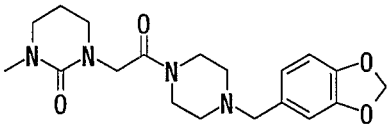
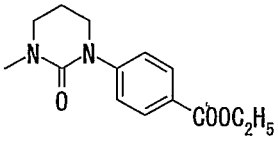
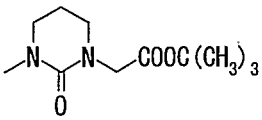
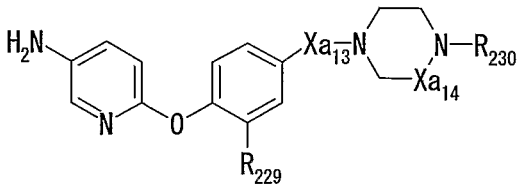
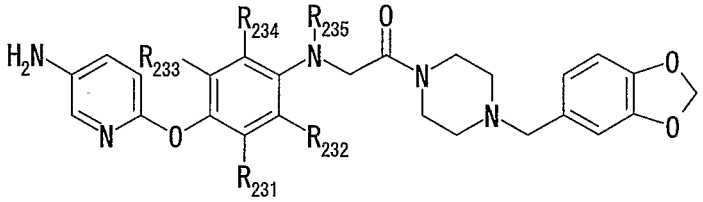
Reference Example No.	R_{227}	R_{228}	^{1}H NMR ($CDCl_3$) δppm or MS
429	-F		MS 478(M^+)
430	$-CH_3$		^{1}H NMR 1.96-2.11(2H, m), 2.19(3H, s), 3.29(2H, t, J = 5.9 Hz), 3.46(2H, s), 3.68(2H, t, J = 5.9 Hz), 4.52(2H, s), 5.95(2H, s), 6.67(1H, d, J = 8.6 Hz), 6.73-6.81(2H, m), 6.88(1H, s), 6.93(1H, d, J = 8.6 Hz), 7.05(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.09(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.18-7.22(1H, m), 7.00(1H, d, J = 3.0 Hz).
431	$-CH_3$		^{1}H NMR 1.99-2.11(2H, m), 2.19(3H, s), 3.29(2H, t, J = 6.0 Hz), 3.47(2H, s), 3.68(2H, d, J = 6.0 Hz), 3.88(3H, s), 3.88(3H, s), 4.56(2H, s), 6.68(1H, d, J = 8.6 Hz), 6.82(1H, d, J = 8.1 Hz), 6.86(1H, dd, J = 1.8 Hz, 8.1 Hz), 6.91(1H, d, J = 1.8 Hz), 6.93(1H, d, J = 8.6 Hz), 7.05(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.09(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.19(1H, d, J = 2.6 Hz), 7.69(1H, d, J = 3.0 Hz).
432	$-CH_3$		^{1}H NMR 2.10-2.21(2H, m), 2.35-2.48 (4H, m), 3.42(2H, s), 3.43-3.54(6H, m), 3.57-3.66(2H, m), 3.73(2H, t, J = 5.7 Hz), 4.21(2H, s), 5.95(2H, s), 6.66(1H, d, J = 8.6 Hz), 6.69-6.77(2H, m), 6.84(1H, d, J = 1.2 Hz), 6.92(1H, d, J = 8.6 Hz), 7.02-7.09(2H, m), 7.17(1H, d, J = 2.4 Hz), 7.69(1H, d, J = 2.8 Hz).
433	$-CH_3$		^{1}H NMR 1.38(3H, t, J = 7.1 Hz), 2.19(3H, s), 2.19-2.38(2H, m), 3.47(2H, s), 3.73-3.93(4H, m), 4.36(2H, q, J = 7.1 Hz), 6.67(1H, d, J = 8.6 Hz), 6.94(1H, d, J = 8.6 Hz), 7.05(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.12(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.22(1H, d, J = 2.6 Hz), 7.40-7.48(2H, m), 7.69(1H, d, J = 3.0 Hz), 7.95-8.04(2H, m).
434	$-CH_3$		^{1}H NMR 1.47(9H, s), 2.05-2.24(5H, m), 3.34-3.54(4H, m), 3.77(2H, t, J = 5.8 Hz), 4.04(2H, s), 6.65(1H, d, J = 8.6 Hz), 6.90(1H, d, J = 8.6 Hz), 6.99-7.10(2H, m), 7.17(1H, d, J = 2.4 Hz), 7. 68(1H, d, J = 3.0 Hz).

Table 62



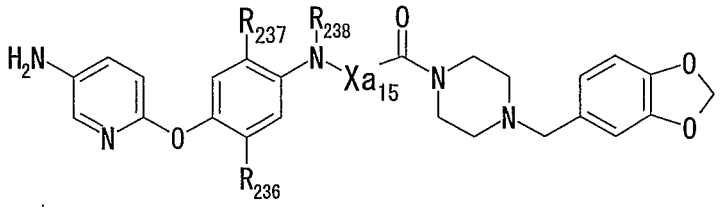
Reference Example No.	R_{229}	Xa_{13}	R_{230}	Xa_{14}	^{1}H NMR ($CDCl_3$) δppm
435	-H	-CO-	3-pyridyl	-CH_2-	3.23(4H, brs), 3.62(2H, brs), 3.81(4H, brs), 6.83(1H, d, J = 8.6 Hz), 7.09(2H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.20-7.21(2H, m), 7.45(2H, d, J = 8.7 Hz), 7.55(1H, d, J = 3.0 Hz), 8.14-8.17(1H, m), 8.31-8.33(1H, m).
436	-H	none	piperonyl	-CO-	3.37(4H, s), 3.48(2H, brs), 3.90(2H, s), 4.57(2H, s), 5.95(2H, s), 6.72(1H, dd, J = 8.5 Hz, 0.7 Hz), 6.74-6.78(2H, m), 6.78-6.82(1H, m), 6.86(2H, d, J = 9.1 Hz), 7.02(2H, d, J = 9.1 Hz), 7.06(1H, dd, J = 8.5 Hz, 2.9 Hz), 7.69(1H, d, J = 2.9 Hz).
437	-$COOCH_3$	none	benzyl	-CH_2-	2.58-2.62(4H, m), 3.14-3.18(4H, m), 3.61(2H, s), 3.65(3H, s), 6.63(1H, d, J = 8.7 Hz), 6.95(1H, d, J = 8.9 Hz), 7.12-7.18(2H, m), 7.25-7.36(5H, m), 7.41(1H, d, J = 3.0 Hz), 7.51(1H, d, J = 2.8 Hz).
438	-H	-CH_2-	-$COOC(CH_3)_3$	-CH_2-	1.45(9H, s), 2.36-2.40(4H, m), 3.40-3.44(4H, m), 3.47(2H, s), 3.56(2H, brs), 6.76(1H, d, J = 8.6 Hz), 6.97-7.02(2H, m), 7.08(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.25-7.29(2H, m), 7.71(1H, d, J = 3.0 Hz).
439	-H	-CO-	benzyl	-CH_2-	2.38(4H, brs), 3.33(2H, brs), 3.50(4H, brs), 5.17(2H, brs), 6.82(1H, d, J = 8.6 Hz), 6.96(2H, d, J = 8.7 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.27-7.33(5H, m), 7.36(2H, d, J = 8.7 Hz), 7.57(1H, d, J = 3.0 Hz).
440	-H	-CO-	4-CH_3OPhCH_2-	-CH_2-	2.44(4H, brs), 3.48(2H, s), 3.59(4H, brs), 3.81 (3H, s), 6.80(1H, dd, J = 8.6 Hz, 0.7 Hz), 6.85-6.89(2H, m), 7.03-7.08(2H, m), 7.11(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.21-7.26(2H, m), 7.38-7.43(2H, m), 7.73-7.75(1H, m).
441	-H	-SO_2-	benzyl	-CH_2-	2.42-2.57(4H, m), 2.91-3.10(4H, m), 3.47(2H, s), 3.63(2H, brs), 6.83(1H, d, J = 8.6 Hz), 7.07-7.14(3H, m), 7.18-7.31(5H, m), 7.68(2H, d, J = 8.8 Hz), 7.74(1H, d, J = 2.0 Hz).

Table 63



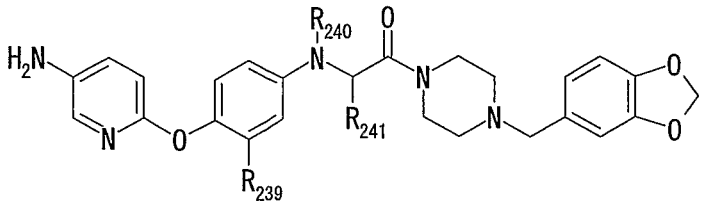
Reference Example No.	R_{231}	R_{232}	R_{233}	R_{234}	R_{235}	^{1}H NMR ($CDCl_3$) δppm
442	-F	-H	-H	-H	-H	2.43-2.48(4H, m), 3.44-3.47(6H, m), 3.67-3.68(2H, m), 3.82(2H, d, J = 4.1 Hz), 4.96(1H, brs), 5.96(2H, s), 6.36-6.43(2H, m), 6.71-6.78(3H, m), 6.86(1H, brs), 6.97-7.03(1H, m), 7.06(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.63(1H, d, J = 3.0 Hz).
443	-F	-H	-H	-H	$-CH_3$	2.43-2.45(4H, m), 3.01(3H, s), 3.44(2H, s), 3.47(2H, brs), 3.63(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.39-6.50(2H, m), 6.72-6.76(3H, m), 6.85(1H, s), 7.00-7.08(2H, m), 7.63(1H, dd, J = 3.0 Hz, 0.5 Hz).
444	-F	-H	-H	-H	$-C_2H_5$	1.18(3H, t, J = 7.1 Hz), 2.43(4H, t, J = 5.0 Hz), 3.37-3.48(8H, m), 3.63(2H, brs), 4.01(2H, s), 5.95 (2H, s), 6.35-6.46(2H, m), 6.72-6.77(3H, m), 6.85 (1H, s), 6.99(1H, d, J = 8.9 Hz), 7.05(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.63(1H, d, J = 3.0 Hz).
445	-F	-H	-H	-F	$-CH_3$	2.33-2.49(4H, m), 2.93(3H, s), 3.38-3.68(8H, m), 4.00(2H, s), 5.95(2H, s), 6.71-6.77(2H, s), 6.78-6.82 (2H, m), 6.83-6.91(2H, m), 7.08(1H, dd, J = 2.9 Hz, 8.6 Hz), 7.62(1H, d, J = 2.9 Hz).
446	-F	-H	-H	-F	$-C_2H_5$	1.11(3H, t, J = 7.1Hz), 2.31-2.49(4H, m), 3.29(2H, q, J = 7.1Hz), 3.41(2H, s), 3.42-3.69(6H, m), 3.96(2H, s), 6.70-6.78(2H, m), 6.79-6.91(4H, m), 7.08(1H, dd, J = 2.9 Hz, 8.6 Hz), 7.62(1H, d, J = 2.9 Hz).
447	-F	-H	-F	-H	$-CH_3$	2.36-2.52(4H, m), 3.01(3H, s), 3.34-3.54(6H, m), 3.55-3.71(2H, m), 4.05(2H, s), 5.95(2H, s), 6.18-6.29 (2H, m), 6.70-6.79(2H, m), 6.82(1H, d, J = 8.6 Hz), 6.85(1H, d, J = 0.98 Hz), 7.07(1H, dd, J = 2.9 Hz, 8.6 Hz), 7.59(1H, d, J = 2.9 Hz).
448	-F	-F	-H	-H	$-CH_3$	2.29-2.55(4H, m), 2.95(3H, s), 3.30-3.75(8H, m), 4.01(2H, s), 5.95(2H, s), 6.60-6.95(6H, m), 7.09(1H, dd, J = 3.0 Hz, 8.6 Hz), 7.62(1H, d, J = 3.0 Hz).
449	$-CH_3$	$-CH_3$	-H	-H	$-CH_3$	2.11(3H, s), 2.25(3H, s), 2.36-2.42(4H, m), 2.66(3H, s), 3.41(2H, s), 3.45(2H, brs), 3.53-3.56(2H, m), 3.61-3.64(2H, m), 3.73(2H, s), 5.95(2H, s), 6.67(1H, d, J = 8.7 Hz), 6.70-6.85(4H, m), 6.95(1H, d, J = 8.7 Hz), 7.03-7.08(1H, m), 7.67(1H, d, J = 3.0 Hz).
450	$-CH_3$	-H	-H	-H		0.62-0.66(2H, m), 0.76-0.83(2H, m), 2.12(3H, s), 2.40-2.46(4H, m), 2.73-2.81(1H, m), 3.43(2H, s), 3.48-3.63(4H, m), 4.15(2H, s), 5.94(2H, s), 6.58(1H, d, J = 8.7 Hz), 6.68-6.77(4H, m), 6.87(2H, d, J = 8.6 Hz), 7.01(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.67(1H, d, J = 3.0 Hz).

Table 64



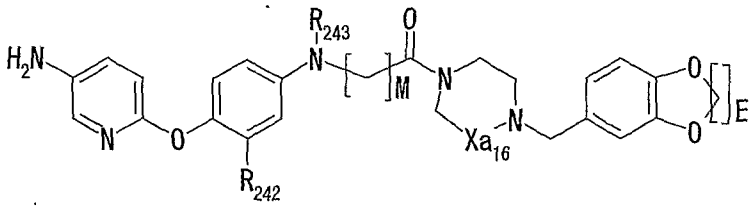
Reference Example No.	R_{236}	R_{237}	R_{238}	Xa_{15}	^{1}H NMR ($CDCl_3$) δppm or MS
451	-CH_3	-H	-H	-CO-	^{1}H NMR 2.20(3H, s), 2.48-2.54(4H, m), 3.44(4H, s), 3.67-3.75(2H, m), 4.23-4.27(2H, m), 5.95(2H, s), 6.68-6.78(3H, m), 6.86(1H, brs), 6.95(1H, d, J = 8.7 Hz), 7.07(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.37(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.52(1H, d, J = 2.5 Hz), 7.66(1H, d, J = 3.0 Hz), 9.13(1H, brs).
452	-CH_3	-H	-CH_3	-CO-	^{1}H NMR 2.21-2.31(7H, m), 3.28-3.40(9H, m), 3.53(2H, brs), 5.93(2H, s), 6.66-6.80(4H, m,) 6.91(1H, d, J = 8.6 Hz), 7.03-7.12(3H, m), 7.66(1H, d, J = 3.0 Hz).
453	-H	-H	-SO_2CH_3	-CH_2-	^{1}H NMR 2.41(4H, brs), 3.19(3H, s), 3.34-3.38(2H, m), 3.42(2H, s), 3.57-3.60(4H, m), 4.51(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.80(1H, d, J = 8.6 Hz), 6.84(1H, brs), 7.02(2H, d, J = 8.7 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.59(2H, d, J = 8.7 Hz), 7.71(1H, d, J = 3.0 Hz).
454	-CH_3	-H	-SO_2CH_3	-CH_2-	^{1}H NMR 2.21(3H, s), 2.41(4H, brs), 3.20(3H, s), 3.34-3.38(2H, m), 3.42(2H, s), 3.53(2H, brs), 3.59-3.61(2H, m), 4.51(2H, s), 5.94(2H, s), 6.70-6.77(3H, m), 6.83(1H, brs), 6.90(1H, d, J = 8. 6 Hz), 7.09(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.36(1H, dd, J = 8.6 Hz, 2.1 Hz), 7.42(1H, d, J = 2.3 Hz), 7.66(1H, d, J = 3.0 Hz).
455	-CF_3	-H	-C_2H_5	-CH_2-	MS 557(M^+)
456	-CF_3	-H	-CH_3	-CH_2-	MS 543(M^+)
457	-CN	-H	-CH_3	-CH_2-	MS 500(M^+)
458	-OCH_3	-H	-SO_2CH_3	-CH_2-	^{1}H NMR 2.48(4H, brs), 3.26(3H, s), 3.42-3.66(8H, m), 3.82(3H, s), 4.58(2H, s), 5.99(2H, s), 6.77-6.79(2H, m), 6.81-6.88(2H, m), 7.06-7.30(4H, m), 7.67(1H, d, J = 2.3 Hz).
459	-CH_3	-CH_3	-CH_3	-CH_2-	MS 503(M^+)

Table 65



Reference Example No.	R_{239}	R_{240}	R_{241}	^{1}H NMR ($CDCl_3$) δppm
460	-H	-CH_3	-H	2.40-2.44(4H, m), 3.00(3H, s), 3.49(4H, brs), 3.63(2H, brs), 4.05(2H, s), 5.95(2H, s), 6.67(1H, d, J = 8.6 Hz), 6.69(2H, d, J = 9.1 Hz), 6.74(2H, brs), 6.85(1H, brs), 6.97(2H, d, J = 9.1 Hz), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.68(1H, d, J = 3.0 Hz).
461	-H	-CH_3	-CH_3	1.28(3H, d, J = 6.6 Hz), 2.14-2.21(1H, m), 2.28-2.35(2H, m), 2.47-2.49 (1H, m), 2.75(3H, s), 3.24-3.54(3H, m), 3.38(2H, s), 3.45(2H, s), 3.78-3.84 (1H, m), 4.54(1H, q, J = 6.8 Hz), 5.93(2H, s), 6.68-6.75(5H, m), 6.82(1H, s), 6.99(2H, d, J = 9.1 Hz), 7.05(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.69(1H, dd, J = 3.1 Hz, 0.7 Hz).
462	-CH_3	-CH_3	-CH_3	1.28(3H, d, J = 6.6 Hz), 2.15(3H, s), 2.15-2.21(1H, m), 2.33-2.36(2H, m), 2.49(1H, brs), 2.74(3H, s), 3.25-3.55(3H, m), 3.39(2H, s), 3.42(2H, s), 3.80(1H, brs), 4.55(1H, q, J = 6.4 Hz), 5.93(2H, s), 6.55-6.59(2H, m), 6.64(1H, dd, J = 8.6 Hz, 0.5 Hz), 6.69-6.75(2H, m), 6.83(1H, brs), 6.90 (1H, d, J = 8.7 Hz), 7.04(1H, dd, J = 8.7 Hz, 3.0Hz), 7.67(1H, dd, J = 3.0 Hz, 0.7 Hz).
463	-OCH_3	-CH_3	-H	2.31-2.50(4H, m), 3.02(3H, s), 3.31-3.57(6H, m), 3.58-3.70(2H, m), 3.76 (3H, s), 4.06(2H, s), 5.95(2H, s), 6.24(1H, dd, J = 8.7Hz, 2.8Hz), 6.37(1H, d, J = 2.8Hz), 6.68(1H, d, J = 8.6Hz), 6.69-6.79(2H, m), 6.85(1H, s), 6.94 (1H, d, J = 8.7 Hz), 7.02(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.65(1H, d, J = 3.0 Hz).
464	-OCH_3	-C_2H_5	-H	1.18(3H, t, J = 7.0 Hz), 2.31-2.51(4H, m), 3.28-3.70(10H, m), 3.74(3H, s), 4.01(2H, s), 5.95(2H, s), 6.22(1H, dd, J = 8.7Hz, 2.8 Hz), 6.35(1H, d, J = 2.8 Hz), 6.68(1H dd, J = 8.7Hz, 0.5 Hz), 6.69-6.79(2H, m), 6.81-6.88(1H, m), 6.93(1H, d, J = 8.7 Hz), 7.03(1H, dd, J = 8.7 Hz, 3.0Hz), 7.65(1H, dd, J = 3.0 Hz, 0.5 Hz).
465	-CH_3	-CH_3	-H	2.13(3H, s), 2.42(4H, t, J = 3.0Hz), 2.99(3H, s), 3.35-3.57(6H, m), 3.58-3.70(2H, m), 4.05(2H, s), 5.95(2H, s), 6.53(1H, dd, J = 8.8 Hz, 3.1 Hz), 6.57(1H, d, J = 3.1 Hz), 6.60(1H, d, J = 8.8 Hz), 6.71-6.78(2H, m), 6.85(1H, brs), 6.88(1H, d, J = 8.7 Hz), 7.02(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.67(1H, d, J = 3.0 Hz).
466	-CH_3	-C_2H_5	-H	1.15(3H, t, J = 7.0 Hz), 2.12(3H, s), 2.42(4H, t, J = 5.1Hz), 3.27-3.70 (10H, m), 4.00(2H, s), 5.95(2H, s), 6.46-6.57(2H, m), 6.60(1H, dd, J = 8.7 Hz, 0.5 Hz), 6.69-6.78(2H, m), 6.82-6.90(2H, m), 7.02(1H, dd, J = 8.7 Hz, 3.0Hz), 7.68(1H, dd, J = 3.0 Hz, 0.5 Hz).
467	-CH_3	-Ac	-H	1.95(3H, s), 2.23(3H, s), 2.31-2.52(4H, m), 3.29-3.70(8H, m), 4.43(2H, s), 5.94(2H, s), 6.69-6.79(3H, m), 6.84(1H, s), 6.92(1H, d, J = 8.5 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.19(1H, dd, J = 8.5 Hz, 2.5 Hz), 7.28(1H, d, J = 2.2 Hz), 7.68(1H, d, J = 2.5 Hz).

Table 66

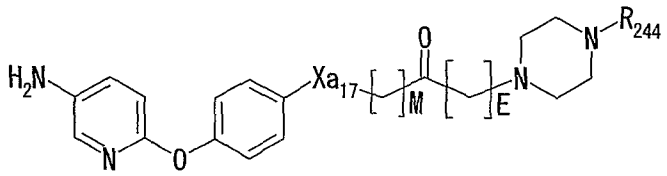


Reference Example No.	R_{242}	R_{243}	Xa_{16}	M	E	^{1}H NMR (solvent) δppm
468	-OCH_3	-H	-CH_2-	1	1	(DMSO-d_6) 2.32-2.40(4H, m), 3.32(2H, brs), 3.50(4H, brs), 3.61(3H, s), 3.88(2H, brs), 4.88(2H, brs), 5.44(1H, brs), 5.99(2H, s), 6.15(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.44 (1H, d, J = 2.3 Hz), 6.51(1H, d, J = 8.6 Hz), 6.71-6.88 (4H, m), 6.98(1H, dd, J = 8.6 Hz, 2.8 Hz), 7.40(1H, d, J = 2.6 Hz).
469	-OCH_3	-H	-CH_2-	1	2	(DMSO-d_6) 2.32(2H, brs), 2.40(2H, brs), 3.39(2H, s), 3.49(4H, brs), 3.61(3H, s), 3.89(2H, brd), 4.22(4H, s), 4.82(2H, brs), 5.44(1H, brt), 6.15(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.44-6.52(2H, m), 6.70-6.81(4H, m), 6.98(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.39(1H, d, J = 2.8 Hz).
470	-H	-CH_3	-CH_2-	2	1	($CDCl_3$) 2.35(4H, tt, J = 5.0 Hz, 5.0 Hz), 2.52-2.58 (2H, m), 2.91(3H, s), 3.36-3.39(4H, m), 3.59-3.62(2H, m), 3.65-3.73(4H, m), 5.93(2H, s), 6.64-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.97(2H, d, J = 9.1 Hz), 7.03 (1H, dd, J = 8.6 Hz, 3.1 Hz), 7.66(1H, dd, J = 3.1 Hz, 0.5 Hz).
471	-CH_3	-CH_3	-CO-	1	1	($CDCl_3$) 2.12(3H, s), 2.88-3.10(3H, m), 3.26(2H, t, J = 5.3 Hz), 3.40(2H, brs), 3.60-3.90(2H, m), 4.00-4.15(2H, m), 4.20-4.40(2H, m), 4.52(2H, s), 5.95(2H, s), 6.53(1H, dd, J = 8.5 Hz, 3.0 Hz), 6.60(1H, s), 6.60(1H, d, J = 8.5 Hz), 6.71(1H, d, J = 8.5 Hz), 6.74(1H, s), 6.76(1H, d, J = 8.5 Hz), 6.88(1H, d, J = 8.8 Hz), 7.02(1H, dd, J = 8.5 Hz, 2.8 Hz), 7.66(1H, d, J = 2.8 Hz).
472	-OCH_3	-C_2H_5	-CO-	1	1	($CDCl_3$) 1.17(3H, t, J = 7.0 Hz), 3.20-3.31(2H, m), 3.40-3.60(2H, m), 3.41(2H, q, J = 7.0 Hz), 3.61-3.82 (2H, m), 3.74(3H, s), 4.02(2H, s), 4.30(2H, s), 4.50(2H, s), 5.95(2H, s), 6.24(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.40 (1H, s), 6.68(1H, d, J = 8.6 Hz), 6.70(1H, dd, J = 7.9 Hz, 1.5 Hz), 6.76(1H, d, J = 1.5 Hz), 6.76(1H, d, J = 7.9 Hz), 6.93(1H, d, J = 8.6 Hz), 7.03(1H, dd, J = 8.5 Hz, 2.8 Hz), 7.64(1H, d, J = 2.8 Hz).

(E means the number of the methylene groups.

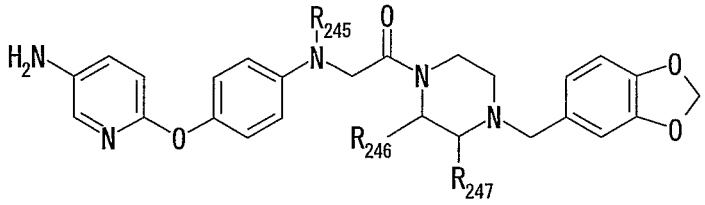
Hereinafter E indicates the same meaning.)

Table 67



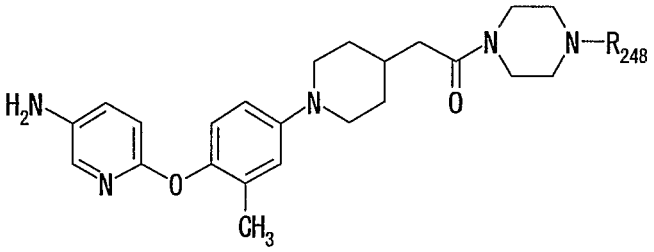
Reference Example No.	Xa_{17}	M	E	R_{244}	Form	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
473	-CH_2-	1	0	benzyl	free	^{1}H NMR 2.33-2.43(4H, m), 2.57-2.63 (2H, m), 2.91-2.97(2H, m), 3.38-3.42(4H, m), 3.50(2H, s), 3.62-3.65(2H, m), 6.75(1H, dd, J = 8.6 Hz, 0.5 Hz), 6.95-7.00(2H, m), 7.07(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.15-7.20(2H, m), 7.28-7.33(5H, m), 7.70(1H, dd, J = 3.0 Hz, 0.5 Hz).
474	-CH_2-	1	0	piperonyl	trihydro-chloride	mp 179-180 dec
475	-O-	1	0	piperonyl	free	^{1}H NMR 2.41(4H, brs), 3.42(2H, s), 3.48 (2H, brs), 3.50-3.70(4H, m), 4.65(2H, s), 5.95(2H, s), 6.72(1H, d, J = 8.6 Hz), 6.74(2H, brs), 6.85(1H, brs), 6.91(2H, d, J = 9.2 Hz), 7.00(2H, d, J = 9.2 Hz), 7.06 (1H, dd, J = 8.6 Hz, 3.0 Hz), 7.69(1H, d, J = 3.0 Hz).
476	-O-	1	0	benzyl	free	^{1}H NMR 2.44(4H, t, J = 5.0 Hz), 3.51(4H, s), 3.58(2H, t, J = 5.0 Hz), 3.64(2H, t, J = 5.0 Hz), 4.65(2H, s), 6.72(1H, d, J = 8.5 Hz), 6.92(2H, d, J = 9.2 Hz), 7.00(2H, d, J = 9.2 Hz), 7.06(1H, dd, J = 8.5 Hz, 3.0 Hz), 7.22-7.35(5H, m), 7.69(1H, d, J = 3.0 Hz).
477	-NH-	0	1	piperonyl	free	^{1}H NMR 2.51(4H, brs), 2.62-2.63(4H, m), 3.12(2H, s), 3.45(2H, s), 3.52(2H, brs), 5.94(2H, s), 6.74(1H, dd, J = 8.7 Hz, 0.7 Hz), 6.75(2H, brs), 6.85 (1H, s), 7.03(2H, d, J = 8.9 Hz), 7.07(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.54(2H, d, J = 9.1 Hz), 7.69(1H, dd, J = 3.0 Hz, 0.7 Hz), 9.10(1H, brs).
478	-N(CH_3)-	0	1	piperonyl	free	^{1}H NMR 2.44(8H, brs), 2.93(2H, s), 3.24 (3H, s), 3.38(2H, s), 3.62(2H, brs), 5.92(2H, s), 6.72 (2H, brs), 6.80-6.84(2H, m), 7.06(2H, d, J = 9.1 Hz), 7.12(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.15(2H, d, J = 8.9 Hz), 7.73(1H, d, J = 3.0 Hz).

Table 68



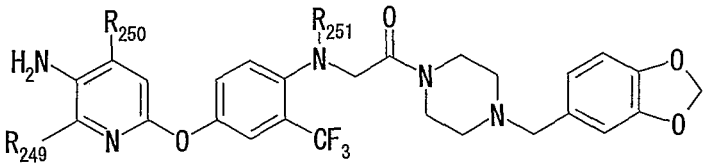
Reference Example No.	R_{245}	R_{246}	R_{247}	^{1}H NMR ($CDCl_3$) δppm
479	$-CH_3$	-H	$-CH_3$	1.12(3H, d, J = 6.3 Hz), 2.10-2.12(1H, m), 2.47(1H, brs), 2.67-2.72 (1H, m), 2.80-3.11(6H, m), 3.47-3.60(3H, m), 3.84-4.10(4H, m), 5.94 (2H, s), 6.64-6.74(5H, m), 6.85(1H, brs), 6.94-6.98(2H, m), 7.00-7.05(1H, m), 7.68(1H, d, J = 2.8 Hz).
480	$-CH_3$	$-CH_3$	-H	1.28-1.37(3H, m), 1.94-2.03(1H, m), 2.11-2.15(1H, m), 2.63-2.67 (1H, m), 2.79-2.82(1H, m), 2.95-3.00(4H, m), 3.30-3.46(5H, m), 4.03-4.69(3H, m), 5.94(2H, s), 6.66(1H, d, J = 8.7 H), 6.68(2H, d, J = 9.1 H), 6.74(2H, brs), 6.87(1H, brs), 6.96(2H, d, J = 9.1 Hz), 7.03(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.68(1H, d, J = 3.0 Hz).
481	$-C_2H_5$	-H	$-CH_3$	1.11-1.18(6H, m), 2.04-2.13(1H, m), 2.45-2.47(1H, m), 2.66-2.73 (1H, m), 2.85-3.64(8H, m), 3.84-4.11(4H, m), 5.94(2H, s), 6.64-6.69 (3H, m), 6.74(2H, brs), 6.85(1H, brs), 6.93-6.96(2H, m), 7.03(1H, dd, J = 8.7 Hz, 3.0Hz), 7.69(1H, d, J = 3.0 Hz).
482	$-C_2H_5$	$-CH_3$	-H	1.15(3H, t, J = 7.1 Hz), 1.26-1.70(3H, m), 1.94-2.04(1H, m), 2.14-2.17(1H, m), 2.63-2.67(1H, m), 2.80(1H, brs), 3.01-3.59(8H, m), 3.73-4.71(3H, m), 5.95(2H, s), 6.63-6.70(3H, m), 6.74(2H, brs), 6.87 (1H, brs), 6.95(2H, d, J = 9.1 Hz), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.69(1H, dd, J = 3.0 Hz, 0.7 Hz).

Table 69



Reference Example No.	R_{248}	^{1}H NMR ($CDCl_3$) δppm
483	piperonyl	1.36-1.46(2H, m), 1.82-1.99(3H, m), 2.13(3H, s), 2.28(2H, d, J = 6.8 Hz), 2.41(4H, brs), 2.70(2H, t, J = 12.0 Hz), 3.41-3.76(10H, m), 5.94(2H, s), 6.59-6.89(7H, m), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.67-7.69(1H, m).
484	benzyl	1.33-1.42(2H, m), 1.82-1.98(3H, m), 2.04(3H, s), 2.28(2H, d, J = 6.8 Hz), 2.41-2.45(4H, m), 2.70(2H, t, J = 12.0 Hz), 3.51-3.78(10H, m), 6.60(1H, d, J = 8.6 Hz), 6.69-6.92(3H, m), 7.03(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.28-7.33(5H, m), 7.67(1H, d, J = 2.5 Hz).

Table 70



Reference Example No.	R_{249}	R_{250}	R_{251}	MS (M^+)
485	-H	-H	$-C_2H_5$	557
486	-H	$-CH_3$	$-CH_3$	557
487	$-CH_3$	-H	$-CH_3$	557

Reference Example 488

Production of ethyl [4-(4-amino-2-fluorophenoxy)phenylsulfanyl]acetate

To a solution of ethyl [4-(2-fluoro-4-nitrophenoxy)phenylsulfanyl]acetate (4.93 g, 14.0 mmol) in ethanol (100 mL) was added tin chloride dihydrate (9.50 g, 42.1 mmol), and the resulting solution was stirred for 8 hours at 50°C. Water was added to the reaction mixture and extracted with ethyl acetate. The ethyl acetate layer was washed with 1 M hydrochloric acid, a saturated sodium bicarbonate solution, and brine, dried over anhydrous sodium sulfate, and evaporated, to thereby yield 3.45 g of the title compound.

Appearance: Brown oil

^{1}H NMR ($CDCl_3$) δ 1.20(3H, t, J = 7.1 Hz), 3.53(2H, s), 3.80-4.20(4H, m), 6.37-6.45(1H, m), 6.49(1H, dd, J = 2.6 Hz, 12.0 Hz), 6.80-7.00(3H, m), 7.38(2H, d, J = 8.9 Hz).

The following compounds were produced in the same manner as in Reference Example 488.

Reference Example 489

2-{Allyl[4-(5-aminopyridin-2-yloxy)-3-fluorophenyl]amino}-1-(4-piperonylpiperazin-1-yl)ethanone

^{1}H NMR ($CDCl_3$) δ 2.44-2.46(4H, m), 3.44(4H, brs), 3.44(2H, s), 3.83(2H, brs), 3.98(2H, d, J = 4.8 Hz), 4.03(2H, s), 5.16-5.30(2H, m), 5.82-5.95(1H, m), 5.95(2H, s), 6.35-6.46(2H, m), 6.71-6.74(3H, m), 6.85-6.87(1H, m), 6.96-7.07(2H, m), 7.63-7.64(1H, m).

Reference Example 490

(*E*)-3-[3-(5-Aminopyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propenone

MS 458(M^+).

Reference Example 491

Production of methyl 3-[4-(5-aminopyridin-2-ylsulfanyl)phenyl]propionate

To a solution of methyl 3-[4-(5-nitropyridin-2-ylsulfanyl)phenyl]propionate (2.97 g, 9.33 mmol) in methanol (50 mL) were added sodium borohydride (0.590 g, 15.6 mmol) and 10% palladium-carbon (1.80 g), and the resulting solution was stirred for 24 hours at room temperature under a hydrogen atmosphere at atmospheric pressure. The reaction solution was filtered through

Celite, and to the resulting filtrate was added concentrated hydrochloric acid (1.5 mL), and concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with ethyl acetate, and the ethyl acetate layer was washed with brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 2.49 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 2.62(2H, t, J = 7.6 Hz), 2.93(2H, t, J = 7.6 Hz), 3.67(3H, s), 6.87(1H, dd, J = 2.9 Hz, 8.4 Hz), 6.98(1H, d, J = 8.4 Hz), 7.15(2H, d, J = 8.2 Hz), 7.35(2H, d, J = 8.2 Hz), 8.01(1H, d, J = 2.9 Hz).

Reference Example 492

Production of ethyl 3-[4-(5-aminopyridin-2-yloxy)phenyl]acrylate

To a solution of ethyl 3-[4-(5-nitropyridin-2-yloxy)phenyl]acrylate (2.02 g, 6.43 mmol) in methanol (100 mL) were added zinc (6.3 g, 96.3 mmol) and ammonium chloride (710 mg, 13.27 mmol). The resulting reaction solution was stirred for 2.5 hours under reflux, then acetic acid (5 mL) was added, and stirred for 20 minutes under reflux. Insoluble matter was filtered off through Celite, after which the filtrate was concentrated under reduced pressure. To the residue was added 5% potassium hydrogensulfate (150

mL), the mixture was extracted with dichloromethane, and the dichloromethane layer was washed with a saturated sodium bicarbonate solution and brine. The dichloromethane layer was dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 1.78 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 1.34(3H, t, J = 7.1 Hz), 3.58(2H, brs), 4.26(2H, q, J = 7.1 Hz), 6.35(1H, dd, J = 16.0 Hz, 2.0 Hz), 6.81(1H, d, J = 8.6 Hz), 7.05(2H, d, J = 8.6 Hz), 7.10(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.50(2H, d, J = 8.6 Hz), 7.66(1H, dd, J = 16.0 Hz, 3.0 Hz), 7.73(1H, d, J = 3.0 Hz).

Reference Example 493

Production of 3-(4-(5-amino-4-methylpyridin-2-yloxy)phenyl)-1-(4-piperonylpiperazin-1-yl)propan-1-one

3-(4-hydroxyphenyl)-1-(4-piperonylpiperazin-1-yl)propan-1-one (0.38 g, 1.0 mmol) was dissolved in DMF (6 mL). To the resulting solution was added 60% sodium hydride (0.05 g, 1.2 mmol) and 2-chloro-4-methyl-5-nitropyridine (0.196 g, 1.1 mmol), and the resulting reaction solution was stirred overnight at room temperature. To the reaction solution was added saturated aqueous ammonium chloride, and extracted with ethyl acetate. The ethyl acetate layer was washed with water and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the

residue was purified by silica gel column chromatography (ethyl acetate), to thereby yield the intermediate product 3-(4-(4-methyl-5-nitropyridin-2-yloxy)phenyl)-1-(4-piperonylpiperazin-1-yl)propan-1-one. The 3-(4-(4-methyl-5-nitropyridin-2-yloxy)phenyl)-1-(4-piperonylpiperazin-1-yl)propan-1-one was dissolved in a mixed solvent consisting of ethanol (4 mL) and dioxane (1 mL). To this solution was added 10% palladium-carbon (0.034 g), and the resulting solution was subjected to catalytic reduction for 8 hours at atmospheric pressure and room temperature. The catalyst was removed by filtration, and the filtrate was concentrated under reduced pressure, and the residue was purified by silica gel chromatography (dichloromethane : methanol = 20 : 1), to thereby yield 0.22 g of the title compound.

Appearance: Slightly yellow oil

^{1}H NMR ($CDCl_3$) δ 2.18(3H, s), 2.30-2.45(4H, m), 2.56-2.63(2H, m), 2.91-2.97(2H, m), 3.30-3.50(6H, m), 3.55-3.70(2H, m), 5.95(2H, s), 6.65-6.80(3H, m), 6.84(1H, s), 6.95-7.05(2H, m), 7.15-7.20(2H, m), 7.64(1H, s).

Reference Example 494

Production of ethyl 3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionate

A solution of 3,4-dichlorobenzoyl chloride (3.65 g, 17.4 mmol) was added dropwise under ice cooling to a solution of ethyl 3-[4-(4-

aminophenoxy)phenyl]propionate (4.52 g, 15.9 mmol) and triethylamine (2.65 mL, 19.0 mmol) in THF (80 mL), and the resulting solution was stirred for 1 hour at the same temperature. Water was added to the reaction mixture, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate and evaporated. The residue was recrystalized from water-containing ethanol to thereby yield 6.67 g of the title compound.

Appearance: Colorless needles

Melting point: 139-141°C

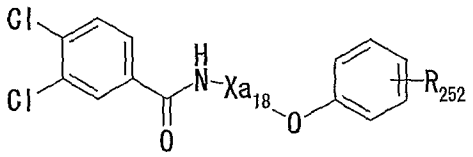
The following compounds were produced in the same manner as in Reference Example 494.

Reference Example 495

Ethyl 3-[4-(5-phenoxycarbonylaminopyridin-2-yloxy)phenyl]propionate

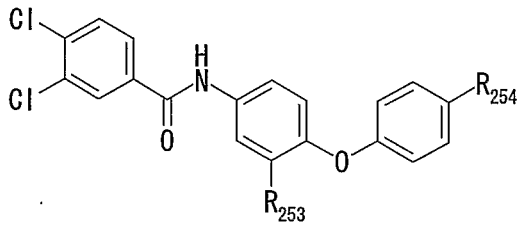
MS 406(M^+).

Table 71



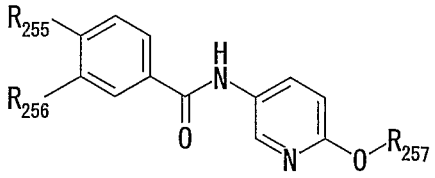
Reference Example No.	Xa_{18}	R_{252}	mp (°C) or ^1H NMR ($CDCl_3$) δppm
496	*p*-phenylene	2-$(CH_2)_2COOCH_3$	mp 117-119
497	*p*-phenylene	3-$(CH_2)_2COOC_2H_5$	mp 111-113
498	*o*-phenylene	4-$(CH_2)_2COOC_2H_5$	mp 72-73
499	*m*-phenylene	4-$(CH_2)_2COOC_2H_5$	^1H NMR 1.22(3H, t, J = 7.2 Hz), 2.59 (2H, t, J = 7.7 Hz), 2.91(2H, t, J = 7.7 Hz), 4.10(2H, q, J = 7.2 Hz), 6.78(1H, dt, J = 8.1 Hz, 1.1 Hz), 6.93 (2H, d, J = 8.5 Hz), 7.14(2H, d, J = 8.5 Hz), 7.20-7.36(3H, m), 7.52(1H, d, J = 8.3 Hz), 7.64(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.81(1H, brs), 7.91(1H, d, J = 2.1 Hz).

Table 72



Reference Example No.	R_{253}	R_{254}	mp (°C) or ^{1}H NMR (solvent) δppm
500	-F	-H	mp 168-169
501	-H	$-COOC_2H_5$	mp 144-145
502	-F	$-COOC_2H_5$	mp 145-146
503	-F	$-CH_2COOCH_3$	mp 127-129
504	-F	$-(CH_2)_2COOC_2H_5$	mp 131-133
505	-F	$-(CH_2)_3COOC_2H_5$	mp 110-111
506	-F	$-SCH_2COOC_2H_5$	^{1}H NMR ($CDCl_3$) 1.23(3H, t, J = 7.1 Hz), 3.56(2H, s), 4.15(2H, q, J = 7.1 Hz), 6.90(2H, d, J = 8.7 Hz), 7.08(1H, t, J = 8.7 Hz), 7.20-7.30(1H, m), 7.42(2H, d, J = 8.7 Hz), 7.58(1H, d, J = 8.3 Hz), 7.65-7.80(2H, m), 7.82(1H, s), 7.96(1H, d, J = 2.1 Hz).
507	-F	$-NHCH_2COOC_2H_5$	^{1}H NMR (DMSO-d_6) 1.19(3H, t, J = 7.1 Hz), 3.87(2H, d, J = 6.4 Hz), 4.11(2H, q, J = 7.1 Hz), 5.93(1H, t, J = 6.4 Hz), 6.56(2H, d, J = 9.0 Hz), 6.81(2H, d, J = 9.0 Hz), 6.98(1H, t, J = 9.2 Hz), 7.44-7.47 (1H, m), 7.82-7.86(2H, m), 7.93(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.20(1H, d, J = 2.0 Hz), 10.50(1H, s).
508	-H	-Br	^{1}H NMR (DMSO-d_6) 6.96(2H, d, J = 9.0 Hz), 7.08(2H, d, J = 9.0 Hz), 7.55(2H, d, J = 8.5 Hz), 7.79(2H, d, J = 8.5 Hz), 7.83(1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.44(1H, brs).
509	-F	-Ac	mp 143
510	-F		^{1}H NMR ($CDCl_3$) 4.00-4.15(4H, m), 5.78(1H, s), 6.96(2H, d, J = 8.7 Hz), 7.00-7.10(1H, m), 7.20-7.30(1H, m), 7.43(2H, d, J = 8.7 Hz), 7.57(1H, d, J = 8.3 Hz), 7.82(1H, s), 7.95(1H, d, J = 2.1 Hz).

Table 73



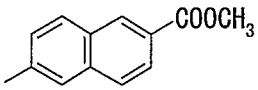
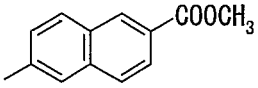
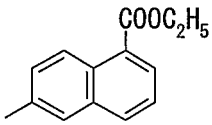
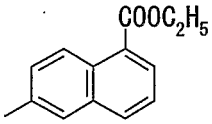
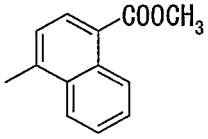
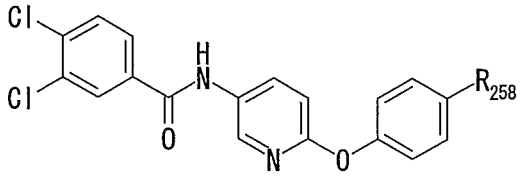
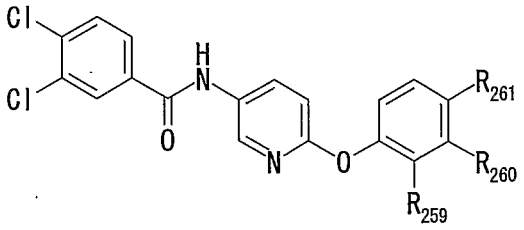
Reference Example No.	R_{255}	R_{256}	R_{257}	^{1}H NMR ($CDCl_3$) δppm
511	-Cl	-Cl		3.98(3H, s), 7.06(1H, d, J = 8.7 Hz), 7.33-7.37(1H, m), 7.56-7.59(2H, m), 7.70-7.73(1H, m), 7.80(1H, d, J = 8.5 Hz), 7.95-8.07(4H, m), 8.23-8.30(2H, m), 8.60(1H, s).
512	-CF_3	-H		3.98(3H, s), 7.07-7.10(1H, m), 7.37(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.58(1H, d, J = 2.3 Hz), 7.76-7.82(3H, m), 7.93-8.08(5H, m), 8.27-8.31(2H, m), 8.60(1H, s).
513	-Cl	-Cl		1.46(3H, t, J = 7.1 Hz), 4.47(2H, q, J = 7.1 Hz), 7.04(1H, d, J = 8.7 Hz), 7.41(1H, dd, J = 9.4 Hz, 2.5 Hz), 7.47-7.60(3H, m), 7.70(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.82(1H, brs), 7.94(1H, d, J = 8.6 Hz), 7.98(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 7.3 Hz, 1.2 Hz), 8.20-8.27(2H, m), 8.92(1H, d, J = 9.4 Hz).
514	-CF_3	-H		1.46(3H, t, J = 7.1 Hz), 4.47(2H, q, J = 7.1 Hz), 7.04(1H, d, J = 8.7 Hz), 7.40(1H, dd, J = 9.4 Hz, 2.5 Hz), 7.47-7.53(1H, m), 7.59(1H, d, J = 2.5 Hz), 7.75(2H, d, J = 8.2 Hz), 7.92-8.00(4H, m), 8.14(1H, dd, J = 7.3 Hz, 1.2 Hz), 8.23-8.29(2H, m), 8.97(1H, d, J = 9.4 Hz).
515	-Cl	-Cl		4.00(3H, s), 7.09(1H, d, J = 9.6 Hz), 7.16(1H, d, J = 8.1 Hz), 7.50-7.57(2H, m), 7.62-7.72(2H, m), 7.98(2H, d, J = 2.1 Hz), 8.15-8.29(4H, m), 9.01(1H, d, J = 8.7 Hz).

Table 74



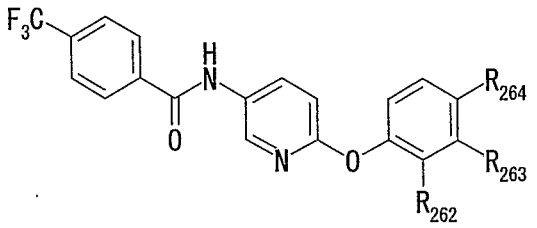
Reference Example No.	R_{258}	^{1}H NMR ($CDCl_3$) δppm
516	-$COOCH_3$	3.91(3H, s), 7.03(1H, d, J = 8.9 Hz), 7.15-7.18(2H, m), 7.58(1H, d, J = 8.3 Hz), 7.69-7.73(1H, m), 7.89(1H, brs), 7.99(1H, d, J = 2.0 Hz), 8.06-8.09(2H, m), 8.23-8.30(2H, m).
517	-$COOC_2H_5$	1.39(3H, t, J = 7.3 Hz), 4.37(2H, q, J = 7.3 Hz), 7.02(1H, d, J = 8.6 Hz), 7.15-7.18(2H, m), 7.57(1H, d, J = 8.6 Hz), 7.70-7.73(1H, m), 7.97-7.99 (2H, m), 8.06-8.09(2H, m), 8.23-8.30(2H, m).
518	-CH_2COOCH_3	3.63(2H, s), 3.71(3H, s), 6.94(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.2 Hz), 7.30(2H, d, J = 8.6 Hz), 7.55(1H, d, J = 8.6 Hz), 7.70(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.97-8.08(2H, m), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
519	-$(CH_2)_2COOCH_3$	2.62-2.67(2H, m), 2.93-2.98(2H, m), 3.68(3H, s), 6.93(1H, d, J = 8.9 Hz), 7.03-7.06(2H, m), 7.20-7.23(2H, m), 7.56(1H, d, J = 8.3 Hz), 7.68-7.72 (1H, m), 7.96-7.98(2H, m), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
520	-$(CH_2)_3COOC_2H_5$	1.26(3H, t, J = 7.0 Hz), 1.96(2H, dt, J = 15.0 Hz, 7.5 Hz), 2.34(2H, t, J = 7.5 Hz), 2.66(2H, t, J = 7.5 Hz), 4.13(2H, q, J = 7.0 Hz), 6.93(1H, d, J = 8.8 Hz), 7.04(2H, d, J = 8.6 Hz), 7.20(2H, d, J = 8.6 Hz), 7.56(1H, d, J = 8.3 Hz), 7.70(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.89(1H, s), 7.98(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
521	-$(CH_2)_4COOC_2H_5$	1.26(3H, t, J = 7.2 Hz), 1.60-1.75(4H, m), 2.33(2H, t, J = 7.0 Hz), 2.64(2H, t, J = 7.0 Hz), 4.13(2H, q, J = 7.2 Hz), 6.94(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 8.5 Hz), 7.20(2H, d, J = 8.5 Hz), 7.58(1H, d, J = 8.3 Hz), 7.70(1H, dd, J = 8.3 Hz, 2.3 Hz), 7.78(1H, brs), 7.98(1H, d, J = 2.3 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
522	-CH_2CN	3.76(2H, s), 7.00(1H, d, J = 8.8 Hz), 7.16(2H, d, J = 8.7 Hz), 7.37(2H, d, J = 8.7 Hz), 7.58(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.81(1H, s), 7.98(1H, d, J = 2.1 Hz), 8.20(1H, dd, J = 8.8 Hz, 2.3 Hz), 8.25(1H, d, J = 2.3 Hz).
523	-$NHCOOC(CH_3)_3$	1.52(9H, s), 6.49(1H, brs), 6.90(1H, d, J = 8.6 Hz), 7.05(2H, d, J = 8.9 Hz), 7.37(2H, d, J = 8.9 Hz), 7.56(1H, d, J = 8.6 Hz), 7.69(1H, dd, J = 8.6 Hz, 2.3 Hz), 7.92(1H, brs), 7.97(1H, d, J = 2.3 Hz), 8.14(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.22(1H, d, J = 2.6 Hz).
524	-$CH=C(COOCH_3)_2$	3.85(3H, s), 3.86(3H, s), 7.02(1H, d, J = 8.8 Hz), 7.13(2H, d, J = 8.5 Hz), 7.46(2H, d, J = 8.5 Hz), 7.59(1H, d, J = 8.2 Hz), 7.70(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.74(1H, s), 7.88(1H, brs), 7.97(1H, d, J = 2.0 Hz), 8.22(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).

Table 75



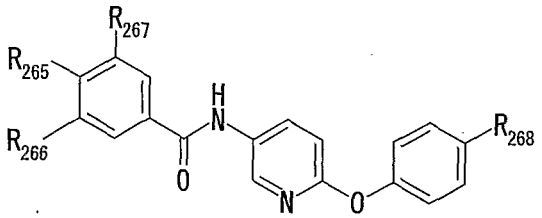
Reference Example No.	R_{259}	R_{260}	R_{261}	^{1}H NMR (solvent) δppm
525	-OCH_3	-H	-$COOC_2H_5$	($CDCl_3$) 1.40(3H, t, J = 7.1 Hz), 3.81(3H, s), 4.39(2H, q, J = 7.1 Hz), 6.99-7.02(1H, m), 7.16(1H, d, J = 8.1 Hz), 7.56(1H, d, J = 8.4 Hz), 7.67-7.72(3H, m), 7.97-8.01(2H, m), 8.17-8.22(2H, m).
526	-CH_3	-H	-$COOCH_3$	($CDCl_3$) 2.24(3H, s), 3.91(3H, s), 6.97-7.01(1H, m), 7.07(1H, d, J = 8.4 Hz), 7.57(1H, d, J = 8.4 Hz), 7.69-7.73(1H, m), 7.91(1H, dd, J = 8.4 Hz, 2.4 Hz), 7.97-7.99(3H, m), 8.21-8.26 (2H, m).
527	-Cl	-H	-$COOCH_3$	($CDCl_3$) 3.93(3H, s), 7.08(1H, d, J = 8.7 Hz), 7.26(1H, d, J = 1.7 Hz), 7.56(1H, d, J = 8.2 Hz), 7.69-7.73(1H, m), 7.95-7.99 (2H, m), 8.10(1H, brs), 8.15(1H, d, J = 2.0 Hz), 8.22-8.24(1H, m), 8.27(1H, d, J = 2.8 Hz).
528	-F	-H	-$COOCH_3$	($CDCl_3$) 3.92(3H, s), 7.07(1H, dd, J = 7.8 Hz, 1.8 Hz), 7.25-7.31(1H, m), 7.56(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.2 Hz, 2.1 Hz), 7.82-7.89(2H, m), 7.97(1H, d, J = 2.1 Hz), 8.08(1H, brs), 8.21-8.25(2H, m).
529	-H	-OCH_3	-$COOCH_3$	($CDCl_3$) 3.83(3H, s), 3.87(3H, s), 6.70(1H, dd, J = 8.6 Hz, 2.2 Hz), 6.74(1H, d, J = 2.2 Hz), 7.01(1H, d, J = 8.6 Hz), 7.56(1H, d, J = 8.1 Hz), 7.75(1H, dd, J = 8.6 Hz, 2.2 Hz), 7.87(1H, d, J = 8.6 Hz), 8.01(1H, d, J = 2.2 Hz), 8.25-8.33(3H, m).
530	-H	-CH_3	-$COOCH_3$	($CDCl_3$) 2.63(3H, s), 3.91(3H, s), 6.98-7.05(3H, m), 7.60(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.2 Hz), 7.97-8.03(3H, m), 8.23-8.28(1H, m), 8.30-8.32(1H, m).
531	-H	-$COOCH_3$	-H	(DMSO-d_6) 3.85(3H, s), 7.17(1H, d, J = 8.9 Hz), 7.43-7.47 (1H, m), 7.56-7.62(2H, m), 7.78-7.86(2H, m), 7.93-7.97(1H, m), 8.22-8.27(2H, m), 8.50(1H, d, J = 2.3 Hz), 10.60(1H, s).

Table 76



Reference Example No.	R_{262}	R_{263}	R_{264}	^{1}H NMR ($CDCl_3$) δppm
532	-OCH_3	-H	-$COOC_2H_5$	1.40(3H, t, J = 7.1 Hz), 3.82(3H, s), 4.39(2H, q, J = 7.1 Hz), 7.00-7.03(1H, m), 7.17(1H, d, J = 8.1 Hz), 7.68-7.76(4H, m), 8.01(2H, d, J = 8.1 Hz), 8.16(1H, brs), 8.22-8.25(2H, m).
533	-OCH_3	-H	-$(CH_2)_2COOCH_3$	2.63-2.69(2H, m), 2.93-2.99(2H, m), 3.69(3H, s), 3.74 (3H, s), 6.78-6.84(2H, m), 6.93(1H, d, J = 8.7 Hz), 7.03(1H, d, J = 8.1 Hz), 7.73(2H, d, J = 8.1 Hz), 7.96-7.99(3H, m), 8.14-8.20(2H, m).
534	-CH_3	-H	-$COOCH_3$	2.25(3H, s), 3.91(3H, s), 6.99-7.03(1H, m), 7.07(1H, d, J = 8.4 Hz), 7.75-7.78(2H, m), 7.88-7.92(1H, m), 7.98-8.01(4H, m), 8.26-8.29(2H, m).
535	-Cl	-H	-$COOCH_3$	3.93(3H, s), 7.09(1H, d, J = 8.7 Hz), 7.24-7.27(1H, m), 7.76(2H, d, J = 8.7 Hz), 7.96-8.03(4H, m), 8.16(1H, d, J = 2.1 Hz), 8.24(1H, d, J = 2.6 Hz), 8.29(1H, dd, J = 8.7 Hz, 2.6 Hz).
536	-F	-H	-$COOCH_3$	3.92(3H, s), 7.08(1H, d, J = 8.7 Hz), 7.26-7.32(1H, m), 7.75(2H, d, J = 8.4 Hz), 7.83-7.90(2H, m), 7.98(3H, d, J = 8.2 Hz), 8.22-8.28(2H, m).
537	-H	-OCH_3	-$COOCH_3$	3.87(3H, s), 3.88(3H, s), 6.71(1H, dd, J = 8.6 Hz, 2.2 Hz), 6.77(1H, d, J = 2.2 Hz), 7.04(1H, d, J = 8.9 Hz), 7.77(2H, d, J = 8.1 Hz), 7.88(1H, d, J = 8.6 Hz), 8.02 (2H, d, J = 8.1 Hz), 8.17(1H, brs), 8.29-8.35(2H, m).
538	-H	-CH_3	-$COOCH_3$	2.63(3H, s), 3.91(3H, s), 6.98-7.06(3H, m), 7.79(2H, d, J = 8.1 Hz), 8.00-8.04(4H, m), 8.27-8.34(2H, m).
539	-H	-$COOCH_3$	-H	3.91(3H, s), 6.99-7.04(1H, m), 7.32-7.37(1H, m), 7.45-7.50(1H, m), 7.74-7.80(3H, m), 7.86-7.90(1H, m), 7.96-8.01(3H, m), 8.22-8.27(2H, m).

Table 77



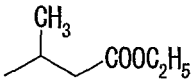
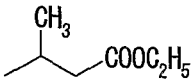
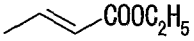
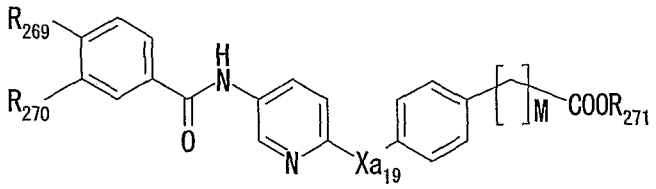
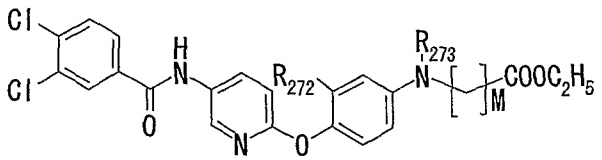
Reference Example No.	R_{265}	R_{266}	R_{267}	R_{268}	^{1}H NMR ($CDCl_3$) δppm or mp (□)
540	$-CF_3$	-H	-H		^{1}H NMR 1.17(3H, t, J = 7.1Hz), 1.26(3H, d, J = 7.0 Hz), 2.44-2.61(2H, m), 3.19-3.29(1H, m), 4.05(2H, q, J = 7.1 Hz), 6.88(1H, d, J = 8.8 Hz), 7.01(2H, d, J = 8.5 Hz), 7.19(2H, d, J = 8.5 Hz), 7.68(2H, d, J = 8.3 Hz), 7.94(2H, d, J = 8.3 Hz), 8.15(1H, dd, J = 8.8 Hz, 2.7Hz), 8.23(1H, d, J = 2.7 Hz), 8.29(1H, brs).
541	-Cl	-Cl	-H		^{1}H NMR 1.17(3H, t, J = 7.1 Hz), 1.26(3H, d, J = 7.0 Hz), 2.43-2.60(2H, m), 3.18-3.28(1H, m), 4.05(2H, q, J = 7.1 Hz), 6.85(1H, d, J = 8.9 Hz), 6.99(2H, d, J = 8.4 Hz), 7.18(2H, d, J = 8.4 Hz), 7.48(1H, d, J = 8.3 Hz), 7.66(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.92(1H, d, J = 2.0Hz), 8.10(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.20(1H, d, J = 2.7Hz), 8.39(1H, brs).
542	$-CF_3$	-H	-H		^{1}H NMR 1.35(3H, t, J = 7.1 Hz), 4.27(2H, q, J = 7.1 Hz), 6.39(1H, dd, J = 16.0 Hz, 2.6 Hz), 7.03(1H, d, J = 8.9 Hz), 7.16(2H, d, J = 8.8 Hz), 7.56(2H, d, J = 8.8Hz), 7.68(1H, dd, J = 16.0 Hz, 3.2 Hz), 7.77(2H, d, J = 8.1 Hz), 7.93(1H, brs), 8.01(2H, d, J = 8.1Hz), 8.26(1H, dd, J = 8.9 Hz, 2.6Hz), 8.29(1H, d, J = 2.6 Hz).
543	$-CF_3$	-H	-H	$-CH_2COOCH_3$	^{1}H NMR 3.62(2H, s), 3.70(3H, s), 6.94(1H, d, J = 8.7 Hz), 7.05-7.09(2H, m), 7.26-7.32(2H, m), 7.72(2H, d, J = 8.6 Hz), 7.97(2H, d, J = 8.2 Hz), 8.17-8.26(3H, m).
544	$-CF_3$	-H	-H	$-(CH_2)_2COOC_2H_5$	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 2.62(2H, t, J = 7.7 Hz), 2.95(2H, t, J = 7.7 Hz), 4.13(2H, q, J = 7.1 Hz), 6.94(1H, d, J = 8.8 Hz), 7.04(2H, d, J = 8.6 Hz), 7.22(2H, d, J = 8.6 Hz), 7.75(2H, d, J = 8.3 Hz), 7.98(2H, d, J = 8.3 Hz), 8.03 (1H, brs), 8.19(1H, dd, J = 8.8 Hz, 2.6Hz), 8.26(1H, d, J = 2.6 Hz).
545	-Cl	-Cl	-H	$-(CH_2)_2O-Si(CH_3)_2-C(CH_3)_3$	^{1}H NMR 0.01(6H, s), 0.89(9H, s), 2.83(2H, t, J = 6.9 Hz), 3.82(2H, t, J = 6.9 Hz), 6.92(1H, d, J = 8.9 Hz), 7.05(2H, dd, J = 6.3 Hz, 2.0 Hz), 7.24(2H, d, J = 8.6 Hz), 7.58(1H, d, J = 8.3 Hz), 7.71(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.80(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.15-8.19(1H, m), 8.25(1H, d, J = 2.6 Hz).
546	-Cl	-Cl	-H	$-(CH_2)_3O-Si(CH_3)_2-C(CH_3)_3$	^{1}H NMR 0.07(6H, s), 0.91(9H, s), 1.82-1.87(2H, m), 2.65-2.71(2H, m), 3.63-3.68(2H, m), 6.92(1H, d, J = 8.9 Hz), 7.02-7.05(2H, m), 7.21(2H, d, J = 8.6Hz), 7.57(1H, d, J = 8.3 Hz), 7.68-7.72(1H, m), 7.86(1H, brs), 7.97(1H, d, J = 2.0Hz), 8.14-8.18(1H, m), 8.24(1H, d, J = 2.3 Hz).
547	-H	-F	$-CF_3$	$-COOC_2H_5$	mp 133-134

Table 78



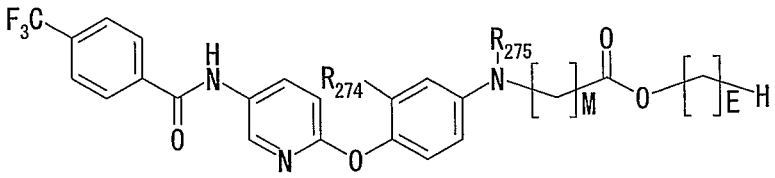
Reference Example No.	R_{269}	R_{270}	Xa_{19}	R_{271}	M	mp (°C) or ^{1}H NMR (solvent) δppm
548	-Cl	-Cl	-S-	$-CH_3$	2	mp 141-142
549	-Cl	-Cl	-NH-	$-C_2H_5$	2	mp 170-171
550	-Cl	-Cl	$-N(CH_3)-$	$-C_2H_5$	2	^{1}H NMR (DMSO-d_6) 1.17(3H, t, J = 7.1 Hz), 2.63(2H, t, J = 7.7 Hz), 2.85(2H, t, J = 7.7 Hz), 3.36(3H, s), 4.07(2H, d, J = 7.1 Hz), 6.56(1H, d, J = 9.5 Hz), 7.18(2H, d, J = 8.3 Hz), 7.27(2H, d, J = 8.3 Hz), 7.75-7.95(3H, m), 8.20(1H, s), 8.47(1H, s), 10.26(1H, s).
551	$-CF_3$	-H	$-N(CH_3)-$	$-C_2H_5$	0	mp 135-136
552	$-CF_3$	-H	$-N(CH_3)-$	$-C_2H_5$	2	^{1}H NMR ($CDCl_3$) 1.26(3H, t, J = 7.2 Hz), 2.65(2H, t, J = 8.0 Hz), 2.97(2H, t, J = 8.0 Hz), 3.45(3H, s), 4.16(2H, q, J = 7.2 Hz), 6.57(1H, d, J = 9.1 Hz), 7.18(2H, d, J = 8.3 Hz), 7.24(2H, d, J = 8.3 Hz), 7.35-7.45(1H, m), 7.65-7.78(3H, m), 7.98(2H, d, J = 8.1 Hz), 8.28(1H, d, J = 2.5 Hz).
553	-Cl	-Cl	$-N(CH_2Ph)-$	$-C_2H_5$	2	^{1}H NMR ($CDCl_3$) 1.23(3H, t, J = 7.2 Hz), 2.61(2H, t, J = 7.6 Hz), 2.92(2H, t, J = 7.6 Hz), 4.12(2H, q, J = 7.2 Hz), 5.20(2H, s), 6.54(1H, d, J = 9.1 Hz), 7.10-7.30(8H, m), 7.53(1H, d, J = 8.4 Hz), 7.60-7.75(3H, m), 7.94(1H, d, J = 1.3 Hz), 8.22(1H, d, J = 2.3 Hz).
554	-Cl	-H	-O-	$-CH_3$	0	^{1}H NMR ($CDCl_3$) 3.91(3H, s), 7.04(1H, d, J = 9.9 Hz), 7.17(2H, d, J = 8.6 Hz), 7.49(2H, d, J = 8.6 Hz), 7.79(1H, brs), 7.83(2H, d, J = 8.6 Hz), 8.08(2H, d, J = 8.6 Hz), 8.27-8.29(2H, m).
555	$-CF_3$	-H	-O-	$-C_2H_5$	0	^{1}H NMR ($CDCl_3$) 1.39(3H, t, J = 7.3 Hz), 4.37(2H, q, J = 7.3 Hz), 7.04(1H, dd, J = 8.3 Hz, 1.3 Hz), 7.15-7.19(2H, m), 7.78(2H, d, J = 8.3 Hz), 7.91(1H, brs), 8.00(2H, d, J = 6.9 Hz), 8.07-8.10(2H, m), 8.27-8.31(2H, m).
556	-H	$-OCF_3$	-O-	$-CH_3$	0	^{1}H NMR ($CDCl_3$) 3.91(3H, s), 7.02(1H, d, J = 8.7 Hz), 7.16(2H, d, J = 8.7 Hz), 7.42(1H, d, J = 8.2 Hz), 7.53(1H, t, J = 8.1 Hz), 7.76-7.81(2H, m), 8.05-8.08(3H, m), 8.25-8.31(2H, m).
557	-H	$-CF_3$	-O-	$-C_2H_5$	0	^{1}H NMR ($CDCl_3$) 1.39(3H, t, J = 7.2 Hz), 4.37(2H, q, J = 7.2 Hz), 7.40(1H, d, J = 8.7 Hz), 7.09-7.20(2H, m), 7.66(1H, t, J = 7.8 Hz), 7.76-7.90(1H, m), 8.00(1H, brs), 8.00-8.10(3H, m), 8.10-8.18(1H, m), 8.20-8.35(2H, m).

Table 79



Reference Example No.	R_{272}	R_{273}	M	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
558	-H	-Ac	1	mp 178-179
559	-H	-Ac	2	^{1}H NMR 1.22(3H, t, J = 7.2Hz), 1.86(3H, s), 2.58(2H, t, J = 7.3Hz), 3.99(2H, t, J = 7.3Hz), 4.07(2H, q, J = 7.2Hz), 7.02(1H, d, J = 8.9Hz), 7.15-7.20(4H, m), 7.58(1H, d, J =8.4Hz), 7.75(1H, dd, J = 2.1Hz, 8.4Hz), 8.02(1H, d, J = 2.1Hz), 8.24(1H, dd, J = 2.7Hz, 8.9Hz), 8.28(1H, s), 8.32(1H, d, J = 2.7Hz).
560	-H	$-CH_3$	1	^{1}H NMR 1.26(3H, t, J = 7.1Hz), 3.06(3H, s), 4.04(2H, s), 4.18(2H, q, J = 7.1Hz), 6.68(2H, d, J = 9.1Hz), 6.85(1H, d, J = 8.9Hz), 7.00(2H, d, J = 9.1Hz), 7.55(1H, d, J = 8.4Hz), 7.70(1H, dd, J = 1.9Hz, 8.4Hz), 7.94(1H, s), 7.97(1H, d, J = 1.9 Hz), 8.10(1H, dd, J = 2.6Hz, 8.9Hz), 8.21(1H, d, J = 2.6Hz).
561	-H	$-C_2H_5$	1	^{1}H NMR 1.22(3H, t, J = 7.1Hz), 1.27(3H, t, J = 7.1Hz), 3.46(2H, q, J = 7.1Hz), 4.01(2H, s), 4.20(2H, q, J = 7.1Hz), 6.64(2H, d, J = 9.1Hz), 6.86(1H, d, J = 8.9 Hz), 6.98(2H, d, J = 9.1Hz), 7.56(1H, d, J = 8.4Hz), 7.70(1H, dd, J = 1.9Hz, 8.4 Hz), 7.82(1H, s), 7.97(1H, d, J = 1.9Hz), 8.11(1H, dd, J = 2.6Hz, 8.9Hz), 8.22(1H, d, J = 2.6Hz).
562	$-OCH_3$	$-CH_3$	1	^{1}H NMR 1.25(3H, t, J = 7.1Hz), 3.03(3H, s), 3.65(3H, s), 4.01(2H, s), 4.17(2H, q, J = 7.1Hz), 6.16(1H, d, J = 8.7Hz), 6.21(1H, s), 6.76(1H, d, J = 8.9Hz), 6.88 (1H, d, J = 8.6Hz), 7.43(1H, d, J = 8.4Hz), 7.67(1H, d, J = 8.4Hz), 7.94(1H, d, J = 1.8Hz), 8.02(1H, d, J = 8.9Hz), 8.13(1H, d, J = 2.3Hz), 8.88(1H, s).
563	$-OCH_3$	$-C_2H_5$	1	^{1}H NMR 1.21(3H, t, J = 7.1Hz), 1.27(3H, t, J = 7.1Hz), 3.44(2H, q, J = 7.1Hz), 3.68(3H, s), 3.98(2H, s), 4.20(2H, q, J = 7.1Hz), 6.17(1H, dd, J = 8.9Hz, 3.0Hz), 6.24(1H, d, J = 2.8Hz), 6.81(1H, d, J = 8.9Hz), 6.91(1H, d, J = 8.7Hz), 7.48(1H, d, J = 8.4Hz), 7.68(1H, dd, J = 8.4Hz, 2.2Hz), 7.96(1H, d, J = 2.0Hz), 8.04(1H, dd, J = 8.9Hz, 2.8Hz), 8.15(1H, d, J = 2.3Hz), 8.34(1H, s).
564	$-CH_3$	-Ac	1	^{1}H NMR 1.26(3H, t, J = 7.1Hz), 1.96(3H, s), 2.22(3H, s), 4.20(2H, q, J = 7.1Hz), 4.37(2H, s), 6.99(1H, d, J = 8.9Hz), 7.07(1H, d, J = 8.4Hz), 7.19(1H, dd, J = 2.4 Hz, 8.4Hz), 7.59(1H, d, J = 8.4Hz), 7.72(1H, d, J = 8.4Hz), 7.90-8.12(2H, m), 8.21(1H, dd, J = 2.0Hz, 8.4Hz), 8.27(1H, s).
565	$-CH_3$	$-CH_3$	1	^{1}H NMR 1.26(3H, t, J = 7.1Hz), 2.12(3H, s), 3.06(3H, s), 4.04(2H, s), 4.20(2H, q, J = 7.1 Hz), 6.49-6.61(2H, m), 6.83(1H, d, J = 8.9Hz), 6.93(1H, d, J = 8.5 Hz), 7.57(1H, d, J = 8.5Hz), 7.70(1H, dd, J = 8.5Hz, 2.1Hz), 7.73(1H, s), 7.97 (1H, d, J = 2.1Hz), 8.12(1H, dd, J = 8.9Hz, 2.8Hz), 8.21(1H, d, J = 2.8Hz).
566	-F	-Ac	1	^{1}H NMR 1.29(3H, t, J = 7.1Hz), 2.00(3H, s), 4.21(2H, q, J = 7.1Hz), 4.37(2H, s), 7.09(1H, dd, J = 7.9Hz, 1.8Hz), 7.18-7.32(3H, m), 7.59(1H, d, J = 8.4Hz), 7.72 (1H, dd, J = 8.3Hz, 2.1Hz), 7.83(1H, brs), 7.99(1H, d, J = 2.0Hz), 8.20-8.24(2H, m).
567	-F	$-CH_3$	1	^{1}H NMR 1.27(3H, t, J = 7.1Hz), 3.06(3H, s), 4.04(2H, s), 4.20(2H, q, J = 7.1Hz), 6.40-6.52(2H, m), 6.96(1H, d, J = 9.2Hz), 7.07(1H, t, J = 9.1Hz), 7.57(1H, d, J = 8.2 Hz), 7.70(1H, dd, J = 8.2Hz, 2.0Hz), 7.82(1H, brs), 7.97(1H, d, J = 2.1Hz), 8.13-8.19(2H, m).
568	-F	$-C_2H_5$	1	^{1}H NMR 1.23(3H, t, J = 7.1Hz), 1.28(3H, t, J = 7.1Hz), 3.45(2H, q, J = 7.1Hz), 4.00(2H, s), 4.22(2H, q, J = 7.1Hz), 6.37-6.48(2H, m), 6.97(1H, d, J = 8.7Hz), 7.05(1H, t, J = 9.1Hz), 7.57(1H, d, J = 8.4Hz), 7.70(1H, dd, J = 8.4Hz, 2.2Hz), 7.79(1H, brs), 7.98(1H, d, J = 2.0Hz), 8.13-8.20(2H, m).

Table 80



Reference Example No.	R_{274}	R_{275}	M	E	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
569	-H	-Ac	1	2	mp 163-164
570	-H	-Ac	2	2	^{1}H NMR 1.22(3H, t, J = 7.2 Hz), 1.87(3H, s), 2.59(2H, t, J = 7.3 Hz), 4.00(2H, t, J = 7.3 Hz), 4.08(2H, q, J = 7.2 Hz), 7.03(1H, d, J = 8.8 Hz), 7.19(4H, s), 7.78(2H, d, J = 8.3 Hz), 7.95(1H, brs), 8.01(2H, d, J = 8.3 Hz), 8.27(1H, d, J = 8.8 Hz), 8.31(1H, s).
571	-H	$-CH_3$	1	1	^{1}H NMR 3.06(3H, s), 3.73(3H, s), 4.07(2H, s), 6.68(2H, d, J = 9.1 Hz), 6.86 (1H, d, J = 8.9 Hz), 7.00(2H, d, J = 9.1 Hz), 7.74(2H, d, J = 8.0 Hz), 7.98(2H, d, J = 8.0 Hz), 8.07(1H, s), 8.15(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).
572	-H	$-C_2H_5$	1	2	^{1}H NMR 1.18(3H, t, J = 7.1 Hz), 1.25(3H, t, J = 7.1 Hz), 3.41(2H, q, J = 7.1 Hz), 3.98(2H, s), 4.17(2H, q, J = 7.1 Hz), 6.59(2H, d, J = 9.1 Hz), 6.79(1H, d, J = 8.7 Hz), 6.92(2H, d, J = 9.1 Hz), 7.64(2H, d, J = 8.4 Hz), 7.94(2H, d, J = 8.1 Hz), 8.07(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.8 Hz), 8.75(1H, s).
573	$-OCH_3$	$-CH_3$	1	2	^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 3.03(3H, s), 3.65(3H, s), 4.01(2H, s), 4.17 (2H, q, J = 7.1 Hz), 6.17(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.24(1H, d, J = 2.5 Hz), 6.77(1H, d, J = 8.9 Hz), 6.89(1H, d, J = 8.7 Hz), 7.63(2H, d, J = 8.3 Hz), 7.96(2H, d, J = 8.1 Hz), 8.06(1H, d, J = 8.7 Hz), 8.16(1H, d, J = 2.5 Hz), 8.91(1H, s).
574	$-OCH_3$	$-C_2H_5$	1	2	^{1}H NMR 1.19(3H, t, J = 7.1 Hz), 1.26(3H, t, J = 7.1 Hz), 3.42(2H, q, J = 7.1 Hz), 3.64(3H, s), 3.97(2H, s), 4.18(2H, q, J = 7.1 Hz), 6.14(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.21(1H, d, J = 2.8 Hz), 6.76(1H, d, J = 8.9 Hz), 6.87(1H, d, J = 8.7 Hz), 7.62(2H, d, J = 8.4 Hz), 7.96(2H, d, J = 8.3 Hz), 8.05(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.18(1H, d, J = 2.6 Hz), 9.01(1H, s).
575	$-CH_3$	-Ac	1	2	^{1}H NMR 1.25(3H, t, J = 7.0 Hz), 1.93(3H, s), 2.21(3H, s), 4.18(2H, q, J = 7.0 Hz), 4.35(2H, s), 6.98(1H, d, J = 8.7 Hz), 7.06(1H, d, J = 8.5 Hz), 7.18(1H, d, J = 8.5 Hz), 7.23-7.28(1H, m), 7.75(2H, d, J = 7.8 Hz), 8.02(2H, d, J = 7.8 Hz), 8.22-8.33(2H, m).
576	$-CH_3$	$-CH_3$	1	2	^{1}H NMR 1.26(3H, t, J = 7.1 Hz), 2.11(3H, s), 3.05(3H, s), 4.04(2H, s), 4.19 (2H, q, J = 7.1 Hz), 6.46-6.60(2H, m), 6.80(1H, d, J = 8.9 Hz), 6.91(1H, d, J = 8.5 Hz), 7.74(2H, d, J = 8.4 Hz), 7.98(2H, d, J = 8.2 Hz), 8.07(1H, s), 8.15 (1H, dd, J = 8.9 Hz, 2.7 Hz), 8.23(1H, d, J = 2.7 Hz).
577	-F	-Ac	1	2	^{1}H NMR 1.28(3H, t, J = 7.1 Hz), 1.98(3H, s), 4.20(2H, q, J = 7.1 Hz), 4.36 (2H, s), 7.09(1H, dd, J = 6.4 Hz, 3.5 Hz), 7.13-7.32(3H, m), 7.77(2H, d, J = 8.3 Hz), 8.01(2H, d, J = 8.1 Hz), 8.12(1H, s), 8.23-8.28(2H, m).
578	-F	$-CH_3$	1	2	^{1}H NMR 1.27(3H, t, J = 7.1 Hz), 3.07(3H, s), 4.04(2H, s), 4.20(2H, q, J = 7.1 Hz), 6.41-6.53(2H, m), 6.98(1H, d, J = 9.7 Hz), 7.07(1H, t, J = 9.1 Hz), 7.76 (2H, d, J = 8.6 Hz), 7.84(1H, s), 7.99(2H, d, J = 8.1 Hz), 8.19-8.21(2H, m).
579	-F	$-C_2H_5$	1	2	^{1}H NMR 1.20-1.31(6H, m), 3.45(2H, q, J = 7.3 Hz), 4.00(2H, s), 4.22(2H, q, J = 7.1 Hz), 6.37-6.49(2H, m), 6.97-7.09(2H, m), 7.76-7.79(3H, m), 7.99(2H, d, J = 7.9 Hz), 8.19-8.21(2H, m).

Reference Example 580

Production of ethyl 3-{4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]-3-methoxyphenyl}propionate

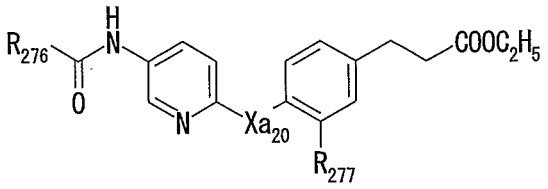
Under ice cooling, to a solution of ethyl 3-(4-(5-aminopyridin-2-yloxy)-3-methoxyphenyl)propionate (1.43 g, 4.5 mmol) in dichloromethane (30 mL) was added pyridine (0.44 mL, 5.4 mmol), and then 3,4-dichlorobenzoyl chloride (0.99 g, 4.7 mmol). The resulting solution was stirred for 1 hour under ice cooling, and then for 10 hours at room temperature. To the resulting reaction solution was added 10% hydrochloric acid, and extracted with dichloromethane. The dichloromethane layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated. To the residue was added diethyl ether, and stirred. The precipitates were collected by filtration. After washing with water and diethyl ether, the precipitates were air dried at 60°C, to thereby yield 0.52 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.26(3H, t, J = 7.1 Hz), 2.56-2.79(2H, m), 2.91-3.09(2H, m), 3.75(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.75(3H, m), 7.10(1H, d, J = 8.0 Hz), 7.56(1H, d, J = 8.2 Hz), 7.99(1H, d, J = 8.1 Hz), 8.17(1H, s), 8.69(1H, d, J = 9.2 Hz), 8.79(1H, s), 9.52(1H, brs).

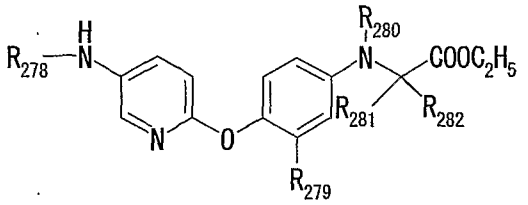
The following compounds were produced in the same manner as in Reference Example 580.

Table 81



Reference Example No.	R_{276}	R_{277}	Xa_{20}	^{1}H NMR ($CDCl_3$) δppm
581	3,4-Cl_2Ph-	-H	-CO-	1.23(3H, t, J = 7.2 Hz), 2.64(2H, t, J = 7.6 Hz), 3.01(2H, t, J = 7.6 Hz), 4.12(2H, q, J = 7.2 Hz), 7.30(2H, d, J = 8.2 Hz), 7.57 (1H, d, J = 8.3 Hz), 7.73(1H, dd, J = 8.3 Hz, 2.2 Hz), 7.95-8.04 (3H, m), 8.09(1H, d, J = 8.6 Hz), 8.16(1H, brs), 8.41(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.80(1H, d, J = 2.6 Hz).
582	4-CF_3Ph-	-OC_2H_5	-O-	1.22(3H, t, J = 6.9 Hz), 1.26(3H, t, J = 7.2 Hz), 2.51-2.73(2H, m), 2.87-3.06(2H, m), 4.02(2H, q, J = 6.9 Hz), 4.15(2H, q, J = 7.2 Hz), 6.71-6.96(3H, m), 7.17(1H, d, J = 7.9 Hz), 7.75(2H, d, J = 7.6 Hz), 8.43(2H, d, J = 7.6 Hz), 9.15-9.32(1H, m), 9.42(1H, s), 11.14(1H, brs).
583	3,4-Cl_2Ph-	-F	-O-	1.26(3H, t, J = 7.1 Hz), 2.53-2.70(2H, m), 2.85-3.03(2H, m), 4.15(2H, q, J = 7.1 Hz), 6.97-7.09(3H, m), 7.10-7.19(1H, m), 7.58(1H, d, J = 8.3 Hz), 7.70(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.72 (1H, brs), 7.97(1H, d, J = 2.1 Hz), 8.15-8.23(2H, m).
584	$PhCH_2O$-	-H	-O-	1.25(3H, t, J = 7.1 Hz), 2.53-2.71(2H, m), 2.84-3.04(2H, m), 4.14(2H, q, J = 7.1 Hz), 6.51-6.64(1H, m), 6.88(1H, d, J = 8.8 Hz), 6.98-7.06(2H, m), 7.17-7.24(2H, m), 7.30-7.43(5H, m), 7.87-8.02(1H, m), 8.05(1H, d, J = 2.5 Hz).
585	4-CF_3Ph-	-F	-O-	1.26(3H, t, J = 7.1 Hz), 2.56-2.71(2H, m), 2.89-3.02(2H, m), 4.15(2H, q, J = 7.1 Hz), 6.97-7.08(3H, m), 7.10-7.19(1H, m), 7.77(2H, d, J = 8.2 Hz), 7.82(1H, brs), 7.99(2H, d, J = 8.2 Hz), 8.17-8.26(2H, m).

Table 82



Reference Example No.	R_{278}	R_{279}	R_{280}	R_{281}	R_{282}	^{1}H NMR ($CDCl_3$) δppm
586	4-CF_3PhCO-	-F	-$(CH_2)_2CH_3$	-H	-H	0.96(3H, t, J = 7.3 Hz), 1.28(3H, t, J = 7.1 Hz), 1.63-1.74(2H, m), 3.32(2H, t, J = 7.6 Hz), 4.01(2H, s), 4.21(2H, q, J = 7.1 Hz), 6.35-6.47(2H, m), 6.97(1H, d, J = 7.8 Hz), 7.01(1H, t, J = 8.9 Hz), 7.77(2H, d, J = 8.2 Hz), 7.81(1H, s), 7.99(2H, d, J = 8.2 Hz), 8.19-8.22(2H, m).
587	4-CF_3PhCO-	-H	-CH_3	-CH_3	-CH_3	1.25(3H, t, J = 7.1 Hz), 1.42(6H, s), 2.91(3H, s), 4.18(2H, q, J = 7.1 Hz), 6.92(1H, d, J = 8.7 Hz), 7.00(2H, d, J = 9.2 Hz), 7.07(2H, d, J = 9.1 Hz), 7.77(2H, d, J = 8.2 Hz), 7.81(1H, s), 8.00(2H, d, J = 8.1 Hz), 8.20(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.28(1H, d, J = 2.5 Hz).
588	3,4-Cl_2PhSO_2-	-F	-CH_3	-H	-H	1.29(3H, t, J = 7.1 Hz), 3.05(3H, s), 4.03(2H, s), 4.22(2H, q, J = 7.1 Hz), 6.38-6.49(2H, m), 6.82(1H, brs), 6.88(1H, d, J = 8.7 Hz), 7.02(1H, t, J = 8.8 Hz), 7.48(1H, dd, J = 8.4, 1.6 Hz), 7.52(1H, d, J = 8.4 Hz), 7.57(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.70(1H, d, J = 2.6 Hz), 7.82(1H, d, J = 1.8 Hz).

Reference Example 589

Production of ethyl 4-[5-(3,4-dimethylbenzoylamino)-pyridin-2-yloxy]benzoate

To a solution of ethyl 4-(5-aminopyridin-2-yloxy)benzoate (14.15 g, 54.8 mmol) in DMF (100 mL) were added 3,4-dimethylbenzoic acid (8.23 g, 54.8 mmol), 1-hydroxybenzotriazole monohydrate (8.4 g, 54.8 mmol), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (12.6 g, 65.7 mmol) under ice cooling, and then stirred for 30 minutes under ice cooling and for 17 hours at room temperature. The reaction solution was concentrated under reduced pressure. To the residue was added water (200 mL), and extracted with ethyl acetate (250 mL). The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 2 : 1), to thereby yield 16.15 g of the title compound.

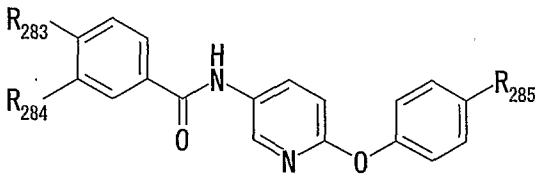
Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.39(3H, t, J = 7.1 Hz), 2.33(6H, s), 4.37(2H, q, J = 7.1 Hz), 6.99(1H, d, J = 9.7 Hz), 7.15(2H, d, J = 8.7 Hz), 7.24(1H, d, J = 7.7 Hz), 7.59(1H, dd, J = 7.7 Hz, 2.0 Hz), 7.65(1H, d, J = 2.0 Hz), 7.90(1H, brs), 8.07(2H, d, J = 8.7 Hz), 8.25-8.35(2H, m).

The following compounds were produced in the

same manner as in Reference Example 589.

Table 83



Reference Example No.	R_{283}	R_{284}	R_{285}	^{1}H NMR ($CDCl_3$) δppm
590	-Cl	-Cl	-Ac	2.58(3H, s), 7.19(1H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.7 Hz), 6.06(2H, s), 7.84(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.01(1H, d, J = 8.7 Hz), 8.24(1H, d, J = 2.1 Hz), 8.28(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.56(1H, d, J = 2.6 Hz), 10.64(1H, brs).
591	-CN	-H	$-COOCH_3$	3.92(3H, s), 7.05(1H, d, J = 8.9 Hz), 7.18(2H, d, J = 8.6 Hz), 7.81(2H, d, J = 8.6 Hz), 7.90(1H, brs), 8.00(2H, d, J = 8.6 Hz), 8.08(2H, d, J = 8.6 Hz), 8.27(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.30(1H, d, J = 2.3 Hz).

Reference Example 592

Production of ethyl 3-{4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]-3-ethoxyphenyl}propionate

To a solution of ethyl 3-[3-ethoxy-4-(5-nitropyridin-2-yloxy)phenyl]propionate (0.82 g, 2.3 mmol) in ethanol (40 mL) was added 10% palladium-carbon (0.15 g) under a nitrogen atmosphere, and the resulting solution was stirred under a hydrogen atmosphere at atmospheric pressure for 1 hour at room temperature. The palladium-carbon was removed by filtration, and the filtrate was concentrated. The obtained filtrate (0.58 g) was dissolved in dichloromethane (30 mL), and to the resulting solution were added pyridine (0.17 mL, 2.1 mmol) and 3,4-dichlorobenzoyl chloride (0.39 g, 1.84 mmol) under ice cooling. The resulting solution was

stirred under ice cooling for 1 hour, and then stirred for 12 hours at room temperature. The reaction solution was made acidic by adding 10% hydrochloric acid, and extracted with dichloromethane. The dichloromethane layer was washed with a saturated sodium bicarbonate solution, dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 0.94 g of the title compound.

Appearance: Yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 1.18(3H, t, J = 7.0 Hz), 1.26(3H, t, J = 7.1 Hz), 2.53-2.71(2H, m), 2.86-3.01(2H, m), 3.98(2H, q, J = 7.0 Hz), 4.15(2H, q, J = 7.1 Hz), 6.78-6.88(2H, m), 6.95(1H, d, J = 8.8 Hz), 7.06(1H, d, J = 7.9 Hz), 7.58(1H, d, J = 8.3 Hz), 7.65-7.77(2H, m), 7.98(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.19(1H, d, J = 2.3 Hz).

The following compound was produced in the same manner as in Reference Example 592.

Reference Example 593

N-{6-[4-(3-hydroxypropyl)phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide

^{1}H NMR ($CDCl_3$) δ 1.86-1.97(2H, m), 2.70-2.75(2H, m), 3.68-3.73(2H, m), 6.95(1H, d, J = 8.7 Hz), 7.03-7.08(2H, m), 7.23(2H, d, J = 8.4 Hz), 7.77(2H, d, J = 8.2 Hz), 7.84(1H, brs), 7.99(2H, d, J = 8.2 Hz), 8.20-8.23(1H, m), 8.26(1H, d, J = 2.6 Hz).

Reference Example 594

Production of methyl 2-(4-{5-[3-(3,4-dichlorophenyl)-ureido]pyridin-2-yloxy}phenyl)acetate

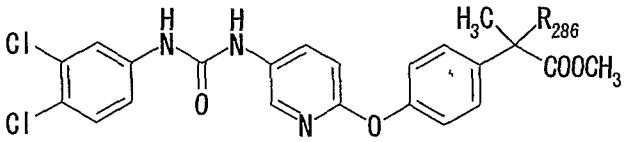
To a solution of methyl 2-[4-(5-aminopyridin-2-yloxy)phenyl]acetate (0.44 g, 1.7 mmol) in dichloromethane (7 mL) was added 3,4-dichlorophenylisocyanate (0.353 g, 1.9 mmol), and the resulting reaction solution was stirred for 1 hour at room temperature. To the reaction solution was added diisopropyl ether. Insoluble matter was removed by filtration, to thereby yield 0.60 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 3.63(3H, s), 3.69(2H, s), 6.99-7.05(3H, m), 7.26-7.30(2H, m), 7.35(1H, dd, J = 8.8, 2.4 Hz), 7.52(1H, d, J = 8.8 Hz), 7.86(1H, d, J = 2.4 Hz), 7.98(1H, dd, J = 8.8, 2.8 Hz), 8.18(1H, d, J = 2.7 Hz), 8.91(1H, s), 9.10(1H, s).

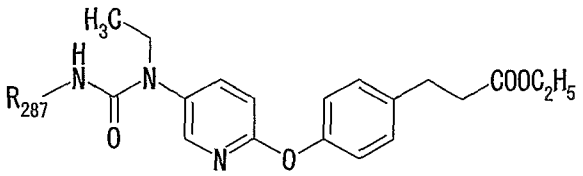
The following compounds were produced in the same manner as in Reference Example 594.

Table 84



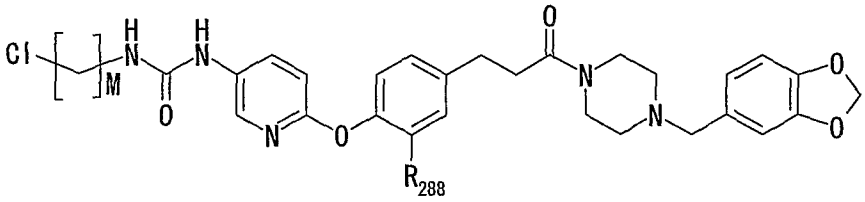
Reference Example No.	R_{286}	MS (M^+)
595	-H	459
596	$-CH_3$	473

Table 85



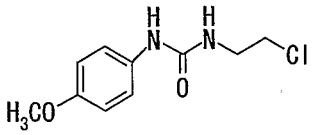
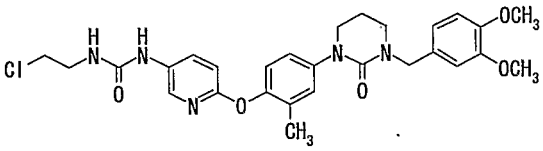
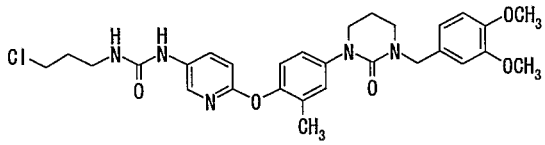
Reference Example No.	R_{287}	^{1}H NMR ($CDCl_3$) δppm or MS
597	4-CF_3Ph-	^{1}H NMR 1.18(3H, t, J = 7.1 Hz), 1.25(3H, t, J = 7.1 Hz), 2.62-2.68(2H, m), 2.96-3.01(2H, m), 3.76(2H, q, J = 7.1 Hz), 4.14(2H, q, J = 7.1 Hz), 6.17(1H, brs), 7.05(1H, dd, J = 8.7 Hz, 0.7 Hz), 7.11(2H, d, J = 8.6 Hz), 7.28(2H, d, J = 8.6 Hz), 7.40(2H, d, J = 8.7 Hz), 7.49(2H, d, J = 8.6 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.14(1H, dd, J = 2.6 Hz, 0.7 Hz).
598	3,4-Cl_2Ph-	MS 501(M^+)

Table 86



Reference Example No.	R_{288}	M	^{1}H NMR ($CDCl_3$) δppm
599	-H	3	1.90-2.11(2H, m), 2.28-2.50(4H, m), 2.51-2.72(2H, m), 2.82-3.07(2H, m), 3.28-3.51(4H, m), 3.52-3.78(4H, m), 5.25-5.40(1H, m), 5.96(2H, s), 6.69-6.81(2H, m), 6.82-6.94(2H, m), 6.95-7.08(2H, m), 7.09-7.26(3H, m), 7.88-8.07(2H, m).
600	-H	2	2.20-2.46(4H, m), 2.52-2.70(2H, m), 2.82-3.02(2H, m), 3.28-3.50(4H, m), 3.51-3.72(6H, m), 5.52-5.71(1H, m), 5.95(1H, s), 6.68-6.78(2H, m), 6.80-6.89(2H, m), 6.91(2H, d, J = 8.4 Hz), 7.17(2H, d, J = 8.4 Hz), 7.36(1H, s), 7.89-8.01(2H, m).
601	-OCH_3	3	1.85-2.08(2H, m), 2.27-2.46(4H, m), 2.55-2.71(2H, m), 2.88-3.03(2H, m), 3.30-3.46(6H, m), 3.56(2H, t, J = 6.3 Hz), 3.63(2H, t, J = 4.9 Hz), 3.71(3H, s), 5.20-5.36(1H, m), 5.95(2H, s), 6.68-6.89(6H, m), 7.00(1H, d, J = 8.0 Hz), 7.15(1H, s), 7.87(1H, d, J = 2.4 Hz), 7.92(1H, dd J = 2.8 Hz, 8.8 Hz).
602	-OCH_3	2	2.25-2.49(4H, m), 2.58-2.72(2H, m), 2.87-3.05(2H, m), 3.30-3.71(10H, m), 3.71(3H, s), 5.40-5.52(1H, m), 5.95(2H, s), 6.66-6.91(6H, m), 7.00(1H, d, J = 8.0 Hz), 7.07(1H, s), 7.85-7.99 (2H, m).

Table 87

Reference Example No.	Chemical Structure	^{1}H NMR (solvent) δppm
603		(DMSO-d_6) 3.38(2H, t, J = 6.1 Hz), 3.63(2H, t, J = 6.1 Hz), 3.68(3H, s), 6.27(1H, t, J = 6.1 Hz), 6.76-6.84(2H, m), 7.22-7.31(2H, m), 8.41(1H, s).
604		($CDCl_3$) 2.00-2.20(5H, m), 3.27-3.47 (4H, m), 3.48-3.60(2H, m), 3.61-3.78 (2H, m), 3.88(3H, s), 3.89(3H, s), 4.59 (2H, s), 5.94-6.12(1H, m), 6.66(1H, d, J = 8.8 Hz), 6.83(1H, d, J = 8.6 Hz), 6.80-6.92(3H, m), 7.04(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.19(1H, d, J = 2.6 Hz), 7.50(1H, d, J = 2.8 Hz, 8.8 Hz), 7.73(1H. s), 7.95(1H, d, J = 2.8 Hz).
605		($CDCl_3$) 1.76-1.93(2H, m), 2.00-2.20 (5H, m), 3.11-3.28(2H, m), 3.29-3.41 (2H, m), 3.42-3.57(2H, m), 3.60-3.78 (2H, m), 3.87(3H, s), 3.88(3H, s), 4.57 (2H, s), 5.70-5.88(1H, m), 6.67(1H, d, J = 8.8 Hz), 6.83(1H, d, J = 8.6 Hz), 6.86(3H, m), 7.04(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.17(1H. d, J = 2.6 Hz), 7.56(1H, dd, J = 2.8 Hz, 8.8 Hz), 7.68(1H, s), 7.93(1H, d, J = 2.8 Hz).

Reference Example 606

Production of methyl 3-(4-{5-[3-(4-trifluoromethyl-phenyl)ureido]pyridin-2-yloxy}phenyl)propionate

Methyl 3-[4-(5-nitropyridin-2-yloxy)phenyl]propionate (1.00 g, 3.3 mmol) was dissolved in a mixed solvent consisting of THF (1 mL) and ethanol (120 mL). To the resulting solution was added 10% palladium-carbon (100 mg), and stirred for 23 hours at room temperature under a hydrogen atmosphere. The reaction solution was filtered and the filtrate was concentrated. To the residue were added THF (20 mL), triethylamine (0.917 mL, 6.6 mmol) and phenyl 4-trifluoromethylisocyanate (0.61 mL, 4.3 mmol), and the

resulting solution was stirred for 20 hours at room temperature. The reaction solution was evaporated under reduced pressure. The residue was washed with ethyl acetate, to thereby yield 850 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.62-2.68(2H, m), 2.83-2.88(2H, m), 3.60(3H, s), 6.97-7.02(3H, m), 7.24(2H, d, J = 8.4 Hz), 7.65-7.69(4H, m), 7.99(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.19(1H, d, J = 2.8 Hz), 8.88(1H, s), 9.20(1H, s).

Reference Example 607

Production of methyl 3-fluoro-4-{5-[(4-trifluoromethylbenzylidene)amino]pyridin-2-yloxy}benzoate

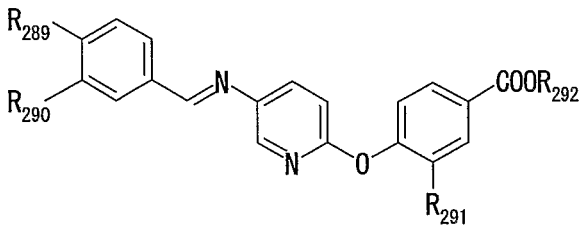
Methyl 4-(5-aminopyridin-2-yloxy)-3-fluorobenzoate (2.0 g, 7.63 mmol) was dissolved in methanol (50 mL). To the resulting solution was added 4-trifluoromethylbenzaldehyde (1.04 mL, 7.63 mmol), and refluxed for 6 hours. The reaction solution was cooled to room temperature, and the resulting precipitated crystals were collected by suction filtration. The collected crystals were washed with methanol, to thereby yield 2.81 g of the title compound.

Appearance: Pale grey powder

^{1}H NMR (DMSO-d_6) δ 3.89(3H, s), 7.32(1H, d, J = 8.7 Hz), 7.48-7.54(1H, m), 7.85-7.92(4H, m), 8.01(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.13-8.16(3H, m), 8.86(1H, s).

The following compounds were produced in the same manner as in Reference Example 607.

Table 88



Reference Example No.	R_{289}	R_{290}	R_{291}	R_{292}	^{1}H NMR (solvent) δppm
608	$-CF_3$	-H	-H	$-CH_3$	(DMSO-d_6) 3.86(3H, s), 7.24-7.30(3H, m), 7.92(2H, d, J = 8.1 Hz), 7.98-8.05(3H, m), 8.16(2H, d, J = 8.1 Hz), 8.24(1H, d, J = 2.1 Hz), 8.88(1H, s).
609	$-CF_3$	-H	-H	$-C_2H_5$	(DMSO-d_6) 1.33(3H, t, J = 7.1 Hz), 4.32(2H, q, J = 7.1 Hz), 7.24-7.30(3H, m), 7.92(2H, d, J = 8.3 Hz), 8.00(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.02(2H, d, J = 8.7 Hz), 8.16(2H, d, J = 7.9 Hz), 8.24(1H, d, J = 2.6 Hz), 8.88(1H, s).
610	-Cl	-Cl	-F	$-CH_3$	(DMSO-d_6) 3.89(3H, s), 7.21(1H, d, J = 8.6 Hz), 7.48-7.54 (1H, m), 7.80-7.94(4H, m), 7.97(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.12-8.15(2H, m), 8.75(1H, s).
611	-Cl	-Cl	-F	$-C_2H_5$	($CDCl_3$) 1.40(3H, t, J = 7.1 Hz), 4.39(2H, q, J = 7.1 Hz), 7.09(1H, d, J = 8.6 Hz), 7.26-7.35(1H, m), 7.55-7.57(1H, m), 7.66-7.73(2H, m), 7.86-7.92(2H, m), 8.02-8.03(2H, m), 8.40(1H, s).

Reference Example 612

Production of ethyl 4-{5-[1-(4-trifluoromethylphenyl)-ethylideneamino]pyridin-2-yloxy}benzoate

Ethyl 4-(5-aminopyridin-2-yloxy)benzoate (16.0 g, 62 mmol) was dissolved in toluene (300 mL). To the resulting solution were added 4-trifluoromethylacetophenone (11.7 g, 62 mmol) and (±)-camphor-10-sulfonic acid (1.08 g, 4.65 mmol), and refluxed overnight. The reaction solution was

concentrated under reduced pressure, to thereby yield 26.5 g of the title compound.

Appearance: Dark green oil

^{1}H NMR ($CDCl_3$) δ 1.35-1.41(3H, m), 2.34(3H, s), 4.36(2H, d, J = 7.1 Hz), 7.01-7.31(4H, m), 7.70-7.77(3H, m), 8.01-8.11(4H, m).

Reference Example 613

Production of methyl 4-[5-(4-trifluoromethylbenzyl-amino)pyridin-2-yloxy]benzoate

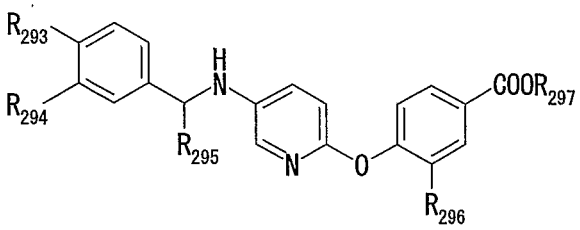
Methyl 4-{5-[(4-trifluoromethylbenzylidene)-amino]pyridin-2-yloxy}benzoate (2.64 g, 6.59 mmol) was suspended in methanol (25 mL), and to the resulting suspension was slowly added sodium borohydride (1.25 g, 33.0 mmol). The resulting solution was stirred at room temperature for 3 days. The reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate, and washed with water and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was washed with diethyl ether, to thereby yield 2.65 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 3.89(3H, s), 4.16(1H, brs), 4.42(2H, s), 6.84(1H, d, J = 8.7 Hz), 7.01(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.05(2H, d, J = 8.4 Hz), 7.49(2H, d, J = 8.4 Hz), 7.62(2H, d, J = 8.3 Hz), 7.67(1H, d, J = 3.1 Hz), 8.01(2H, d, J = 8.6 Hz).

The following compounds were produced in the same manner as in Reference Example 613.

Table 89



Reference Example No.	R_{293}	R_{294}	R_{295}	R_{296}	R_{297}	^{1}H NMR ($CDCl_3$) δppm
614	$-CF_3$	-H	-H	-H	$-C_2H_5$	1.37(3H, t, J = 7.1 Hz), 4.19(1H, brs), 4.35(2H, q, J = 7.1 Hz), 4.41(2H, brs), 6.83(1H, d, J = 8.7 Hz), 7.01(1H, dd, J = 8.6 Hz, 3.0 Hz), 7.04(2H, d, J = 8.6 Hz), 7.48(2H, d, J = 8.1 Hz), 7.61(2H, d, J = 8.3 Hz), 7.66(1H, d, J = 3.0 Hz), 8.02(2H, d, J = 8.7 Hz).
615	$-CF_3$	-H	$-CH_3$	-H	$-C_2H_5$	1.37(3H, t, J = 7.1 Hz), 1.56(3H, d, J = 6.8 Hz), 4.06(1H, brs), 4.34(2H, q, J = 7.1 Hz), 4.49(1H, q, J = 6.6 Hz), 6.75(1H, d, J = 8.7 Hz), 6.87(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.01(2H, d, J = 8.6 Hz), 7.47(2H, d, J = 8.1 Hz), 7.53(1H, d, J = 3.0 Hz), 7.60(2H, d, J = 8.3 Hz), 8.00(2H, d, J = 8.7 Hz).
616	$-CF_3$	-H	-H	-F	$-CH_3$	3.90(3H, s), 4.40(2H, brs), 6.89(1H, d, J = 8.1 Hz), 7.03(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.15-7.21(1H, m), 7.47(2H, d, J = 8.1 Hz), 7.55(1H, d, J = 3.0 Hz), 7.61(2H, d, J = 8.1 Hz), 7.80-7.84(2H, m).
617	-Cl	-Cl	-H	-F	$-CH_3$	3.91(3H, s), 4.29(2H, brs), 6.88(1H, d, J = 8.7 Hz), 7.02(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.15-7.21(2H, m), 7.41(1H, d, J = 8.3 Hz), 7.46(1H, d, J = 2.0 Hz), 7.53(1H, d, J = 3.0 Hz), 7.81-7.84(2H, m).

Reference Example 618

Production of ethyl 3-{4-[5-(3,4-dichlorobenzylamino)-pyridin-2-yloxy]phenyl}propionate

A solution of 3,4-dichlorobenzaldehyde (1.28

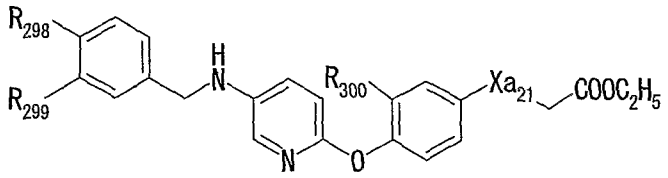
g, 7.3 mmol) was added to a solution of ethyl 3-[4-(5-aminopyridin-2-yloxy)phenyl]propionate (2.1 g, 7.3 mmol) in ethanol (20 mL), and the resulting solution was stirred for 2 hours at 40°C. To the resulting reaction solution was added sodium borohydride (0.55 g, 15.7 mmol) under ice cooling, and stirred at the same temperature for 1 hour. To the solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane: ethyl acetate = 4 : 1), to thereby yield 2.71 g of the title compound.

Appearance: Colorless oil

^{1}H NMR ($CDCl_3$) δ 1.24(3H, t, J = 7.1 Hz), 2.50-2.68(2H, m), 2.81-3.01(2H, m), 3.71-4.20(3H, m), 4.28(2H, s), 6.76(1H, d, J = 8.7 Hz), 6.88-7.02(3H, m), 7.06-7.23(3H, m), 7.41(1H, d, J = 8.2 Hz), 7.46(1H, d, J = 2.0 Hz), 7.60(1H, d, J = 3.0 Hz).

The following compounds were produced in the same manner as in Reference Example 618.

Table 90



Reference Example No.	R_{298}	R_{299}	R_{300}	Xa_{21}	^{1}H NMR ($CDCl_3$) δppm
619	-CF_3	-H	-H	-CH_2-	1.24(3H, t, J = 7.3Hz), 2.60(2H, t, J = 8.1Hz), 2.92(2H, t, J = 8.1 Hz), 4.13(2H, q, J = 7.3Hz), 4.39(2H, s), 6.76(1H, d, J = 8.7Hz), 6.97(2H, d, J = 8.4Hz), 6.98(1H, dd, J = 8.6Hz, 3.1Hz), 7.17(2H, d, J = 8.4Hz), 7.47(2H, d, J = 8.1Hz), 7.60(2H, d, J = 7.9Hz), 7.61(1H, d, J = 3.1Hz).
620	-Cl	-Cl	-OCH_3	-CH_2-	1.25(3H, t, J = 7.1Hz), 2.65-2.74(2H, m), 2.94(2H, t, J = 8.2Hz), 3.76(3H, s), 3.93(1H, brs), 4.14(2H, q, J = 7.1Hz), 4.22-4.34(2H, m), 6.70-6.85(3H, m), 6.85-7.02(2H, m), 7.10-7.25(1H, m), 7.39 (1H, d, J = 8.2Hz), 7.44(1H, d, J = 2.0Hz), 7.53(1H, d, J = 2.7Hz).
621	-CF_3	-H	-OCH_3	-CH_2-	1.25(3H, t, J = 7.1Hz), 2.52-2.68(2H, m), 2.81-3.01(2H, m), 3.76 (3H, s), 3.93(1H, brs), 4.14(2H, q, J = 7.1Hz), 4.30-4.40(2H, m), 6.72-6.84(3H, m), 6.96(1H, d, J = 8.0Hz), 6.98(1H, dd, J = 8.0 Hz, 3.0Hz), 7.40(2H, d, J = 8.0Hz), 7.55(1H, d, J = 3.0Hz), 7.59 (2H, d, J = 8.0Hz).
622	-Cl	-Cl	-OC_2H_5	-CH_2-	1.18(3H, t, J = 7.0Hz), 1.25(3H, t, J = 7.1Hz), 2.52-2.69(2H, m), 2.82-3.00(2H, m), 3.81-4.02(3H, m), 4.14(2H, q, J = 7.1Hz), 4.27 (2H, d, J = 4.7Hz), 6.72-6.82(3H, m), 6.93-7.02(2H, m), 7.18 (1H, dd, J = 8.2Hz, 2.0Hz), 7.39(1H, d, J = 8.4Hz), 7.45(1H, d, J = 2.0 Hz), 7.52(1H, d, J = 3.0Hz).
623	-CF_3	-H	-OC_2H_5	-CH_2-	1.18(3H, t, J = 7.0Hz), 1.25(3H, t, J = 7.1Hz), 2.51-2.72(2H, m), 2.83-3.01(2H, m), 3.87-4.06(3H, m), 4.16(2H, q, J = 7.1Hz), 4.30-4.42(2H, m), 6.72-6.83(3H, m), 6.94-7.02(2H, m), 7.46(2H, d, J = 8.1Hz), 7.54(1H, d, J = 3.0Hz), 7.59(2H, d, J = 8.1Hz).
624	-Cl	-Cl	-F	-CH_2-	1.12-1.35(3H, m), 2.50-2.74(2H, m), 2.93(2H, t, J = 7.7Hz), 3.95 (1H, brs), 4.05-4.20(2H, m), 4.27 (2H, s), 6.82(1H, d, J = 8.4Hz), 6.90-7.15(4H, m), 7.18(1H, dd, J = 8.4Hz, 2.0Hz),7.35-7.60(3H, m).
625	-CF_3	-H	-F	-CH_2-	1.13-1.35(3H, m), 2.65-2.70(2H, m), 2.93(2H, t, J = 7.7Hz), 4.01 (1H, brs), 4.05-4.23(2H, m), 4.37(2H, s), 6.82(1H, d, J = 8.8Hz), 6.90-7.15(4H, m), 7.37-7.55(3H, m), 7.55-7.70(2H, m).
626	-Cl	-Cl	-H	-N(Ac)-	1.27(3H, t, J = 7.1Hz), 1.94(3H, s), 4.10(1H, brs), 4.19(2H, q, J = 7.1 Hz), 4.31(2H, s), 4.34(2H, s), 6.84(1H, d, J = 8.5Hz), 7.00(1H, dd, J = 8.5Hz, 3.0Hz), 7.06(2H, d, J = 8.7Hz), 7.20(1H, dd, J = 8.2Hz, 2.2Hz), 7.31(2H, d, J = 8.7Hz), 7.42(1H, d, J = 8.2Hz), 7.47(1H, d, J = 2.2Hz), 7.62(1H, d, J = 3.0Hz).
627	-CF_3	-H	-H	-N(Ac)-	1.27(3H, t, J = 7.1Hz), 1.93(3H, s), 4.15(1H, brs), 4.18(2H, q, J = 7.1 Hz), 4.34(2H, s), 4.35-4.50(2H, m), 6.83(1H, d, J = 8.6Hz), 7.01(1H, dd, J = 8.6Hz, 3.0Hz), 7.06(2H, d, J = 8.9Hz), 7.31(2H, d, J = 8.9 Hz), 7.48(2H, d, J = 8.1Hz), 7.62(2H, d, J = 8.1Hz), 7.64(1H, d, J = 3.6Hz).

Reference Example 628

Production of ethyl 3-(4-{5-[benzyloxycarbonyl(2-methoxyethyl)amino]pyridin-2-yloxy}phenyl)propionate

Under a nitrogen atmosphere, to a solution of ethyl 3-[4-(5-benzyloxycarbonylaminopyridin-2-yloxy)phenyl]propionate (1.7 g, 4.0 mmol) in DMF (50 mL) was added 60% sodium hydride (0.19 g, 4.9 mmol) under ice cooling, and the resulting solution was stirred for 35 minutes at the same temperature. 2-Bromoethylmethyl ether (0.4 mL, 4.2 mmol) was added dropwise to the solution. The reaction solution was stirred for 2 hours under ice cooling, and then stirred for 2 days at room temperature. To the reaction solution was added water, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane: ethyl acetate = 4 : 1), to thereby yield 1.6 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.25(3H, t, J = 7.1 Hz), 2.57-2.70(2H, m), 2.89-3.02(2H, m), 3.52(2H, t, J = 5.4 Hz), 3.79(2H, t, J = 5.4 Hz), 4.14(2H, q, J = 7.1 Hz), 5.14(2H, brs), 6.87(1H, d, J = 8.7 Hz), 6.89-7.10(2H, m), 7.11-7.41(7H, m), 7.47-7.69(1H, m), 8.10(1H, brs).

The following compounds were produced in the

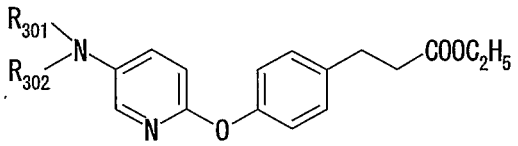
same manner as in Reference Example 628.

Reference Example 629

Ethyl [(4-{5-[(3,4-dichlorophenyl)methylamino]pyridin-2-yloxy}-2-trifluoromethylphenyl)ethylamino]acetate

MS 541(M^+).

Table 91



Reference Example No.	R_{301}	R_{302}	^{1}H NMR ($CDCl_3$) δppm or MS
630	4-CF_3PhCH_2-	-$(CH_2)_2OCH_3$	^{1}H NMR 1.24(3H, t, J = 7.1 Hz), 2.54-2.67(2H, m), 2.76-2.98(2H, m), 4.13(2H, q, J = 7.1 Hz), 4.61(2H, s), 6.76(1H, d, J = 8.9 Hz), 6.93-7.01(2H, m), 7.07(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.12-7.20 (2H, m), 7.33(2H, d, J = 8.0 Hz), 7.56(2H, d, J = 8.0 Hz), 7.65 (1H, d, J = 2.9 Hz).
631	4-CF_3PhCH_2-	-C_2H_5	^{1}H NMR 1.09-1.32(6H, m), 2.53-2.66(2H, m), 2.84-2.98(2H, m), 3.45 (2H, q, J = 7.1 Hz), 4.13(2H, q, J = 7.1 Hz), 4.49(2H, s), 6.77 (1H, d, J = 8.5 Hz), 6.93-7.01(2H, m), 7.02-7.09(1H, m), 7.12-7.20(2H, m), 7.11-7.39(2H, m), 7.53-7.61(2H, m), 7.66 (1H, d, J = 3.0 Hz).
632	$PhCH_2OCO$-	-C_2H_5	^{1}H NMR 1.15(3H, t, J = 7.1 Hz), 1.25(3H, t, J = 7.1 Hz), 2.54-2.71(2H, m), 2.83-3.04(2H, m), 3.69(2H, q, J = 7.1 Hz), 4.14(2H, q, J = 7.1 Hz), 5.14(2H, brs), 6.88(1H, d, J = 8.7 Hz), 7.02-7.11(2H, m), 7.18-7.40(7H, m), 7.44-7.59(1H, m), 7.98-8.08(1H, m).
633	4-CF_3PhCH_2-	-SO_2CH_3	MS 522(M^+)
634	3,4-Cl_2PhCH_2-	-SO_2CH_3	MS 522(M^+)
635	3,4-Cl_2Ph-	-CH_3	MS 444(M^+)

Reference Example 636

Production of ethyl 3-{4-[5-(2-methoxyethylamino)-pyridin-2-yloxy]phenyl}propionate

To a solution of ethyl 3-(4-{5-[benzyloxycarbonyl(2-methoxyethyl)amino]pyridin-2-yloxy}phenyl}propionate (1.82 g, 3.8 mmol) in ethanol-ethyl acetate (10 mL - 10 mL) was added under a nitrogen atmosphere 10% palladium-carbon (0.2 g), and the resulting solution was stirred for 3 hours under a hydrogen atmosphere at atmospheric pressure. The palladium-carbon was filtered off through Celite, and the filtrate was evaporated to yield 1.23 g of the title compound.

Appearance: Blue oil

^{1}H NMR ($CDCl_3$) δ 1.24(3H, t, J = 7.1 Hz), 2.55-2.68(2H, m), 2.87-2.98(2H, m), 3.20-3.31(2H, m), 3.56-3.66(2H, m), 4.13(2H, q, J = 7.1 Hz), 6.77(1H, d, J = 8.7 Hz), 6.93-7.01(2H, m), 7.03(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.13-7.22(2H, m), 7.66(1H, d, J = 3.0 Hz).

The following compound was produced in the same manner as in Reference Example 636.

Reference Example 637

Ethyl 3-[4-(5-ethylaminopyridin-2-yloxy)phenyl]-propionate

^{1}H NMR ($CDCl_3$) δ 1.29-1.32(6H, m), 2.55-2.67(2H, m), 2.87-2.99(2H, m), 3.14(2H, q, J = 7.1 Hz), 4.13(2H, q,

J = 7.1 Hz), 6.77(1H, d, J = 8.7 Hz), 6.89-7.02(3H, m), 7.09-7.25(3H, m), 7.63(1H, d, J = 3.0 Hz).

Reference Example 638

Production of ethyl 3-(3-methoxy-4-{5-[methyl-(4-trifluoromethylbenzyl)amino]pyridin-2-yloxy}phenyl)-propionate

To a solution of ethyl 3-{3-methoxy-4-[5-(4-trifluoromethylbenzylamino]pyridin-2-yloxy}phenyl}-propionate (0.8 g, 1.7 mmol) in methanol (15 mL) were added a 37% aqueous formaldehyde solution (0.38 mL, 5.1 mmol) and acetic acid (0.1 mL, 1,7 mmol). The reaction solution was stirred for 30 minutes at room temperature. After that, sodium cyanoborohydride (0.24 g, 3.4 mmol) was added to the reaction solution under ice cooling, and the mixture was stirred under ice cooling for 40 minutes. To the reaction solution was added water, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane: ethyl acetate = 4 : 1), to thereby yield 0.62 g of the title compound.

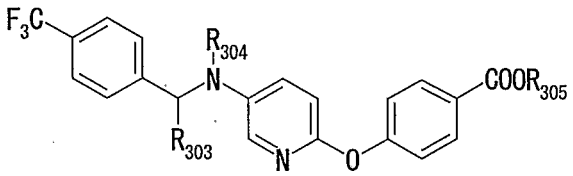
Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.25(3H, t, J = 7.1 Hz), 2.52-2.70(2H, m), 2.87-3.02(5H, m), 3.77(3H, s), 4.14(2H, q, J = 7.1 Hz), 4.40-4.50(2H, m), 6.74-6.86((3H, m), 6.97(1H, d, J = 8.0 Hz), 7.11(1H, dd, J = 8.9 Hz, 3.2 Hz), 7.34(2H,

d, J = 8.1 Hz), 7.57(2H, d, J = 8.1 Hz), 7.65(1H, d, J = 3.2 Hz).

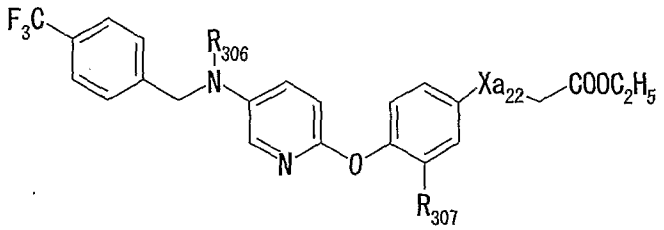
The following compounds were produced in the same manner as in Reference Example 638.

Table 92



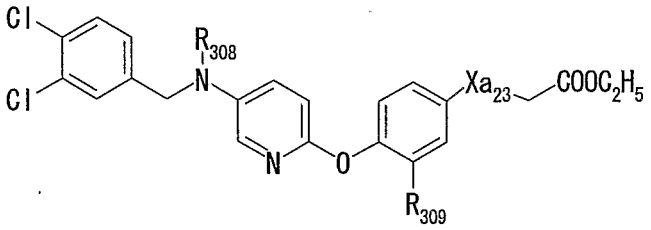
Reference Example No.	R_{303}	R_{304}	R_{305}	^{1}H NMR ($CDCl_3$) δppm
639	-H	-CH_3	-CH_3	3.07(3H, s), 3.89(3H, s), 4.56(2H, s), 6.87(1H, d, J = 8.9 Hz), 7.06(2H, d, J = 8.6 Hz), 7.13(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.35(2H, d, J = 8.1 Hz), 7.60(2H, d, J = 8.3 Hz), 7.75(1H, d, J = 3.1 Hz), 8.02(2H, d, J = 8.6 Hz).
640	-H	-C_2H_5	-C_2H_5	1.24(3H, t, J = 7.1 Hz), 1.37(3H, t, J = 7.1 Hz), 3.49(2H, q, J = 7.1 Hz), 4.35(2H, q, J = 7.1 Hz), 4.53(2H, s), 6.84(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.6 Hz), 7.06(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.36(2H, d, J = 8.4 Hz), 7.58(2H, d, J = 8.3 Hz), 7.69(1H, d, J = 3.1 Hz), 8.02(2H, d, J = 8.6 Hz).
641	-CH_3	-CH_3	-C_2H_5	1.38(3H, t, J = 7.1 Hz), 1.59(3H, d, J = 6.9 Hz), 2.74(3H, s), 4.36(2H, q, J = 7.1 Hz), 4.49(1H, q, J = 6.9 Hz), 6.89(1H, d, J = 8.9 Hz), 7.08 (2H, d, J = 8.9 Hz), 7.24(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.43(2H, d, J = 8.6 Hz), 7.61(2H, d, J = 8.3 Hz), 7.84(1H, d, J = 3.1 Hz), 8.03(2H, d, J = 8.9 Hz).

Table 93



Reference Example No.	R_{306}	R_{307}	Xa_{22}	^{1}H NMR ($CDCl_3$) δppm
642	-CH_3	-H	-CH_2-	1.24(3H, t, J = 7.1 Hz), 2.60(2H, t, J = 7.8 Hz), 2.92(2H, t, J = 7.8 Hz), 3.02(3H, s), 4.12(2H, q, J = 7.1 Hz), 4.51(2H, s), 6.79(1H, d, J = 8.9 Hz), 6.97(2H, d, J = 8.4 Hz), 7.10(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.17(2H, d, J = 8.3 Hz), 7.34(2H, d, J = 8.1 Hz), 7.58(2H, d, J = 8.3 Hz), 7.69(1H, d, J = 3.1 Hz).
643	-CH_3	-H	-N(Ac)-	1.27(3H, t, J = 7.1 Hz), 1.94(3H, s), 3.06(3H, s), 4.18(2H, q, J = 7.1 Hz), 4.34(2H, s), 4.55(2H, s), 6.87(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.7 Hz), 7.13(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.31(2H, d, J = 8.7 Hz), 7.35(2H, d, J = 8.0 Hz), 7.59(2H, d, J = 8.0 Hz), 7.72(1H, d, J = 3.1 Hz).
644	-CH_3	-F	-CH_2-	1.25(3H, t, J = 7.1 Hz), 2.55-2.70(2H, m), 2.93(2H, t, J = 7.9 Hz), 3.00(3H, s), 4.13(2H, q, J = 7.1 Hz), 4.49(2H, s), 6.86(1H, d, J = 8.9 Hz), 6.90-7.16(4H, m), 7.33(2H, d, J = 8.1 Hz), 7.57(2H, d, J = 8.1 Hz), 7.62(1H, d, J = 3.2 Hz).
645	-CH_3	-OC_2H_5	-CH_2-	1.19(3H, t, J = 7.0 Hz), 1.25(3H, t, J = 7.1 Hz), 2.50-2.69(2H, m), 2.81-2.99(2H, m), 2.98(3H, s), 3.98(2H, q, J = 7.0 Hz), 4.14(2H, q, J = 7.1 Hz), 4.48(2H, s), 6.68-6.88(3H, m), 7.00(1H, d, J = 8.0 Hz), 7.11(1H, dd, J = 8.0 Hz, 3.0 Hz), 7.33(2H, d, J = 8.0 Hz), 7.56(2H, d, J = 8.0 Hz), 7.64(1H, d, J = 3.0 Hz).
646	-C_2H_5	-F	-CH_2-	1.19(3H, t, J = 7.1 Hz), 1.10-1.35(3H, m), 2.50-2.70(2H, m), 2.93 (2H, t, J = 8.0 Hz), 3.43(2H, q, J = 7.1 Hz), 4.02-4.22(2H, m), 4.47 (2H, s), 6.83(1H, d, J = 9.0 Hz), 6.88-7.15(4H, m), 7.34(2H, d, J = 8.0 Hz), 7.41-7.70(3H, m).
647	-C_2H_5	-OCH_3	-CH_2-	1.18(3H, t, J = 7.0 Hz), 1.25(3H, t, J = 7.1 Hz), 2.57-2.68(2H, m), 2.88-2.99(2H, m), 3.42(2H, q, J = 7.0 Hz), 3.77(3H, s), 4.14(2H, q, J = 7.1 Hz), 4.42-4.50(2H, m), 6.72-6.86((3H, m), 6.97(1H, d, J = 8.0 Hz), 7.05(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.30-7.38(2H, m), 7.51-7.59 (2H, m), 7.60(1H, d, J = 3.2 Hz).
648	-C_2H_5	-OC_2H_5	-CH_2-	1.17(3H, t, J = 7.0 Hz), 1.18(3H, t, J = 7.0 Hz), 1.25(3H, t, J = 7.1 Hz), 2.55-2.69(2H, m), 2.84-2.98(2H, m), 3.42(2H, q, J = 7.1 Hz), 3.97(2H, q, J = 7.0 Hz), 4.13(2H, q, J = 7.0 Hz), 4.46(2H, s), 6.71-6.82(3H, m), 6.99(1H, d, J = 8.0 Hz), 7.05(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.34(2H, d, J = 8.0 Hz), 7.55(2H, d, J = 8.0 Hz), 7.59(1H, d, J = 3.1 Hz).

Table 94



Reference Example No.	R_{308}	R_{309}	Xa_{23}	^{1}H NMR ($CDCl_3$) δppm
649	$-CH_3$	-H	-N(Ac)-	1.27(3H, t, J = 7.1 Hz), 1.94(3H, s), 3.03(3H, s), 4.19(2H, q, J = 7.1 Hz), 4.34(2H, s), 4.43(2H, s), 6.87(1H, d, J = 9.0 Hz), 7.03-7.11(1H, m), 7.07(2H, d, J = 8.7 Hz), 7.13(1H, dd, J = 9.0 Hz, 3.1 Hz), 7.27-7.35(1H, m), 7.31(2H, d, J = 8.7 Hz), 7.40(1H, d, J = 8.2 Hz), 7.71(1H, d, J = 3.1 Hz).
650	$-CH_3$	-F	$-CH_2-$	1.15-1.30(3H, m), 2.53-2.70(2H, m), 2.93(2H, t, J = 7.9 Hz), 2.97(3H, s), 4.02-4.20(2H, m), 4.37(2H, s), 6.86(1H, d, J = 8.9 Hz), 6.91-7.18(5H, m), 7.32(1H, d, J = 2.0 Hz), 7.38(1H, d, J = 8.2 Hz), 7.61(1H, d, J = 2.9 Hz).
651	$-CH_3$	$-OCH_3$	$-CH_2-$	1.25(3H, t, J = 7.1 Hz), 2.55-2.75(2H, m), 2.85-3.05(2H, m), 2.95(3H, s), 3.77(3H, s), 4.14(2H, q, J = 7.1 Hz), 4.36(2H, s), 6.71-6.88(3H, m), 6.98(1H, d, J = 8.1 Hz), 7.00-7.15(2H, m), 7.32(1H, d, J = 2.0 Hz), 7.38(1H, d, J = 8.1 Hz), 7.64(1H, d, J = 3.1 Hz).
652	$-CH_3$	$-OC_2H_5$	$-CH_2-$	1.19(3H, t, J = 7.0 Hz), 1.25(3H, t, J = 7.1 Hz), 2.55-2.72(2H, m), 2.84-3.01(5H, m), 3.98(2H, q, J = 7.0 Hz), 4.14(2H, q, J = 7.1 Hz), 4.29-4.40(2H, m), 6.74-6.83(3H, m), 7.00(1H, d, J = 8.0 Hz), 7.06(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.10(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.31(1H, d, J = 2.0 Hz), 7.37(1H, d, J = 8.2 Hz), 7.63(1H, d, J = 3.2 Hz).
653	$-C_2H_5$	-F	$-CH_2-$	1.17(3H, t, J = 7.1 Hz), 1.20-1.30(3H, m), 2.50-2.72(2H, m), 2.93(2H, t, J = 7.8 Hz), 3.40(2H, q, J = 7.1 Hz), 4.00-4.22(2H, m), 4.36(2H, s), 6.83(1H, d, J = 8.9 Hz), 6.85-7.15(5H, m), 728-7.32(1H, m), 7.37(1H, d, J = 8.2 Hz), 7.56(1H, d, J = 3.2 Hz).
654	$-C_2H_5$	$-OCH_3$	$-CH_2-$	1.16(3H, t, J = 7.1 Hz), 1.21-1.35(3H, m), 2.50-2.75(2H, m), 2.82-3.05(2H, m), 3.39(2H, q, J = 7.1 Hz), 3.77(3H, s), 4.05-4.25 (2H, m), 4.35(2H, s), 6.68-6.88(3H, m), 6.90-7.00(1H, m), 7.00-7.11(2H, m), 7.31(1H, d, J = 2.0 Hz), 7.37(1H, d, J = 8.2 Hz), 7.59(1H, d, J = 3.0 Hz).
655	$-C_2H_5$	$-OC_2H_5$	$-CH_2-$	1.11-1.22(6H, m), 1.25(3H, t, J = 7.1 Hz), 2.56-2.67(2H, m), 2.86-2.97(2H, m), 3.39(2H, q, J = 7.1 Hz), 3.97(2H, q, J = 7.0 Hz), 4.14(2H, q, J = 7.1 Hz), 4.34(2H, s), 6.73-6.82(3H, m), 6.99 (1H, d, J = 8.0 Hz), 7.02-7.10(2H, m), 7.32(1H, d, J = 1.9 Hz), 7.36(1H, d, J = 8.2 Hz), 7.58(1H, d, J = 3.1 Hz).

Reference Example 656

Production of ethyl 3-(4-(5-(3,4-dichlorophenylamino)pyridin-2-yloxy)phenyl)propionate

Triethylamine (1.2 mL, 8.4 mmol) was added to a suspension of ethyl 3-(4-(5-aminopyridin-2-yloxy)phenyl)propionate (1.2 g, 4.2 mmol), 3,4-dichlorophenylboronic acid (1.6 g, 8.4 mmol), anhydrous copper acetate (0.762 g, 4.2 mmol) and molecular sieves 4A (5 g) in dichloromethane (24 mL), and the resulting reaction solution was stirred overnight at room temperature. After the resulting solution was filtered through Celite, the filtrate was concentrated under reduced pressure. The residue was purified by silica gel chromatography (*n*-hexane: ethyl acetate = 4 : 1), to thereby yield 1.5 g of the title compound.

Appearance: Slightly brown solid

^{1}H NMR ($CDCl_3$) δ 1.25(3H, t, J = 7.1 Hz), 2.60-2.66(2H, m), 2.93-2.99(2H, m), 4.14(2H, q, J = 7.1 Hz), 5.52(1H, brs), 6.71(1H, dd, J = 8.7 Hz, 2.7 Hz), 6.90(1H, d, J = 8.7 Hz), 6.97(1H, d, J = 2.7 Hz), 7.04-7.08(2H, m), 7.21-7.26(3H, m), 7.49(1H, dd, J = 8.7 Hz, 2.9 Hz), 8.01(1H, d, J = 2.8 Hz).

The following compound was produced in the same manner as in Reference Example 656.

Reference Example 657

Ethyl ({4-[5-(3,4-dichlorophenylamino)pyridin-2-yloxy]-

2-trifluoromethylphenyl}ethylamino)acetate

MS 527(M^+).

Reference Example 658

Production of ethyl 4-[3-(4-benzyloxy-3-methyl)phenyl-2-oxotetrahydropyrimidin-1-yl]benzoate

Under a nitrogen atmosphere, to a solution of 1-(4-benzyloxy-3-methyl)phenyltetrahydropyrimidin-2-one (0.5 g, 1.7 mmol) in dioxane (5 mL) were added copper (I) iodide (16 mg, 0.08 mmol) and N,N-dimethylglycine hydrochloride (47 mg, 0.34 mmol). The resulting solution was stirred for 5 minutes, and then ethyl 4-iodobenzoate (0.39 g, 1.4 mmol) and potassium (III) phosphate (1.04 g, 4.9 mmol) were added to the reaction mixture. The resulting solution was stirred for 20 hours at 100°C, after which the resulting solution was sprinkled with silica gel. The residue was purified by silica gel chromatography (*n*-hexane: ethyl acetate = 3 : 1 → dichloromethane : methanol = 40 : 1), to thereby yield 0.43 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 1.30(3H, t, J = 7.1 Hz), 2.08-2.22(5H, m), 3.66(2H, t, J = 5.9 Hz), 3.81(2H, t, J = 5.9 Hz), 4.28(2H, q, J = 7.1 Hz), 5.10(2H, s), 6.86-7.14(3H, m), 7.26-7.51(7H, m), 7.82-7.92(2H, m).

Reference Example 659

Production of ethyl (*E*)-3-(3-methoxy-4-{5-[2-(4-

trifluoromethylphenyl)vinyl]pyridin-2-yloxy}phenyl)propionate

To ethyl 3-[4-(5-bromopyridin-2-yloxy)-3-methoxyphenyl]propionate (610 mg, 1.6 mmol) were added 4-trifluoromethylstyrene (0.332 mL, 2.2 mmol), dichlorobis(benzonitrile)palladium (II) (33 mg, 0.082 mmol), N,N-dimethylglycine hydrochloride (17 mg, 0.16 mmol), sodium acetate (263 mg, 3.2 mmol) and N-methylpyrrolidone (5 mL) under an argon atmosphere. The resulting solution was stirred under an argon atmosphere for 17 hours at 130°C. To the reaction solution was added ethyl acetate and filtered. The filtrate was washed with water, and then dried over anhydrous sodium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane: ethyl acetate = 3 : 1), to thereby yield 500 mg of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.1 Hz), 2.64-2.69(2H, m), 2.95-3.01(2H, m), 3.76(3H, s), 4.05(2H, q, J = 7.1 Hz), 6.71-6.88(2H, m), 6.95(1H, d, J = 8.6 Hz), 6.98-7.08(2H, m), 7.11(1H, d, J = 16.5 Hz), 7.56-7.63(4H, m), 7.87-7.91(1H, m), 8.23(1H, d, J = 2.3 Hz).

The following compound was produced in the same manner as in Reference Example 659.

Reference Example 660

Ethyl 3-(4-{5-[(*E*)-2-(3,4-dichlorophenyl)vinyl]pyridin-2-yloxy}-3-methoxyphenyl)propionate

^{1}H NMR ($CDCl_3$) δ 1.26(3H, t, J = 7.1 Hz), 2.63-2.69(2H, m), 2.94-3.00(2H, m), 3.76(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.81-6.90(3H, m), 6.93(1H, d, J = 8.6 Hz), 6.99(1H, d, J = 15.3 Hz), 7.06(1H, d, J = 9.1 Hz), 7.27-7.31(1H, m), 7.40(1H, d, J = 8.2 Hz), 7.55(1H, d, J = 2.0 Hz), 7.82-7.86(1H, m), 8.19(1H, d, J = 2.5 Hz).

Reference Example 661

Production of ethyl {4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]benzenesulfonyl}acetate

To a solution of ethyl {4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]phenylsulfanyl}-acetate (1.20 g, 2.43 mmol) in dichloromethane (20 mL) was added m-chloroperbenzoic acid (1.45 g, 6.06 mmol) at 0°C. The resulting solution was stirred for 2 hours at room temperature. To the reaction solution was added methanol and stirred for some time. To the resulting solution was then added water, and extracted with dichloromethane. The dichloromethane layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous sodium sulfate, and evaporated. The obtained residue was purified by silica gel column chromatography (*n*-hexane: ethyl acetate = 1 : 1), to thereby yield 1.28 g of the title compound.

Appearance: Yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 1.22(3H, t, J = 7.1 Hz), 4.11(2H, s), 4.16(2H, q, J = 7.1 Hz), 7.06(2H, d, J = 8.9 Hz), 7.19(1H, t, J = 8.7 Hz), 7.30(1H, d, J = 8.7 Hz), 7.59(1H, d, J = 8.3 Hz), 7.71(1H, dd, J = 2.0 Hz, 8.3 Hz), 7.75-7.85(1H, m), 7.86-7.95(3H, m), 7.98(1H, d, J = 2.0 Hz).

Reference Example 662

Production of methyl 3-{4-[5-(3,4-dichlorobenzoyl-amino)pyridine-2-sulfinyl]phenyl}propionate

To a solution of methyl 3-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-ylsulfanyl]phenyl}propionate (1.00 g, 2.17 mmol) in dichloromethane (20 mL) was added m-chloroperbenzoic acid (0.620 g, 2.60 mmol)at 0°C. The resulting solution was stirred for 1 hour at0°C. To the reaction solution was added methanol and stirred for some time. To the resulting solution was then added water, and extracted with dichloromethane. The dichloromethane layer was washed with water, a saturated sodium bicarbonate solution and brine, dried over anhydrous sodium sulfate, and evaporated. The obtained residue was recrystalized from ethanol 3 times, to thereby yield 0.790 g of the title compound.

Appearance: White powder

Melting point: 164-166°C

Reference Example 663

Production of methyl 3-{4-[5-(3,4-dichlorobenzoyl-amino)pyridine-2-sulfonyl]phenyl}propionate

To a solution of methyl 3-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-ylsulfanyl]phenyl}-propionate (1.00 g, 2.17 mmol) in dichloromethane (20 mL) was added m-chloroperbenzoic acid (1.29 g, 5.42 mmol) at 0°C. The resulting solution was stirred for 1.5 hours at0°C. To the reaction solution was added methanol and stirred for some time. To the resulting solution was then added water, and extracted with dichloromethane. The dichloromethane layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated. The obtained residue was recrystalized from ethanol, to thereby yield 0.890 g of the title compound.

Appearance: White powder

Melting point: 165-166 °C

Reference Example 664

Production of ethyl {4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]benzenesulphenyl}acetate

To a solution of ethyl {4-[4-(3,4-dichloro-benzoylamino)-2-fluorophenoxy]phenylsulfanyl}acetate (0.800 g, 1.61 mmol) in methanol (20 mL) was added a 31% hydrogen peroxide solution (2.08 mL, 18.5 mmol). The resulting solution was refluxed for 16 hours. The reaction solution was cooled with ice, and the

resulting precipitated solid was collected by filtration, to thereby yield 0.651 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 1.13(3H, t, J = 7.1 Hz), 3.90-4.10(4H, m), 7.14(2H, d, J = 8.8 Hz), 7.34(1H, t, J = 9.0 Hz), 7.55-7.65(1H, m), 7.72(2H, d, J = 8.8 Hz), 7.84(1H, d, J = 8.4 Hz), 7.90-8.00(2H, m), 8.22(1H, d, J = 2.0 Hz), 10.63(1H, s).

Reference Example 665

Production of ethyl 3-(4-{5-[4-(trifluoromethyl)phenylcarbamoyl]pyridin-2-yloxy}phenyl)butyrate

To a suspension of 60% sodium hydride (0.133 g, 3.3 mmol) in THF (6 mL) was added dropwise triethylphosphono acetate (0.53 mL, 2.7 mmol) under ice cooling, and the resulting solution was stirred for 1 hour at room temperature. To the reaction solution was added a solution of 6-(4-acetylphenoxy)-N-[4-(trifluoromethyl]phenyl]nicotinamide (0.53 g, 1.3 mmol) in THF (6 mL), and the resulting solution was stirred for 10 hours at 60°C. To the reaction solution was added saturated aqueous ammonium chloride, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel chromatography (*n*-hexane : ethyl acetate = 4 : 1), to thereby yield 0.57 g of the intermediate

product ethyl 3-(4-{5-[4-(trifluoromethyl)phenyl-carbamoyl]pyridin-2-yloxy}phenyl)-2-butenoate. 10% palladium-carbon (0.057 g) was suspended in a mixed solvent consisting of ethanol (8 mL) and dioxane (2 mL), and to this suspension was added ethyl 3-(4-{5-[4-(trifluoromethyl)phenylcarbamoyl]pyridin-2-yloxy}phenyl)-2-butenoate (0.57 g, 1.2 mmol). The resulting product was subjected to catalytic reduction at atmospheric pressure and room temperature. Once the absorption of hydrogen had stopped, the catalyst was removed by filtration, and the filtrate was concentrated under reduced pressure, to thereby yield 0.56 g of the title compound.

Appearance: White solid

^{1}H NMR ($CDCl_3$) δ 1.21(3H, t, J = 7.1 Hz), 1.33(3H, d, J = 7.0 Hz), 2.51-2.67(2H, m), 3.28-3.37(1H, m), 4.10(2H, q, J = 7.1 Hz), 7.00(1H, d, J = 8.6 Hz), 7.07-7.12(2H, m), 7.26-7.31(2H, m), 7.60-7.65(2H, m), 7.73-7.77(2H, m), 7.81(1H, brs), 8.21(1H, dd, J = 8.6, 2.6 Hz), 8.68(1H, d, J = 2.3 Hz).

The following compound was produced in the same manner as in Reference Example 665.

Reference Example 666

Ethyl 2-methyl-3-{4-[5-(4-trifluoromethylphenyl-carbamoyl)pyridin-2-yloxy]phenyl}propionate

MS 472(M^+)

Reference Example 667

Production of 3,4-dichloro-N-{6-[4-(N-hydroxy-carbamimidoylmethyl)phenoxy]pyridin-3-yl}benzamide

To a solution of 3,4-dichloro-N-[6-(4-cyanomethylphenoxy)pyridin-3-yl]benzamide (700 mg, 1.76 mmol) in ethanol (30 mL) were added water (2 mL), hydroxylamine (420 mg, 12.71 mmol) and potassium carbonate (1.76 g, 12.73 mmol). Under argon, the resulting solution was stirred under reflux for 4 hours. The resulting reaction solution was concentrated under reduced pressure. To the residue was added water, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 10 : 1), to thereby yield 510 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 3.27(2H, s), 5.41(2H, brs), 7.03(2H, d, J = 8.4 Hz), 7.05(1H, d, J = 8.8 Hz), 7.31(2H, d, J = 8.4 Hz), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.18(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.46(1H, d, J = 2.6 Hz), 8.88(1H, s), 10.53(1H, s).

Reference Example 668

Production of 3,4-dichloro-N-{6-[4-(N-acetoxy-carbamimidoylmethyl)phenoxy]pyridin-3-yl}benzamide

To a solution of 3,4-dichloro-N-{6-[4-(N-hydroxycarbamimidoylmethyl)phenoxy]pyridin-3-yl}benzamide (510 mg, 1.18 mmol) in dioxane (8 mL) was added potassium carbonate (163 mg, 1.18 mmol). While stirring under ice cooling, to the resulting solution was added dropwise acetyl chloride (0.084 mL, 1.18 mmol), and the resulting solution was stirred for 15 minutes at room temperature. To the reaction solution was added THF (10 mL), and then water, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, evaporated. The residue was washed with ethyl acetate to yield 340 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.05(3H, s), 3.35(2H, s), 6.43(2H, brs), 7.06(1H, d, J = 9.0 Hz), 7.06(2H, d, J = 8.6 Hz), 7.36(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.3 Hz), 7.94(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.18(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.22(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.5 Hz), 10.54(1H, s).

Reference Example 669

Production of 4-{4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]phenyl}-4-oxobutyric acid

To a suspension consisting of 3,4-dichloro-3'-fluoro-4'-phenoxybenzanilide (5.05 g, 13.4 mmol) and succinic anhydride (1.48 g, 14.8 mmol) in 1,2-dichloroethane (25 mL) was added aluminum chloride

(6.26 g, 47.0 mmol) under ice cooling, and the resulting mixture was stirred at the same temperature for 5 minutes, and then at room temperature for 1.5 hours. The resulting reaction solution was poured into ice water, and the resulting solid was collected by filtration. To the solid was added 50% aqueous acetone (200 mL), and the resulting solution was refluxed for 0.5 hours, then cooled. The obtained solid was collected by filtration, to thereby yield 6.30 g of the title compound.

Appearance: White powder

Melting point: 205-208°C

Reference Example 670

Production of ethyl 3-{4-[hydroxy(5-nitro-2-pyridyl)-methyl]phenyl}propionate

To a solution of ethyl 3-[4-(5-nitropyridine-2-carbonyl)phenyl]propionate (1.52 g, 4.63 mmol) in dichloromethane (15 mL) and ethanol (15 mL) was added sodium borohydride (0.175 g, 4.63 mmol) under ice cooling, and the resulting solution was stirred at the same temperature for 1 hour. The reaction solution was concentrated under reduced pressure. The residue was dissolved in water and ethyl acetate. To the solution was added acetic acid and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, and then dried over anhydrous magnesium sulfate. The solvent was

evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane :ethyl acetate = 3 : 1), to thereby yield 0.264 g of the title compound.

Appearance: Brown powder

^{1}H NMR ($CDCl_3$) δ 1.19(3H, t, J = 7.2 Hz), 2.56(2H, t, J = 7.8 Hz), 2.91(2H, t, J = 7.8 Hz), 4.09(2H, q, J = 7.2 Hz), 4.35(1H, brs), 5.84(1H, s), 7.17(2H, d, J = 8.1 Hz), 7.26(2H, d, J = 8.1 Hz), 7.46(1H, d, J = 8.7 Hz), 8.40(1H, dd, J = 8.7 Hz, 2.5 Hz), 9.36(1H, d, J = 2.5 Hz).

The following compound was produced in the same manner as in Reference Example 670.

Reference Example 671

t-Butyl 4-[2-hydroxy-3-(4-hydroxyphenyl)propionyl]-piperazine-1-carboxylate

^{1}H NMR ($CDCl_3$) δ 1.47(9H, s), 1.62(1H, brs), 2.85(2H, d, J = 6.0 Hz), 3.00-3.80(8H, m), 4.56(1H, t, J = 6.0 Hz), 5.35(1H, brs), 6.74(2H, d, J = 8.4 Hz), 7.06(2H, d, J = 8.4 Hz).

Reference Example 672

Production of ethyl 3-(4-{5-[bis(3,4-dichlorobenzoyl)-amino]-2-pyridylmethyl}phenyl)propionate

To a suspension of 10% palladium-carbon (27 mg) in ethanol (5 mL) were added a solution of ethyl 3-{4-[hydroxy (5-nitro-2-pyridyl)-

methyl]phenyl}propionate (0.264 g, 0.799 mmol) and 0.5 M hydrogen chloride in ethanol (2 mL), and the resulting solution was subjected to catalytic reduction at atmospheric pressure at 50°C. Once the absorption of hydrogen had stopped, the catalyst was removed by filtration, and the filtrate was concentrated under reduced pressure. The residue was suspended in THF (5 mL), and triethylamine (0.267 mL, 2.40 mmol) was added. To the solution was added dropwise a solution of 3,4-dichlorobenzoyl chloride (0.255 g, 0.879 mmol) in THF (1 mL) under ice cooling, and stirred for 1 hour at the same temperature. To the resulting solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane :ethyl acetate = 5 : 1), to thereby yield 0.177 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.20(3H, t, J = 7.2 Hz), 2.56(2H, t, J = 7.8 Hz), 2.89(2H, t, J = 7.8 Hz), 4.09(2H, q, J = 7.2 Hz), 6.99(1H, s), 7.17(2H, d, J = 8.2 Hz), 7.35(2H, d, J = 8.2 Hz), 7.42(1H, d, J = 8.6 Hz), 7.43-7.56(2H, m), 7.63(1H, dd, J = 8.6 Hz, 2.1 Hz), 7.85-7.94(2H, m), 8.15(1H, d, J = 2.0 Hz), 8.20-8.32(2H, m), 8.57(1H, d, J = 2.5 Hz).

Reference Example 673

Production of ethyl 3-(4-(5-(*N*-(4-(trifluoromethyl)-phenyl)sulfamoyl)pyridin-2-yloxy)phenyl)propionate

To a solution of ethyl 3-(4-(3-bromo-5-(*N*-(4-(trifluoromethyl)phenyl)sulfamoyl)pyridin-2-yloxy)phenyl)propionate (0.41 g, 0.7 mmol) in ethanol (10 mL) were added 10% palladium-carbon (0.041 g) and ammonium formate (0.226 g, 3.6 mmol), and the resulting solution was heated to reflux for 2 hours. The catalyst was removed by filtration, and the filtrate was concentrated under reduced pressure. The residue was then purified by silica gel chromatography (*n*-hexane :ethyl acetate = 4 : 1), to thereby yield 0.28 g of the title compound.

Appearance: White solid

^{1}H NMR ($CDCl_3$) δ 1.24(3H, t, J = 7.1 Hz), 2.60-2.66(2H, m), 2.93-2.99(2H, m), 4.14(2H, q, J = 7.1 Hz), 6.95(1H, d, J = 8.8 Hz), 7.01-7.05(2H, m), 7.20-7.26(3H, m), 7.50-7.54(3H, m), 8.03(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.59(1H, d, J = 2.6 Hz).

Reference Example 674

Production of 1-(4-methoxyphenyl)imidazolin-2-one

To a suspension of 1-(2-chloroethyl)-3-(4-methoxyphenyl)urea (7.0 g, 30.6 mmol) in *t*-butanol (120 mL) was added potassium *t*-butoxide(6.4 g, 57.0 mmol) under a nitrogen atmosphere. The resulting solution was stirred for 10 minutes, and then potassium *t*-

butoxide (3.0 g, 26.7 mmol) was added. This solution was stirred for 10 minutes, and then potassium *t*-butoxide (4.3 g, 38.3 mmol) was added. The resulting solution was stirred for 16 hours at room temperature. The pH was adjusted to between 2 and 3 with 10% hydrochloric acid, and the solvent was evaporated under reduced pressure. To the residue were added water (100 mL) and ethyl acetate (100 mL), and stirred for 1 hour at room temperature. Resulting precipitates were filtered, washed with diethyl ether, and then dried under reduced pressure, to thereby yield 5.1 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 3.29-3.44(2H, m), 3.70(3H, s), 3.71-3.88(2H, m), 6.77(1H, s), 6.81-6.95(2H, m), 7.35-7.50(2H, m).

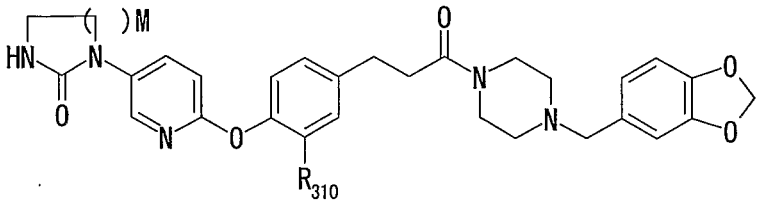
The following compounds were produced in the same manner as in Reference Example 674.

Reference Example 675

1-(4-Benzyloxy-3-methylphenyl)tetrahydropyrimidin-2-one

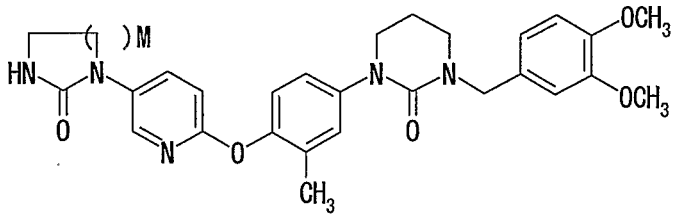
^{1}H NMR (DMSO-d_6) δ 1.81-1.96(2H, m), 2.16(3H, s), 3.11-3.25(2H, m), 3.51(2H, t, J = 5.6 Hz), 5.09(2H, s), 6.42(1H, s), 6.91(1H, d, J = 8.7 Hz), 6.98(1H, dd, J = 2.6 Hz, 8.7 Hz), 7.04(1H, d, J = 2.6 Hz), 7.28-7.34(1H, m), 7.36-7.41(2H, m), 7.42-7.48(2H, m).

Table 95



Reference Example No.	R_{310}	M	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
676	-H	1	mp 162.0 - 163.0
677	-H	2	mp 179.0 - 180.0
678	$-OCH_3$	1	^{1}H NMR 2.29-2.45(4H, m), 2.59-2.69(2H, m), 2.91-3.04(2H, m), 3.34-3.47(4H, m), 3.53-3.69(4H, m), 3.75(3H, s), 3.85-3.96(2H, m), 4.58(1H, s), 5.95(2H, s), 6.69-6.78(2H, m), 6.79-6.89(3H, m), 6.91(1H, d, J = 9.0 Hz), 7.02(1H, d, J = 8.0 Hz), 7.99(1H, d, J = 2.9 Hz), 8.25(1H, dd, J = 2.9 Hz, 9.0 Hz).
679	$-OCH_3$	2	mp 140.0 - 141.5

Table 96



Reference Example No.	M	^{1}H NMR ($CDCl_3$) δppm
680	1	1.98-2.14(2H, m), 2.18(3H, s), 3.30(2H, d, J = 6.0 Hz), 3.51-3.66(2H, m), 3.67-3.78(2H, m), 3.80-4.05(8H, m), 4.57(2H, s), 4.79(1H, s), 6.78-6.94(4H, m), 6.99(1H, d, J = 8.6 Hz), 7.13(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.22(1H, d, J = 2.6 Hz), 8.05(1H, d, J = 2.9 Hz), 8.22(1H, dd, J = 2.9 Hz, 9.0 Hz).
681	2	1.91-2.15(4H, m), 2.18(3H, s), 3.18-3.36(2H, m), 3.37-3.51(2H, m), 3.58-3.78(2H, m), 3.88(3H, s), 3.88(3H, s), 4.56(2H, s), 4.89(1H, s), 6.76-6.94(4H, m), 7.00(1H, d, J = 8.7 Hz), 7. 13(1H, dd, J = 2.6 Hz, 8.7 Hz), 7.23(1H, d, J = 2.6 Hz), 7.67(1H, dd, J = 2.8 Hz, 8.8 Hz), 8.08(1H, d, J = 2.8 Hz).

Reference Example 682

Production of 3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionic acid

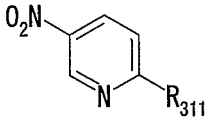
To a solution of ethyl 3-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}propionate (6.00 g, 13.1 mmol) in THF (60 mL) and ethanol (30 mL) were added 5 M aqueous sodium hydroxide (3.14 mL, 15.7 mmol) and water (30 mL) and the resulting solution was refluxed for 1 hour. The reaction solution was cooled with ice. To the reaction solution were added 5 M hydrochloric acid (4.0 mL, 20.0 mmol) and water (100 mL). The obtained solid was collected by filtration, and recrystallized from water-containing acetone, to thereby yield 5.60 g of the title compound.

Appearance: White powder

Melting point: 188-190 °C

The following compounds were produced in the same manner as in Reference Example 682.

Table 97



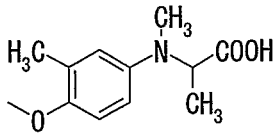
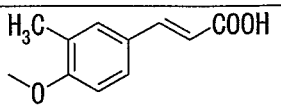
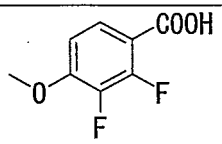
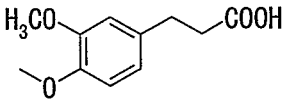
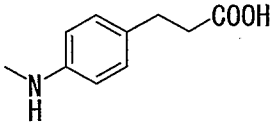
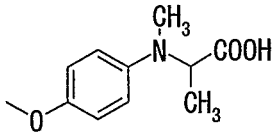
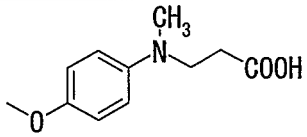
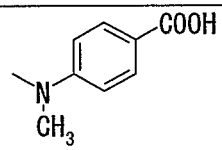
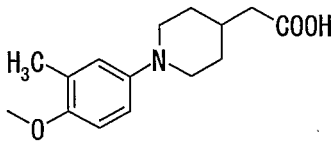
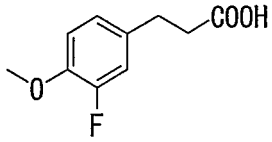
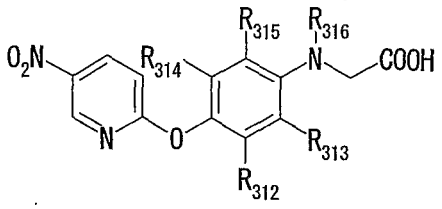
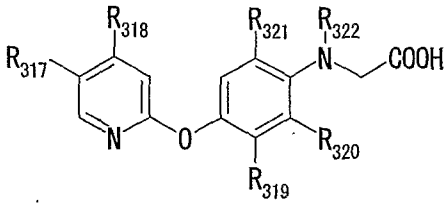
Reference Example No.	R_{311}	^{1}H NMR (solvent) δppm or MS
683		^{1}H NMR ($CDCl_3$) 1.51(3H, d, J = 7.1 Hz), 2.12(3H, s), 2.91 (3H, s), 4.49(1H, q, J = 7.1 Hz), 6.71-6.75(2H, m), 6.95-7.00 (2H, m), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, dd, J = 2.8 Hz, 0.5 Hz).
684		MS 300(M^+)
685		^{1}H NMR (DMSO-d_6) 7.39(1H, td, J = 2.0 Hz, 8.9 Hz), 7.50 (1H, d, J = 9.0 Hz), 7.78(1H, td, J = 2.1 Hz, 8.9 Hz), 8.70(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz), 11.35-11.91 (1H, m).
686		^{1}H NMR ($CDCl_3$) 2.72-2.77(2H, m), 2.98-3.03(2H, m), 3.74(3H, s), 6.85-6.89(2H, m), 7.03(1H, d, J = 9.1 Hz), 7.06-7.09(1H, m), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01.(1H, d, J = 2.8 Hz).
687		^{1}H NMR (DMSO-d_6) 2.52(2H, t, J = 7.6 Hz), 2.80(2H, t, J = 7.6 Hz), 6.86(1H, d, J = 9.4 Hz), 7.21(2H, d, J = 8.5 Hz), 7.58 (2H, d, J = 8.5 Hz), 8.26(1H, dd, J = 2.9 Hz, 9.4 Hz), 9.01(1H, d, J = 2.9 Hz), 10.06(1H, s).
688		^{1}H NMR (DMSO-d_6) 2.96(3H, s), 4.09(2H, s), 6.44-6.49 (2H, m), 6.56(1H, dd, J = 8.3 Hz, 2.4 Hz), 7.15(1H, d, J = 9.1 Hz), 7.20-7.26(1H, m), 8.59(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05 (1H, d, J = 2.8 Hz).
689		^{1}H NMR ($CDCl_3$) 1.53(3H, d, J = 7.1 Hz), 2.93(3H, s), 4.51 (1H, q, J = 7.1 Hz), 6.87(2H, d, J = 9.2 Hz), 6.98(1H, d, J = 9.1 Hz), 7.05(2H, d, J = 9.1 Hz), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.6 Hz).
690		^{1}H NMR ($CDCl_3$) 2.63-2.69(2H, m), 2.97(3H, s), 3.68(2H, t, J = 7.1 Hz), 6.81(2H, d, J = 9.1 Hz), 6.98(1H, d, J = 9.1 Hz), 7.05(2H, d, J = 9.2 Hz), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06 (1H, d, J = 2.8 Hz).
691		^{1}H NMR (DMSO-d_6) 3.55(3H, s), 6.67(1H, d, J = 9.5 Hz), 7.52(2H, d, J = 8.5 Hz), 8.04(2H, d, J = 8.5 Hz), 8.21(1H, dd, J = 2.8 Hz, 9.5 Hz), 9.05(1H, d, J = 2.8 Hz), 13.10(1H, brs).
692		^{1}H NMR (DMSO-d_6) 1.28-1.32(2H, m), 1.75-1.79(3H, m), 2.01(3H, s), 2.19(2H, d, J = 6.8 Hz), 2.65(2H, t, J = 12.0 Hz), 3.65(2H, d, J = 12.4 Hz), 6.80-6.96(3H, m), 7.15(1H, d, J = 9.2 Hz), 8.58(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz), 10.71(1H, brs).
693		MS 306(M^+)

Table 98



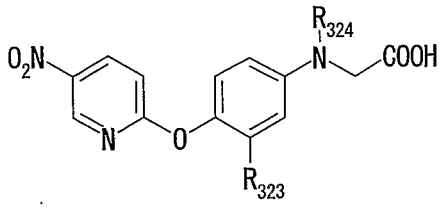
Reference Example No.	R_{312}	R_{313}	R_{314}	R_{315}	R_{316}	^{1}H NMR (solvent) δppm
694	-F	-H	-H	-H	$-CH_3$	($CDCl_3$) 3.09(3H, s), 4.12(2H, s), 6.45-6.57(2H, m), 7.05-7.12(2H, m), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, dd, J = 2.8 Hz, 0.7 Hz).
695	-F	-H	-H	-H	$-C_2H_5$	($CDCl_3$) 1.25(3H, t, J = 7.1 Hz), 3.47(2H, q, J = 7.1 Hz), 4.06(2H, s), 6.42-6.53(2H, m), 7.04-7.10(2H, m), 8.47 (1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, dd, J = 2.8 Hz, 0.5 Hz).
696	-F	-H	-H	-H	allyl	($CDCl_3$) 4.03(2H, d, J = 5.0 Hz), 4.09(2H, s), 5.25-5.32 (2H, m), 5.82-5.96(1H, m), 6.44-6.56(2H, m), 7.04-7.10 (2H, m), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, d, J = 2.6 Hz).
697	-F	-H	-H	-F	$-CH_3$	(DMSO-d_6) 2.94(3H, s), 4.04(3H, s), 6.92(1H, dd, J = 8.5 Hz, 12.9 Hz), 7.30(1H, dd, J = 7.5 Hz, 13.7 Hz), 7.35 (1H, d, J = 9.1 Hz), 8.63(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.04(1H, d, J = 2.8 Hz), 12.41-12.82(1H, m).
698	-F	-H	-H	-F	$-C_2H_5$	(DMSO-d_6) 1.10(3H, t, J = 7.0 Hz), 3.12-3.48(2H, m), 4.01(2H, s), 6.90(1H, dd, J = 8.4 Hz, 13.1 Hz), 7.29(1H, dd, J = 7.6 Hz, 13.7 Hz), 7.35(1H, d, J = 9.0 Hz), 8.63 (1H, dd, J = 2.8 Hz, 9.0 Hz), 9.04(1H, d, J = 2.8 Hz), 12.41-12.70(1H, m).
699	-F	-H	-F	-H	$-CH_3$	(DMSO-d_6) 2.96(3H, s), 4.26(2H, s), 6.41-6.61(2H, m), 7.43(1H, d, J = 9.1 Hz), 8.65(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.05(1H, d, J = 2.8 Hz), 12.56-12.90(1H, m).
700	$-CH_3$	$-CH_3$	-H	-H	$-CH_3$	($CDCl_3$) 2.07(3H, s), 2.32(3H, s), 2.85(3H, s), 3.76(2H, s), 6.91(1H, d, J = 8.7 Hz), 7.00(1H, dd, J = 9.1 Hz, 0.6 Hz), 7.09(1H, d, J = 8.7 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, dd, J = 2.8 Hz, 0.6 Hz).
701	$-CH_3$	-H	-H	$-CH_3$	$-C_2H_5$	(DMSO-d_6) 0.98(3H, t, J = 7.1 Hz), 1.98(3H, s), 2.20 (3H, s), 3.09(2H, q, J = 7.1 Hz), 3.70(2H, s), 6.91(1H, s), 7.06(1H, s), 7.18(1H, d, J = 9.1 Hz), 8.59(1H, dd, J = 9.1 Hz, 2.9 Hz), 9.03(1H, d, J = 2.9 Hz), 12.30(1H, brs).
702	-H	-H	-H	-H	$-SO_2CH_3$	(DMSO-d_6) 3.17(3H, s), 4.43(2H, s), 7.29(2H, d, J = 8.7 Hz), 7.31(1H, d, J = 9.1 Hz), 7.55(2H, d, J = 8.9 Hz), 8.64(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
703	$-CH_3$	-H	-H	-H	$-SO_2CH_3$	(DMSO-d_6) 2.09(3H, s), 3.11(3H, s), 4.42(2H, s), 7.20(1H, d, J = 8.6 Hz), 7.31(1H, d, J = 9.1 Hz), 7.37(1H, dd, J = 8.6 Hz, 2.5 Hz), 7.44(1H, d, J = 2.3 Hz), 8.64(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz), 12.88(1H, brs).

Table 99



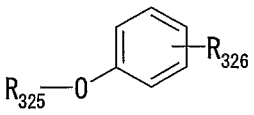
Reference Example No.	R_{317}	R_{318}	R_{319}	R_{320}	R_{321}	R_{322}	^{1}H NMR (solvent) δppm or MS
704	$-NO_2$	-H	$-CH_3$	-H	$-CH_3$	$-CH_3$	MS 331(M^+)
705	$-NO_2$	-H	$-CF_3$	-H	-H	$-CH_3$	MS 371(M^+)
706	$-NO_2$	-H	$-CF_3$	-H	-H	$-C_2H_5$	MS 385(M^+)
707	$-NO_2$	$-CH_3$	-H	$-CF_3$	-H	$-CH_3$	MS 385(M^+)
708	$-NO_2$	-H	-F	-F	-H	$-CH_3$	^{1}H NMR (DMSO-d_6) 2.98(3H, s), 4.05 (2H, s), 6.64-6.88(1H, m), 6.96-7.20 (1H, m), 7.38(1H, d, J = 9.1 Hz), 8.64 (1H, dd, J = 2.7 Hz, 9.1 Hz), 9.04(1H, d, J = 2.7 Hz), 12.24-12.95(1H, m).
709	$-NO_2$	-H	$-OCH_3$	-H	-H	$-SO_2CH_3$	^{1}H NMR (DMSO-d_6) 3.16(3H, s), 3.70 (3H, s), 4.45(2H, s), 7.10-7.30(4H, m), 8.61(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02 (1H, d, J = 2.8 Hz), 12.97(1H, brs).
710	-Br	-H	-F	-H	-F	$-CH_3$	^{1}H NMR (DMSO-d_6) 2.92(3H, s), 4.01 (2H, s), 6.80-6.93(1H, m), 7.11(1H, d, J = 8.8 Hz), 7.14-7.26(1H, m), 8.06 (1H, dd, J = 2.6 Hz, 8.8 Hz), 8.25(1H, d, J = 2.6 Hz), 12.18-12.89(1H, m).
711	$4-CF_3PhCH_2-$	-H	-H	-H	-H	$-CH_3$	^{1}H NMR ($CDCl_3$) 3.04(3H, s), 3.93(2H, s), 4.04(2H, s), 6.69(2H, d, J = 9.1 Hz), 6.70(1H, d, J = 8.5 Hz), 6.97(2H, d, J = 9.1 Hz), 7.25(2H, d, J = 8.6 Hz), 7.39(1H, dd, J = 8.5 Hz, 2.5 Hz), 7.52(2H, d, J = 8.6 Hz), 8.09(1H, d, J = 2.5 Hz), 11.26(1H, brs).
712	$4-CF_3PhOCH_2-$	-H	-H	-H	-H	$-SO_2CH_3$	^{1}H NMR (DMSO-d_6) 3.11(3H, s), 4.40 (2H, s), 5.18(2H, s), 7.12(1H, d, J = 8.9 Hz), 7.15-7.23(4H, m), 7.49(2H, d, J = 8.9 Hz), 7.67(2H, d, J = 8.6 Hz), 7.98(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.28 (1H, d, J = 2.0 Hz), 12.41(1H, brs).
713	$4-CF_3PhOCH_2-$	-H	$-CH_3$	-H	-H	$-SO_2CH_3$	^{1}H NMR (DMSO-d_6) 2.06(3H, s), 3.18 (3H, s), 3.89(2H, s), 5.15(2H, s), 7.02 (1H, d, J = 8.4 Hz), 7.07(1H, d, J = 8.6 Hz), 7.21(2H, d, J = 8.4 Hz), 7.44(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.49(1H, d, J = 2.3 Hz), 7.67(2H, d, J = 8.9 Hz), 7.95 (1H, dd, J = 8.4 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).

Table 100



Reference Example No.	R_{323}	R_{324}	^{1}H NMR (solvent) δppm
714	-H	-H	(DMSO-d_6) 3.35(1H, brs), 3.84(2H, s), 6.63(2H, d, J = 8.9 Hz), 6.96(2H, d, J = 8.9 Hz), 7.14(1H, d, J = 9.1 Hz), 8.59(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.05(1H, d, J = 2.9 Hz).
715	-H	-CH_3	($CDCl_3$) 3.09(3H, s), 4.11(2H, s), 6.74(2H, d, J = 9.1 Hz), 6.97(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.04(2H, d, J = 9.1 Hz), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, dd, J = 2.8 Hz, 0.5 Hz).
716	-H	-C_2H_5	($CDCl_3$) 1.24(3H, t, J = 7.1 Hz), 3.48(2H, q, J = 7.1 Hz), 4.07(2H, s), 6.73(2H, d, J = 9.2 Hz), 6.98(1H, d, J = 9.1 Hz), 7.04(2H, d, J = 9.2 Hz), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d , J = 2.8 Hz).
717	-OCH_3	-H	(DMSO-d_6) 3.62(3H, s), 3.83(2H, s), 6.13(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.41(1H, d, J = 2.5 Hz), 6.90(1H, d, J = 8.6 Hz), 7.09(1H, d, J = 8.6 Hz), 8.54(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.00(1H, d, J = 3.0 Hz).
718	-OCH_3	-CH_3	(DMSO-d_6) 3.00(3H, s), 3.65(3H, s), 4.12(2H, s), 6.21(1H, dd, J = 8.8 Hz, 2.8 Hz), 6.39(1H, d, J = 2.8 Hz), 6.96(1H, d, J = 8.8 Hz), 7.11(1H, d, J = 9.1 Hz), 8.54(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.00(1H, d, J = 2.8 Hz), 12.57(1H, s).
719	-OCH_3	-C_2H_5	(DMSO-d_6) 1.13(3H, t, J = 7.0 Hz), 3.42(2H, q, J = 7.0 Hz), 3.64(3H, s), 4.05(2H, s), 6.14(1H, dd, J = 8.8 Hz, 2.8 Hz), 6.31(1H, d, J = 2.8 Hz), 6.95(1H, d, J = 8.8 Hz), 7.12(1H, d, J = 9.1 Hz), 8.53(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.00(1H, d, J = 2.8 Hz), 12.59(1H, brs).
720	-CH_3	-Ac	(DMSO-d_6) 1.86(3H, s), 2.08(3H, s), 4.26(2H, s), 7.05-7.50(4H, m), 8.63 (1H, dd, J = 9.1 Hz, 2.9 Hz), 9.02(1H, dd, J = 2.9 Hz, 0.4 Hz), 12.72(1H, brs).
721	-CH_3	-H	($CDCl_3$) 2.09(3H, s), 3.98(2H, s), 5.26(1H, brs), 6.50-6.55(2H, m), 6.92(1H, d, J = 8.4 Hz), 6.98(1H, d, J = 8.1 Hz), 8.45(1H, dd, J = 8.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
722	-CH_3	-CH_3	(DMSO-d_6) 1.99(3H, s), 2.97(3H, s), 4.09(2H, s), 6.52(1H, dd, J = 8.8 Hz, 3.0 Hz), 6.59(1H, d, J = 3.0 Hz), 6.92(1H, d, J = 8.8 Hz), 7.13(1H, dd, J = 9.1 Hz, 0.3 Hz), 8.57(1H, dd, J = 9.1 Hz, 2.9 Hz), 9.01(1H, d, J = 2.9 Hz), 12.54(1H, brs).
723	-CH_3	-C_2H_5	(DMSO-d_6) 1.11(3H, t, J = 7.0 Hz), 1.98(3H, s), 3.89(2H, q, J = 7.0 Hz), 4.02(2H, s), 6.44(1H, dd, J = 8.8 Hz, 2.9 Hz), 6.51(1H, d, J = 2.9 Hz), 6.90(1H, d, J = 8.8 Hz), 7.13(1H, d, J = 9.1 Hz), 8.56(1H, dd, J = 9.1 Hz, 2.9 Hz), 9.01(1H, d, J = 2.9 Hz), 12.53(1H, brs).
724	-CH_3		(DMSO-d_6) 0.54-0.59(2H, m), 0.80-0.87(2H, m), 2.02(3H, s), 2.64-2.71 (1H, m), 4.11(2H, s), 6.77-6.81(1H, m), 6.85(1H, d, J = 2.8 Hz), 6.96(1H, d, J = 8.7 Hz), 7.17(1H, dd, J = 9.2 Hz, 0.5 Hz), 8.59(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.04(1H, dd, J = 3.0 Hz, 0.5 Hz), 12.56(1H, brs).
725	-F	-H	(DMSO-d_6) 3.82(2H, s), 6.43(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.53(1H, dd, J = 13.4 Hz, 2.6 Hz), 7.07(1H, t, J = 8.9 Hz), 7.28(1H, dd, J = 9.1 Hz, 0.5 Hz), 8.61(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, dd, J = 2.8 Hz, 0.5 Hz).

Table 101



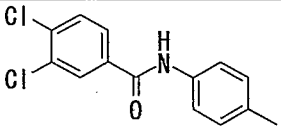
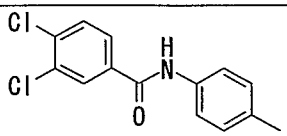
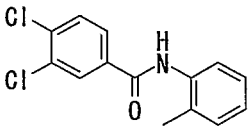
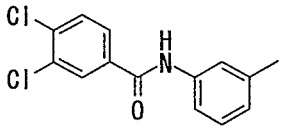
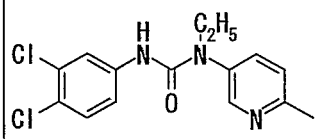
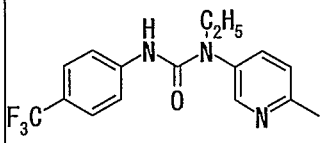
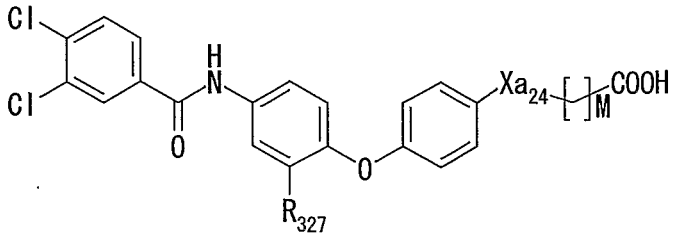
Reference Example No.	R_{325}	R_{326}	mp (°C) or ^{1}H NMR (solvent) δppm
726	4-NO_2Ph-	4-N(CH_3)CH_2COOH	^{1}H NMR ($CDCl_3$) 3.10(3H, s), 4.13(2H, s), 6.74(2H, d, J = 9.2 Hz), 6.95(2H, d, J = 9.2 Hz), 7.00(2H, d, J = 9.2 Hz), 8.17(2H, d, J = 9.2 Hz).
727		2-$(CH_2)_2$COOH	mp 157-159
728		3-$(CH_2)_2$COOH	mp 192-194
729		4-$(CH_2)_2$COOH	^{1}H NMR ($CDCl_3$) 2.67(2H, t, J = 7.7 Hz), 2.94(2H, t, J = 7.7 Hz), 6.78 (1H, dd, J = 8.2 Hz, 1.2 Hz), 6.97(2H, d, J = 8.6 Hz), 7.02-7.19(2H, m), 7.20(2H, d, J = 8.6 Hz), 7.48(1H, d, J = 8.3 Hz), 7.56(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.84(1H, d, J = 2.1 Hz), 8.38(1H, brs), 8.49(1H, dd, J = 8.3 Hz, 2.1 Hz), 10.46(1H, brs).
730		4-$(CH_2)_2$COOH	^{1}H NMR ($CDCl_3$) 2.67(2H, t, J = 7.6 Hz), 2.93(2H, t, J = 7.6 Hz), 6.78 (1H, dt, J = 8.1 Hz, 1.2 Hz), 6.95(2H, d, J = 8.5 Hz), 7.16(2H, d, J = 8.5Hz), 7.22-7.34(3H, m), 7.53(1H, d, J = 8.3 Hz), 7.64(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.73(1H, brs), 7.90(1H, d, J = 2.1 Hz), 10.23(1H, brs).
731		4-$(CH_2)_2$COOH	^{1}H NMR (DMSO-d_6) 1.05(3H, t, J = 7.1 Hz), 2.56(2H, t, J = 7.6 Hz), 2.84(2H, t, J = 7.6 Hz), 3.64 (2H, q, J = 7.1 Hz), 7.05-7.10(3H, m), 7.28(2H, d, J = 8.6 Hz), 7.45(2H, brs), 7.76-7.80(2H, m), 8.08 (1H, dd, J = 2.8 Hz, 0.5 Hz), 8.27(1H, brs), 12.10(1H, brs).
732		4-$(CH_2)_2$COOH	^{1}H NMR (DMSO-d_6) 1.06(3H, t, J = 7.1 Hz), 2.53-2.59(2H, m), 2.81-2.87(2H, m), 3.67(2H, q, J = 7.1 Hz), 7.05-7.10(3H, m), 7.29(2H, d, J = 8.7 Hz), 7.56(2H, d, J = 8.7 Hz), 7.66(2H, d, J = 8.7 Hz), 7.78(1H, dd, J = 8.6 Hz, 2.8 Hz), 8.09(1H, d, J = 2.8 Hz), 8.41(1H, brs), 12.14(1H, brs).

Table 102



Reference Example No.	R_{327}	Xa_{24}	M	Form	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
733	-H	none	0	free	mp 252-255
734	-F	none	0	free	mp 257-259
735	-F	none	1	free	mp 204-206
736	-F	none	2	free	mp 173-174
737	-F	none	3	free	mp 175-177
738	-F	-S-	1	Na salt	^{1}H NMR 3.86(2H, s), 6.86(2H, d, J = 8.7 Hz), 7.15(1H, t, J = 9.0 Hz), 7.25(2H, d, J = 8.7 Hz), 7.55(1H, d, J = 9.0 Hz), 7.80(1H, d, J = 8.4 Hz), 7.91(1H, dd, J = 2.4 Hz, 13.3 Hz), 7.98(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.25(1H, d, J = 2.0 Hz).
739	-F	-SO-	1	free	^{1}H NMR 3.79(1H, d, J = 14.3 Hz), 3.97(1H, d, J = 14.3 Hz), 7.12(2H, d, J = 8.8 Hz), 7.33(1H, t, J = 9.1 Hz), 7.55-7.65(1H, m), 7.71(2H, d, J = 8.8 Hz), 7.84(1H, d, J = 8.4 Hz), 7.90-7.95(2H, m), 8.20(1H, d, J = 2.0 Hz), 10.63(1H, s), 13.20(1H, brs).
740	-F	$-SO_2-$	1	free	mp 214-216
741	-F	-N(Ac)-	1	free	^{1}H NMR 1.80(3H, s), 4.22(2H, s), 7.00(1H, d, J = 8.9 Hz), 7.25-7.30(1H, m), 7.38(2H, d, J = 8.9 Hz), 7.50-7.60(1H, m), 7.84(1H, d, J = 8.4 Hz), 7.90-7.96(2H, m), 8.21(1H, d, J = 2.0 Hz), 10.61(1H, s), 12.68(1H, s).
742	-F		0	free	mp 241-243

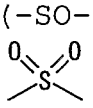
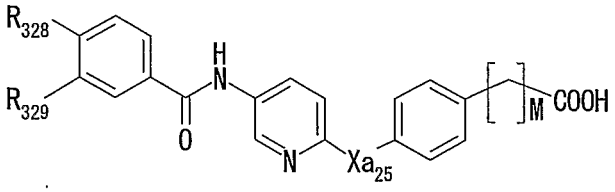
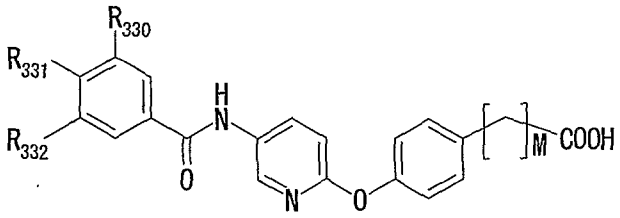
(-SO- means a group of and $-SO_2-$ means a group of  . Hereinafter -SO- and $-SO_2-$ indicate the same meanings.)

Table 103



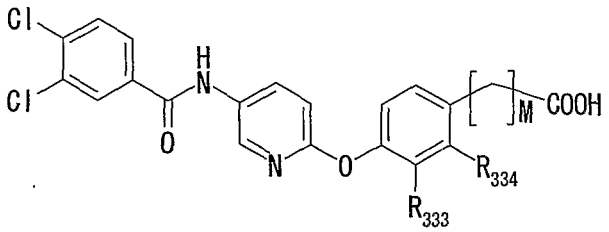
Reference Example No.	R_{328}	R_{329}	Xa_{25}	M	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
743	-Cl	-Cl	-CO-	2	^{1}H NMR 2.60(2H, t, J = 7.6 Hz), 2.91(2H, t, J = 7.6 Hz), 7.39(2H, d, J = 8.2 Hz), 7.82-8.20(4H, m), 8.07(1H, d, J = 8.6 Hz), 8.25(1H, dd, J = 7.5 Hz, 2.1 Hz), 8.45(1H, dd, J = 8.6 Hz, 2.5 Hz), 9.03(1H, d, J = 2.5 Hz), 10.91(1H, s), 12.16(1H, brs).
744	-Cl	-Cl	-S-	2	mp 201-202
745	-Cl	-Cl	-SO-	2	mp 202-205
746	-Cl	-Cl	$-SO_2-$	2	mp 172-173
747	-Cl	-Cl	-NH-	2	^{1}H NMR 2.76(2H, t, J = 7.6 Hz), 3.20-3.40 (2H, m), 6.86(1H, d, J = 8.8 Hz), 7.12(2H, d, J = 8.3 Hz), 7.52(2H, d, J = 8.3 Hz), 7.83(1H, d, J = 8.4 Hz), 7.90-7.96 (2H, m), 8.21(1H, d, J = 1.3 Hz), 8.45(1H, d, J = 2.4 Hz), 9.03(1H, brs), 10.37(1H, s), 12.11(1H, brs).
748	-Cl	-Cl	$-N(CH_3)-$	2	mp 158-160
749	$-CF_3$	-H	$-N(CH_3)-$	0	mp 240-243
750	$-CF_3$	-H	$-N(CH_3)-$	2	^{1}H NMR 2.57(2H, t, J = 7.5 Hz), 2.84(2H, t, J = 7.5 Hz), 3.38(3H, s), 6.61(1H, d, J = 9.1 Hz), 7.22(2H, d, J = 8.3 Hz), 7.29(2H, d, J = 8.3 Hz), 7.80-7.85(1H, m), 7.91 (2H, d, J = 8.3 Hz), 8.15(2H, d, J = 8.3 Hz), 8.51(1H, d, J = 2.5 Hz), 10.42(1H, s), 12.10(1H, brs).
751	-Cl	-Cl	$-N(CH_2Ph)-$	2	^{1}H NMR 2.53(2H, t, J = 7.9 Hz), 2.80(2H, t, J = 7.9 Hz), 5.21(2H, s), 6.63(1H, d, J = 9.1 Hz), 7.15-7.30 (9H, m), 7.75-7.95(3H, m), 8.19(1H, d, J = 2.1 Hz), 8.45(1H, d, J = 2.5 Hz), 10.34(1H, s), 12.10(1H, brs).

Table 104



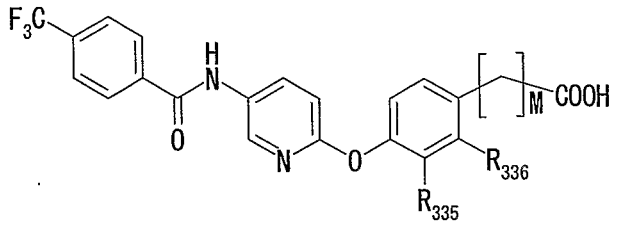
Reference Example No.	R_{330}	R_{331}	R_{332}	M	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
752	-H	-CN	-H	0	^{1}H NMR 7.18-7.21(3H, m), 7.98(2H, d, J = 8.2 Hz), 8.05(2H, d, J = 8.9 Hz), 8.13(2H, d, J = 8.2 Hz), 8.28(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.57(1H, d, J = 2.6 Hz), 10.70(1H, s), 12.87(1H, brs).
753	-Cl	-Cl	-H	0	^{1}H NMR 7.17-7.22(3H, m), 7.85(1H, d, J = 8.2 Hz), 7.94-8.01(3H, m), 8.23-8.29(2H, m), 8.55(1H, d, J = 2.6 Hz), 10.01(1H, s), 12.87 (1H, brs).
754	-H	-Cl	-H	0	^{1}H NMR 7.16-7.21(3H, m), 7.63(2H, d, J = 8.6 Hz), 7.97-8.02(4H, m), 8.28(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.57(1H, d, J = 2.6 Hz), 10.53 (1H, s), 12.86(1H, brs).
755	-H	-CF_3	-H	0	^{1}H NMR 7.18-7.22(3H, m), 7.93-8.00(4H, m), 8.18(2H, d, J = 8.4 Hz), 8.30(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.58(1H, d, J = 2.7 Hz), 10.69 (1H, s), 12.91(1H, brs).
756	-CH_3	-CH_3	-H	0	^{1}H NMR 2.30(3H, s), 2.31(3H, s), 7.16(1H, d, J = 8.9 Hz), 7.18(2H, d, J = 8.7 Hz), 7.31(1H, d, J = 7.6 Hz), 7.72(1H, d, J = 7.6 Hz), 7.77 (1H, s), 7.98(2H, d, J = 8.7 Hz), 8.28(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.58(1H, d, J = 2.7 Hz), 10.35(1H, s), 12.88(1H, brs).
757	-CF_3	-H	-F	0	mp 238-239
758	-OCF_3	-H	-H	0	^{1}H NMR 7.18-7.22(3H, m), 7.61-7.81(2H, m), 7.89-8.06(4H, m), 8.28(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.57(1H, d, J = 2.3 Hz), 10.62(1H, s), 12.95(1H, brs).
759	-CF_3	-H	-H	0	^{1}H NMR 7.11-7.22(3H, m), 7.70-7.85(1H, m), 7.90-8.05(3H, m), 8.2-8.35(3H, m), 8.56(1H, d, J = 2.4 Hz), 10.70(1H, s), 12.90(1H, brs).
760	-H	-CF_3	-H	1	^{1}H NMR 3.59(2H, s), 7.04-7.10(3H, m), 7.27-7.33(2H, m), 7.94(2H, d, J = 8.4 Hz), 8.17(2H, d, J = 8.1 Hz), 8.21-8.25(1H, m), 8.51(1H, d, J = 2.6 Hz), 10.64(1H, s), 12.43(1H, brs).
761	-Cl	-Cl	-H	1	^{1}H NMR 3.59(2H, s), 7.04-7.09(3H, m), 7.27-7.32(2H, m), 7.83(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.18-8.23(2H, m), 8.48(1H, d, J = 2.6 Hz), 10.55(1H, s), 12.37(1H, brs).
762	-Cl	-Cl	-H	2	^{1}H NMR 2.51-2.58(2H, m), 2.81-2.86(2H, m), 7.01-7.06(3H, m), 7.26(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.93-7.97(1H, m), 8.16-8.23(2H, m), 8.47(1H, d, J = 2.7 Hz), 10.54(1H, s), 12.13(1H, brs).
763	-H	-CF_3	-H	2	^{1}H NMR 2.56(2H, t, J = 7.5 Hz), 2.84(2H, t, J = 7.5 Hz), 7.03(2H, d, J = 8.6 Hz), 7.05(1H, d, J = 8.8 Hz), 7.27(2H, d, J = 8.6 Hz), 7.93(2H, d, J = 8.2 Hz), 8.17(2H, d, J = 8.2 Hz), 8.21(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.50(1H, d, J = 2.6 Hz), 10.63(1H, s), 12.16(1H, s).

Table 105



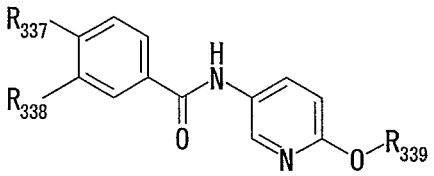
Reference Example No.	R_{333}	R_{334}	M	^{1}H NMR (DMSO-d_6) δppm
764	-OCH_3	-H	0	3.76(3H, s), 7.09(1H, d, J = 8.9 Hz), 7.23(1H, d, J = 8.1 Hz), 7.59-7.63 (2H, m), 7.84(1H, d, J = 8.4 Hz), 7.93-7.96(1H, m), 8.16-8.22(2H, m), 8.39(1H, d, J = 2.7 Hz), 10.53(1H, s), 13.00(1H, brs).
765	-H	-OCH_3	0	3.80(3H, s), 6.69(1H, dd, J = 8.4 Hz, 2.2 Hz), 6.90(1H, d, J = 2.2 Hz), 7.17(1H, d, J = 8.9 Hz), 7.73(1H, d, J = 8.4 Hz), 7.85(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.23-8.28(2H, m), 8.56(1H, d, J = 2.4 Hz), 10.62(1H, s), 12.56(1H, brs).
766	-CH_3	-H	0	2.18(3H, s), 7.09-7.16(2H, m), 7.79-7.97(4H, m), 8.21-8.26(2H, m), 8.47(1H, d, J = 2.2 Hz), 10.57(1H, s), 12.86(1H, brs).
767	-H	-CH_3	0	2.53(3H, s), 6.97-7.04(2H, m), 7.16(1H, d, J = 8.7 Hz), 7.77-7.98(3H, m), 8.23-8.27(2H, m), 8.54(1H, d, J = 2.6 Hz), 10.62(1H, s), 12.79(1H, brs).
768	-F	-H	0	7.24(1H, d, J = 8.9 Hz), 7.39-7.45(1H, m), 7.70-8.05(4H, m), 8.23-8.28 (2H, m), 8.46(1H, d, J = 2.6 Hz), 10.64(1H, s), 13.55(1H, brs).
769	-Cl	-H	0	7.25(1H, d, J = 8.9 Hz), 7.39(1H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.93-7.97(2H, m), 8.06(1H, d, J = 2.0 Hz), 8.22(1H, d, J = 2.0 Hz), 8.25-8.29(1H, m), 8.47(1H, d, J = 2.6 Hz), 10.61(1H, s), 13.31(1H, brs).
770	-OCH_3	-H	2	2.50-2.65(2H, m), 2.71-2.92(2H, m), 3.67(3H, s), 6.81(1H, dd, J = 8.1 Hz, 1.9 Hz), 6.95(1H, d, J = 8.9 Hz), 6.99-7.05(2H, m), 7.82(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.20(1H, d, J = 2.0 Hz), 8.35(1H, m), 10.47(1H, s), 12.15(1H, brs).
771	-OC_2H_5	-H	2	1.06(3H, t, J = 7.0 Hz), 2.51-2.62(2H, m), 2.74-2.88(2H, m), 3.94(2H, q, J = 7.0 Hz), 6.80(1H, dd, J = 8.1 Hz, 1.8 Hz), 6.92-7.04(3H, m), 7.82 (1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.11(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.20(1H, d, J = 2.0 Hz), 8.36(1H, d, J = 2.7 Hz), 10.47 (1H, s), 12.14(1H, brs).
772	-F	-H	2	2.50-2.67(2H, m), 2.75-2.93(2H, m), 7.03-7.29(4H, m), 7.82(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.12-8.24(2H, m), 8.39(1H, d, J = 2.5 Hz), 10.53(1H, s), 12.18(1H, brs).

Table 106



Reference Example No.	R_{335}	R_{336}	M	^{1}H NMR (DMSO-d_6) δppm
773	-OCH_3	-H	0	3.76(3H, s), 7.10(1H, d, J = 8.9 Hz), 7.23(1H, d, J = 8.1 Hz), 7.59-7.64 (2H, m), 7.93(2H, d, J = 8.1 Hz), 8.15-8.23(3H, m), 8.42(1H, d, J = 2.2 Hz), 10.60(1H, s), 13.00(1H, brs).
774	-H	-OCH_3	0	3.80(3H, s), 6.69(1H, dd, J = 8.6 Hz, 2.2 Hz), 6.90(1H, d, J = 2.2 Hz), 7.17(1H, d, J = 8.6 Hz), 7.73(1H, d, J = 8.4 Hz), 7.95(2H, d, J = 8.4 Hz), 8.18(2H, d, J = 8.4 Hz), 8.29(1H, dd, J = 8.6 Hz, 2.7 Hz), 8.58(1H, d, J = 2.7 Hz), 10.69(1H, s), 12.51(1H, brs).
775	-CH_3	-H	0	1.99(3H, s), 7.09-7.17(2H, m), 7.79-7.83(1H, m), 7.91-7.95(3H, m), 8.12-8.18(2H, m), 8.27(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.49(1H, d, J = 2.7 Hz), 10.64(1H, s), 12.87(1H, brs).
776	-H	-CH_3	0	2.54(3H, s), 6.98-7.05(2H, m), 7.17(1H, d, J = 8.7 Hz), 7.87-7.97(3H, m), 8.13-8.19(2H, m), 8.26-8.30(1H, m), 8.57(1H, d, J = 2.8 Hz), 10.70 (1H, s), 12.81(1H, brs).
777	-F	-H	0	7.26(1H, d, J = 8.9 Hz), 7.40-7.46(1H, m), 7.82-7.85(2H, m), 7.94(2H, d, J = 8.2 Hz), 8.17(2H, d, J = 8.2 Hz), 8.30(1H, dd, J = 8.9 Hz, 2.1 Hz), 8.49(1H, d, J = 2.1 Hz), 10.70(1H, s), 13.39(1H, brs).
778	-Cl	-H	0	7.14(1H, d, J = 8.9 Hz), 7.19(1H, d, J = 8.2 Hz), 7.82-7.86(1H, m), 7.92(2H, d, J = 8.4 Hz), 7.96(1H, d, J = 1.8 Hz), 8.20(2H, d, J = 8.2 Hz), 8.29(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.47(1H, d, J = 2.6 Hz), 10.86(1H, s).
779	-OCH_3	-H	2	2.57-2.63(2H, m), 2.83-2.89(2H, m), 3.69(3H, s), 6.84(1H, dd, J = 8.1 Hz, 1.8 Hz), 6.97(1H, d, J = 8.9 Hz), 7.01-7.04(2H, m), 7.92(2H, d, J = 8.4 Hz), 8.14-8.18(3H, m), 8.40(1H, d, J = 2.5 Hz), 10.58(1H, s).
780	-OC_2H_5	-H	2	1.06(3H, t, J = 7.0 Hz), 2.47-2.67(2H, m), 2.72-2.91(2H, m), 3.94(2H, q, J = 7.0 Hz), 6.80(1H, dd, J = 8.0 Hz, 1.8 Hz), 6.94-7.05(3H, m), 7.91(2H, d, J = 8.3 Hz), 8.09-8.19(3H, m), 8.38(1H, d, J = 2.6 Hz), 10.55(1H, s), 12.14(1H, brs)
781	-F	-H	2	2.49-2.63(2H, m), 2.71-2.93(2H, m), 7.09(1H, dd, J = 8.3 Hz, 1.5 Hz), 7.14(1H, d, J = 8.9 Hz), 7.17-7.28(2H, m), 7.92(2H, d, J = 8.2 Hz), 8.15(2H, d, J = 8.2 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.38-8.44(1H, m), 10.60(1H, s), 12.17(1H, brs).

Table 107



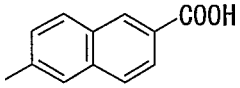
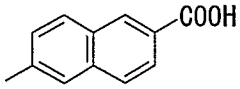
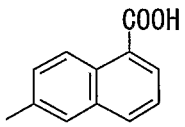
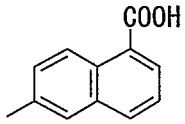
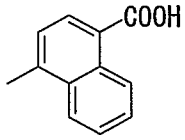
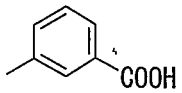
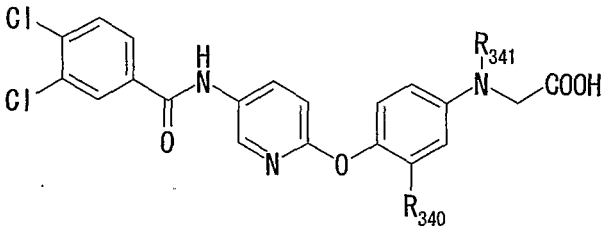
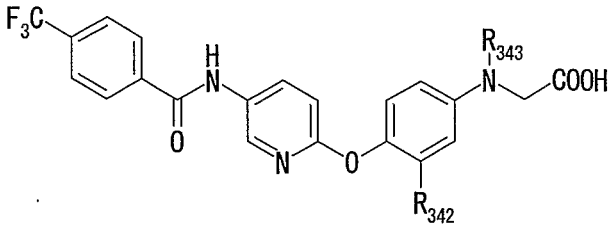
Reference Example No.	R_{337}	R_{338}	R_{339}	^{1}H NMR (DMSO-d_6) δppm
782	-Cl	-Cl		7.20(1H, d, J = 8.7 Hz), 7.40(1H, dd, J = 8.7 Hz, 2.3 Hz), 7.60-7.67(1H, m), 7.82-8.03(4H, m), 8.15(1H, d, J = 8.9 Hz), 8.26-8.32(2H, m), 8.56-8.60(2H, m), 10.78(1H, s).
783	-CF_3	-H		7.18(1H, d, J = 8.7 Hz), 7.36(1H, dd, J = 8.7 Hz, 2.3 Hz), 7.63(1H, d, J = 2.0 Hz), 7.84-8.11(5H, m), 8.23 (2H, d, J = 8.1 Hz), 8.34(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.54-8.60(2H, m), 10.98(1H, s).
784	-Cl	-Cl		7.19(1H, d, J = 8.7 Hz), 7.47(1H, dd, J = 9.4 Hz, 2.5 Hz), 7.57-7.63(1H, m), 7.73(1H, d, J = 2.5 Hz), 7.85 (1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.10-8.14(2H, m), 8.23-8.28(2H, m), 8.52(1H, d, J = 2.5 Hz), 8.92(1H, d, J = 9.4 Hz), 10.60(1H, s), 13.20 (1H, brs).
785	-CF_3	-H		7.20(1H, d, J = 8.7 Hz), 7.48(1H, dd, J = 9.4 Hz, 2.6 Hz), 7.57-7.63(1H, m), 7.73(1H, d, J = 2.5 Hz), 7.94 (2H, d, J = 8.2 Hz), 8.11-8.19(4H, m), 8.29(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.55(1H, d, J = 2.5 Hz), 8.93(1H, d, J = 9.4 Hz), 10.68(1H, s), 13.21(1H, brs).
786	-Cl	-Cl		7.24(1H, d, J = 8.1 Hz), 7.32(1H, d, J = 8.7 Hz), 7.58-7.64(1H, m), 7.69-7.77(1H, m), 7.85(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.06-8.12 (1H, m), 8.20-8.23(2H, m), 8.30(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.48(1H, d, J = 2.6 Hz), 9.02(1H, d, J = 8.7 Hz), 10.63(1H, s), 13.11(1H, brs).
787	-Cl	-Cl		7.17(1H, d, J = 8.9 Hz), 7.38-7.43(1H, m), 7.53-7.59 (2H, m), 7.76-7.86(2H, m), 7.93-7.97(1H, m), 8.22-8.27(2H, m), 8.51(1H, d, J = 2.0 Hz), 10.60(1H, s), 13.15(1H, brs).

Table 108



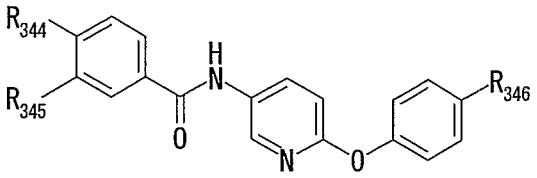
Reference Example No.	R_{340}	R_{341}	^{1}H NMR (solvent) δppm
788	-H	-Ac	(DMSO-d_6) 1.85(3H, s), 4.26(2H, s), 7.13(1H, d, J = 8.8 Hz), 7.19(2H, d, J = 8.7 Hz), 7.42(2H, d, J = 8.7 Hz), 7.85(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 1.9 Hz, 8.4 Hz), 8.20-8.24(2H, m), 8.51(1H, d, J = 2.5 Hz), 12.77(1H, brs).
789	-H	-CH_3	(DMSO-d_6) 2.98(3H, s), 4.01(2H, s), 6.65(1H, d, J = 9.1 Hz), 6.90-6.95(3H, m), 7.82(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 2.1 Hz, 8.4 Hz), 8.13(1H, dd, J = 2.7 Hz, 8.9 Hz), 8.22(1H, d, J = 2.1 Hz), 8.43(1H, d, J = 2.7 Hz), 10.54(1H, s).
790	-H	-C_2H_5	(DMSO-d_6) 1.11(3H, t, J = 7.1 Hz), 3.39(2H, q, J = 7.1 Hz), 4.01(2H, s), 6.58(2H, d, J = 9.1 Hz), 6.90-6.95(3H, m), 7.81(1H, d, J = 8.4 Hz), 7.92(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.11(1H, dd, J = 2.7 Hz, 8.9 Hz), 8.19(1H, d, J = 2.0 Hz), 8.41(1H, d, J = 2.7 Hz), 10.48(1H, s), 12.53(1H, brs).
791	-OCH_3	-CH_3	(DMSO-d_6) 3.01(3H, s), 3.67(3H, s), 4.12(2H, s), 6.20(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.39(1H, d, J = 2.8 Hz), 6.85-6.94(2H, m), 7.83(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.08(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.21(1H, d, J = 2.0 Hz), 8.36(1H, d, J = 2.5 Hz), 10.47(1H, s), 12.58(1H, brs).
792	-OCH_3	-C_2H_5	(DMSO-d_6) 1.15(3H, t, J = 7.1 Hz), 3.43(2H, q, J = 7.1 Hz), 3.65(3H, s), 4.06(2H, s), 6.13(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.30(1H, d, J = 2.6 Hz), 6.87-6.91(2H, m), 7.83(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.08(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.21(1H, d, J = 2.0 Hz), 8.36(1H, d, J = 2.6 Hz), 10.48(1H, s), 12.58(1H, brs).
793	-CH_3	-Ac	(DMSO-d_6) 1.84(3H, s), 2.11(3H, s), 4.23(2H, s), 7.05-7.10(2H, m), 7.20-7.25 (1H, m), 7.32(1H, d, J = 2.2 Hz), 7.75-7.85(1H, m), 7.92(1H, dd, J = 2.2 Hz, 8.4 Hz), 8.10-8.20(2H, m), 8.43(1H, d, J = 2.6 Hz), 10.53(1H, s), 12.66(1H, brs).
794	-CH_3	-CH_3	(DMSO-d_6) 2.01(3H, s), 2.97(3H, s), 4.07(2H, s), 6.49(1H, dd, J = 8.8 Hz, 3.0 Hz), 6.57(1H, d, J = 3.0 Hz), 6.85(1H, d, J = 8.8 Hz), 6.90(1H, d, J = 8.9 Hz), 7.82(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.11(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.20(1H, d, J = 2.0 Hz), 8.39(1H, d, J = 2.7 Hz), 10.47(1H, s), 12.51(1H, brs).
795	-F	-Ac	($CDCl_3$+DMSO-d_6) 1.99(3H, s), 4.35(2H, s), 7.03(1H, d, J = 8.9 Hz), 7.21-7.31 (3H, m), 7.57(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.19(1H, d, J = 2.0 Hz), 8.32(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.46(1H, d, J = 2.5 Hz), 10.12 (1H, s).
796	-F	-CH_3	($CDCl_3$+DMSO-d_6) 3.04(3H, s), 3.98(2H, s), 6.40-6.49(2H, m), 6.90(1H, d, J = 8.9 Hz), 7.02(1H, t, J = 8.7 Hz), 7.52(1H, d, J = 8.4 Hz), 7.85(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.14(1H, d, J = 2.0 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.34(1H, d, J = 2.5 Hz), 9.77(1H, s).
797	-F	-C_2H_5	($CDCl_3$) 1.26(3H, t, J = 7.1 Hz), 3.44(2H, q, J = 7.1 Hz), 4.03(2H, s), 6.39-6.52 (2H, m), 6.96(1H, d, J = 9.7 Hz), 7.06(1H, t, J = 8.9 Hz), 7.55(1H, d, J = 8.4 Hz), 7.69(1H, dd, J = 8.6 Hz, 2.1 Hz), 7.96-7.97(2H, m), 8.15-8.18(2H, m).

Table 109



Reference Example No.	R_{342}	R_{343}	^{1}H NMR (solvent) δppm
798	-H	-Ac	(DMSO-d_6) 1.85(3H, s), 4.26(2H, s), 7.13(1H, d, J = 8.8 Hz), 7.18(2H, d, J = 8.7 Hz), 7.42(2H, d, J = 8.7 Hz), 7.94(2H, d, J = 8.2 Hz), 8.16(2H, d, J = 8.2 Hz), 8.25(1H, dd, J = 2.5 Hz, 8.8 Hz), 8.54(1H, d, J = 2.5 Hz), 10.66 (1H, s), 12.70(1H, brs).
799	-H	-CH_3	(DMSO-d_6) 2.99(3H, s), 4.09(2H, s), 6.67(2H, d, J = 9.0 Hz), 6.96(3H, d, J = 9.0 Hz), 7.93(2H, d, J = 8.2 Hz), 8.16(2H, d, J = 8.2 Hz), 8.12-8.20(1H, m), 8.46(1H, d, J = 2.3 Hz), 10.59(1H, s), 12.58(1H, brs).
800	-H	-C_2H_5	(DMSO-d_6) 1.13(3H, t, J = 7.1 Hz), 3.38(2H, q, J = 7.1 Hz), 4.00(2H, s), 6.65(1H, d, J = 8.9 Hz), 6.73(1H, d, J = 8.9 Hz), 6.92-6.97(3H, m), 7.93 (2H, d, J = 8.1 Hz), 8.15-8.18(3H, m), 8.46(1H, s), 10.59(1H, s).
801	-OCH_3	-CH_3	(DMSO-d_6) 3.01(3H, s), 3.67(3H, s), 4.12(2H, s), 6.20(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.39(1H, d, J = 2.5 Hz), 6.83-6.95(2H, m), 7.93(2H, d, J = 8.3 Hz), 8.09-8.17(3H, m), 8.38(1H, d, J = 2.6 Hz), 10.56(1H, s), 12.58(1H, brs).
802	-OCH_3	-C_2H_5	(DMSO-d_6) 1.15(3H, t, J = 7.1 Hz), 3.43(2H, q, J = 7.1 Hz), 3.66(3H, s), 4.06(2H, s), 6.14(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.31(1H, d, J = 2.8 Hz), 6.88-6.92(2H, m), 7.93(2H, d, J = 8.4 Hz), 8.09-8.17(3H, m), 8.39(1H, d, J = 2.5 Hz), 10.55(1H, s), 12.59(1H, brs).
803	-CH_3	-Ac	(DMSO-d_6) 1.84(3H, s), 2.11(3H, s), 4.23(2H, s), 7.05-7.10(2H, m), 7.23 (1H, dd, J = 2.4 Hz, 8.5 Hz), 7.33(1H, d, J = 2.4 Hz), 7.86(1H, d, J = 8.3 Hz), 7.91(2H, d, J = 8.3 Hz), 8.14(2H, d, J = 8.3 Hz), 8.20(1H, dd, J = 2.7 Hz, 8.9 Hz), 8.45(1H, d, J = 2.7 Hz), 10.61(1H, s), 12.67(1H, brs).
804	-CH_3	-CH_3	(DMSO-d_6) 2.01(3H, s), 2.97(3H, s), 4.06(2H, s), 6.49(1H, dd, J = 8.8 Hz, 3.1 Hz), 6.57(1H, d, J = 2.9 Hz), 6.85(1H, d, J = 8.8 Hz), 6.91(1H, d, J = 8.9 Hz), 7.91(2H, d, J = 8.3 Hz), 8.04-8.23(3H, m), 8.41(1H, d, J = 2.6 Hz), 10.56(1H, s), 12.11-12.98(1H, m).
805	-F	-Ac	($CDCl_3$) 1.96(3H, s), 4.32(2H, s), 7.09-7.31(4H, m), 7.75(2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.3 Hz), 8.20(1H, d, J = 2.6 Hz), 8.40(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.44(1H, s).
806	-F	-CH_3	($CDCl_3$+DMSO-d_6) 3.08(3H, s), 4.02(2H, s), 6.47-6.52(2H, m), 6.92(1H, d, J = 8.7 Hz), 7.06(1H, t, J = 9.0 Hz), 7.73(2H, d, J = 8.4 Hz), 8.11(2H, d, J = 8.4 Hz), 8.26(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.39(1H, d, J = 2.5 Hz), 9.76 (1H, s).
807	-F	-C_2H_5	($CDCl_3$+DMSO-d_6) 1.23(3H, t, J = 7.1 Hz), 3.45(2H, q, J = 7.1 Hz), 3.97 (2H, s), 6.39-6.48(2H, m), 6.91(1H, d, J = 8.7 Hz), 7.04(1H, t, J = 9.1 Hz), 7.73(2H, d, J = 7.9 Hz), 8.12(2H, d, J = 7.9 Hz), 8.25(1H, d, J = 9.1 Hz), 8.42(1H, d, J = 2.5 Hz), 9.92(1H, s).
808	-F	-$(CH_2)_2CH_3$	($CDCl_3$+DMSO-d_6) 0.96(3H, t, J = 7.2 Hz), 1.61-1.72(2H, m), 3.33(2H, t, J = 7.6 Hz), 3.99(2H, s), 6.37-6.48(2H, m), 6.93(1H, d, J = 8.8 Hz), 7.04 (1H, t, J = 9.1 Hz), 7.73(2H, d, J = 8.1 Hz), 8.09(2H, d, J = 8.1 Hz), 8.26 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.36(1H, d, J = 2.5 Hz), 9.45(1H, s).

Table 110



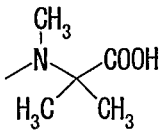
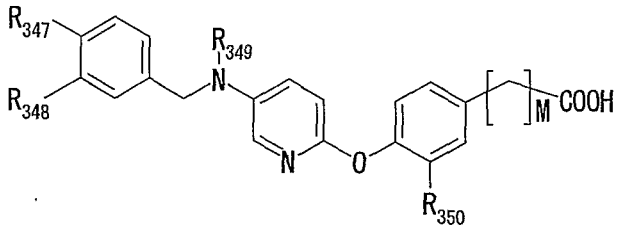
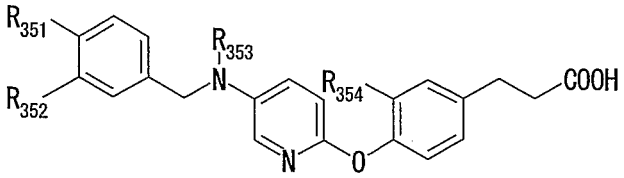
Reference Example No.	R_{344}	R_{345}	R_{346}	^{1}H NMR (solvent) δppm
809	-Cl	-Cl	-N(Ac)(CH$_2$)$_2$COOH	(DMSO-d$_6$) 1.71(3H, s), 2.39(2H, t, J = 7.5 Hz), 3.78(2H, t, J = 7.5 Hz), 7.08(1H, d, J = 8.8 Hz), 7.14(2H, d, J = 8.6 Hz), 7.31(2H, d, J = 8.6 Hz), 7.80(1H, d, J = 8.4 Hz), 7.91 (1H, dd, J = 2.1 Hz, 8.4 Hz), 8.15-8.21(2H, m), 8.49(1H, d, J = 2.5 Hz), 10.55(1H, s), 12.20(1H, brs)
810	-CF$_3$	-H	-N(Ac)(CH$_2$)$_2$COOH	(DMSO-d$_6$) 1.71(3H, s), 2.40(2H, t, J = 7.3 Hz), 3.78(2H, t, J = 7.3 Hz), 7.09(1H, d, J = 8.7 Hz), 7.14(2H, d, J = 8.1 Hz), 7.31(2H, d, J = 8.1 Hz), 7.90(2H, d, J = 8.1 Hz), 8.12 (2H, d, J = 8.1 Hz), 8.21(1H, d, J = 8.7 Hz), 8.52(1H, s), 10.63(1H, s), 12.25(1H, brs).
811	-Cl	-Cl	-CH(CH$_3$)CH$_2$COOH	(CDCl$_3$-CD$_3$OD) 1.26(3H, d, J = 7.0 Hz), 2.42-2.61(2H, m), 3.17-3.28(1H, m), 6.84(1H, d, J = 8.9 Hz), 6.98(2H, d, J = 8.5 Hz), 7.20(2H, d, J = 8.5 Hz), 7.50(1H, d, J = 8.4 Hz), 7.73(1H, dd, J = 8.5 Hz, 2.1 Hz), 8.01(1H, d, J = 2.1 Hz), 8.14(1H, d, J = 2.7 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.7 Hz).
812	-CF$_3$	-H	-CH(CH$_3$)CH$_2$COOH	(CDCl$_3$-CD$_3$OD) 1.28(3H, d, J = 7.0 Hz), 2.44-2.61(2H, m), 3.18-3.29(1H, m), 6.88(1H, d, J = 8.9 Hz), 7.00(2H, d, J = 8.5 Hz), 7.20(2H, d, J = 8.5 Hz), 7.70(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.17(1H, d, J = 2.6 Hz), 8.28(1H, dd, J = 8.9 Hz, 2.6 Hz).
813	-CF$_3$	-H	-CH=CHCOOH (trans)	(DMSO-d$_6$) 6.49(1H, d, J = 16.0 Hz), 7.15(3H, d, J = 8.8 Hz), 7.61(1H, d, J = 16.0 Hz), 7.74(2H, d, J = 8.8 Hz), 7.94(2H, d, J = 8.3 Hz), 8.17(2H, d, J = 8.3 Hz), 8.26(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.55(1H, d, J = 2.7 Hz), 10.67(1H, s), 12.36(1H, s).
814	-CF$_3$	-H		(CDCl$_3$)·1.34(6H, s), 2.79(3H, s), 6.98(1H, d, J = 8.9 Hz), 7.10(2H, d, J = 8.9 Hz), 7.21(2H, d, J = 9.1 Hz), 7.76(2H, d, J = 8.2 Hz), 8.01(2H, d, J = 8.1 Hz), 8.10(1H, brs), 8.24(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.31(1H, d, J = 2.3 Hz).

Table 111



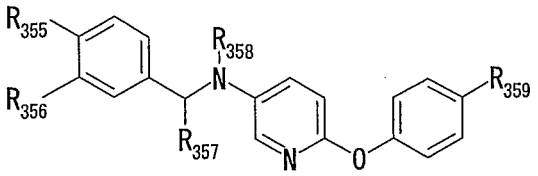
Reference Example No.	R_{347}	R_{348}	R_{349}	R_{350}	M	^{1}H NMR (solvent) δppm
815	-Cl	-Cl	-H	-F	0	(DMSO-d_6) 4.29(2H, d, J = 5.6 Hz), 6.46(1H, t, J = 5.9 Hz), 6.94(1H, d, J = 8.7 Hz), 7.15(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.20 (1H, d, J = 8.3 Hz), 7.36(1H, dd, J = 8.3 Hz, 1.8 Hz), 7.47(1H, d, J = 2.8 Hz), 7.59(1H, d, J = 8.3 Hz), 7.63(1H, d, J = 2.0 Hz), 7.72-7.77(2H, m).
816	-CF_3	-H	-H	-F	0	(DMSO-d_6) 4.37(2H, d, J = 5.3 Hz), 6.47(1H, brs), 6.89(1H, d, J = 8.7 Hz), 7.06-7.12(1H, m), 7.13(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.45(1H, d, J = 3.0 Hz), 7.58(2H, d, J = 8.1 Hz), 7.65-7.69(2H, m), 7.70(2H, d, J = 8.1 Hz).
817	-CF_3	-H	-CH_3	-H	0	(DMSO-d_6) 3.03(3H, s), 4.66(2H, s), 6.82(2H, d, J = 8.7 Hz), 6.87(1H, d, J = 8.9 Hz), 7.29(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.45 (2H, d, J = 8.1 Hz), 7.68-7.72(3H, m), 7.82(2H, d, J = 8.7 Hz).
818	-CF_3	-H	-C_2H_5	-H	0	(DMSO-d_6) 1.13(3H, t, J = 7.1 Hz), 3.49(2H, q, J = 7.1 Hz), 4.61(2H, s), 6.81(2H, d, J = 8.6 Hz), 6.84(1H, d, J = 8.9 Hz), 7.22(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.47(2H, d, J = 8.1 Hz), 7.62 (1H, d, J = 3.3 Hz), 7.70(2H, d, J = 8.3 Hz), 7.80(2H, d, J = 8.7 Hz).
819	-Cl	-Cl	-CH_3	-OCH_3	2	($CDCl_3$) 2.66(2H, t, J = 7.7 Hz), 2.93(2H, t, J = 7.7 Hz), 2.95 (3H, s), 3.75(3H, s), 4.35(2H, s), 6.68-6.88(3H, m), 6.90-7.00 (1H, m), 7.00-7.17(2H, m), 7.31(1H, d, J = 2.0 Hz), 7.37(1H, d, J = 8.2 Hz), 7.65(1H, d, J = 3.0 Hz), 8.21(1H, brs).
820	-CF_3	-H	-CH_3	-OCH_3	2	(DMSO-d_6) 2.41-2.62(2H, m), 2.69-2.85(2H, m), 2.96(3H, s), 3.64(3H, s), 4.58(2H, s), 6.70-6.79(2H, m), 6.88(1H, d, J = 8.0 Hz), 6.95(1H, d, J = 1.8 Hz), 7.25(1H, dd, J = 9.2 Hz, 3.2 Hz), 7.42(2H, d, J = 8.0 Hz), 7.52(1H, d, J = 3.2 Hz), 7.67(2H, d, J = 8.0 Hz), 11.64-12.51(1H, m).
821	-Cl	-Cl	-CH_3	-OC_2H_5	2	(DMSO-d_6) 1.03(3H, t, J = 7.0 Hz), 2.53(2H, t, J = 7.6 Hz), 2.78(2H, t, J = 7.6 Hz), 3.89(2H, q, J = 7.0 Hz), 4.49(2H, s), 6.70-6.80(2H, m), 6.88(1H, d, J = 8.0 Hz), 6.92(1H, d, J = 1.9 Hz), 7.19(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.26(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.45(1H, d, J = 2.0 Hz), 7.52(1H, d, J = 3.2 Hz), 7.56(1H, d, J = 8.3 Hz), 11.81-12.30(1H, m).
822	-Cl	-Cl	-CH_3	-F	2	(DMSO-d_6) 2.55(2H, t, J = 7.6 Hz), 2.80(2H, t, J = 7.6 Hz), 2.96(3H, s), 4.50(2H, s), 6.92(1H, d, J = 8.9 Hz), 7.00-7.22 (4H, m), 7.22-7.38(1H, m), 7.38-7.40(1H, m), 7.40-7.55(2H, m), 12.10(1H, brs).
823	-Cl	-Cl	-C_2H_5	-F	2	($CDCl_3$) 1.17(3H, t, J = 7.0 Hz), 2.66(2H, t, J = 7.7 Hz), 2.93 (2H, t, J = 7.7 Hz), 3.40(2H, q, J = 7.0 Hz), 4.36(2H, s), 6.72-6.86(1H, m), 6.90-7.15(5H, m), 727-7.35(1H, m), 7.36 (1H, d, J = 8.2 Hz), 7.59(1H, d, J = 3.2 Hz).

Table 112



Reference Example No.	R_{351}	R_{352}	R_{353}	R_{354}	^{1}H NMR (solvent) δppm
824	$-CF_3$	-H	$-CH_3$	-H	(DMSO-d_6) 2.50-2.54(2H, m), 2.79(2H, t, J = 7.6 Hz), 3.02(3H, s), 4.64(2H, s), 6.86(1H, d, J = 8.9 Hz), 6.89(2H, d, J = 8.4 Hz), 7.19 (2H, d, J = 8.7 Hz), 7.29(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.44(2H, d, J = 7.9 Hz), 7.69(2H, d, J = 7.9 Hz), 7.64(1H, d, J = 3.1 Hz).
825	$-CF_3$	-H	$-CH_3$	$-OC_2H_5$	(DMSO-d_6) 1.03(3H, t, J = 7.0 Hz), 2.47-2.59(2H, m), 2.71-2.83 (2H, m), 2.97(3H, s), 3.89(2H, q, J = 7.0 Hz), 4.59(2H, s), 6.69-6.79 (2H, m), 6.88(1H, d, J = 8.0 Hz), 6.91(1H, d, J = 1.9 Hz), 7.26(1H, dd, J = 9.0 Hz, 3.1 Hz), 7.41(2H, d, J = 8.0 Hz), 7.52(1H, d, J = 3.1 Hz), 7.66(2H, d, J = 8.0 Hz), 11.85-12.31(1H, m).
826	$-CF_3$	-H	$-CH_3$	-F	($CDCl_3$) 2.67(2H, t, J = 7.7 Hz), 2.94(2H, t, J = 7.7 Hz), 3.00(3H, s), 4.49(2H, s), 6.86(1H, d, J = 8.9 Hz), 6.90-7.16(4H, m), 7.33(2H, d, J = 8.1 Hz), 7.57(2H, d, J = 8.1 Hz), 7.64(1H, d, J = 3.1 Hz).
827	$-CF_3$	-H	$-C_2H_5$	-H	(DMSO-d_6) 1.11(3H, t, J = 7.0 Hz), 2.42-2.57(2H, m), 2.71-2.82 (2H, m), 3.47(2H, q, J = 7.0 Hz), 4.58(2H, s), 6.82(1H, d, J = 8.9 Hz), 6.84-6.91(2H, m), 7.13-7.21(2H, m), 7.20(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.45(2H, d, J = 8.1 Hz), 7.57(1H, d, J = 3.1 Hz), 7.68(2H, d, J = 8.1 Hz), 12.06(1H, brs).
828	-Cl	-Cl	$-C_2H_5$	$-OCH_3$	($CDCl_3$) 1.16(3H, t, J = 7.1 Hz), 2.55-2.78(2H, m), 2.94(2H, t, J = 7.7 Hz), 3.39(2H, q, J = 7.1 Hz), 3.77(3H, s), 4.35(2H, s), 6.70-6.88 (3H, m), 6.92-7.13(3H, m), 7.32(1H, d, J = 2.0 Hz), 7.36(1H, d, J = 8.2 Hz), 7.59(1H, d, J = 3.1 Hz).
829	$-CF_3$	-H	$-C_2H_5$	$-OCH_3$	(DMSO-d_6) 1.09(3H, t, J = 7.0 Hz), 2.48-2.61(2H, m), 2.72-2.86 (2H, m), 3.40(2H, q, J = 7.0 Hz), 3.64(3H, s), 4.54(2H, s), 6.73(1H, d, J = 9.0 Hz), 6.74(1H, dd, J = 8.0 Hz, 1.9 Hz), 6.87(1H, d, J = 8.0 Hz), 6.95(1H, d, J = 1.9 Hz), 7.18(2H, dd, J = 9.0 Hz, 3.2 Hz), 7.39-7.49(3H, m), 7.62-7.71(2H, m), 11.90-12.31(1H, m).
830	-Cl	-Cl	$-C_2H_5$	$-OC_2H_5$	(DMSO-d_6) 0.95-1.11(6H, m), 2.41-2.57(2H, m), 2.77(2H, t, J = 7.7 Hz), 3.29-3.47(2H, m), 3.88(2H, q, J = 7.0 Hz), 4.44(2H, s), 6.73(1H, dd, J = 8.0 Hz, 1.9 Hz), 6.74(1H, d, J = 9.0 Hz), 6.88(1H, d, J = 8.0 Hz), 6.91(1H, d, J = 1.9 Hz), 7.15-7.24(2H, m), 7.41-7.48 (2H, m), 7.55(1H, d, J = 8.2 Hz), 11.60-12.50(1H, m).
831	$-CF_3$	-H	$-C_2H_5$	$-OC_2H_5$	(DMSO-d_6) 1.02(3H, t, J = 7.0 Hz), 1.08(3H, t, J = 7.0 Hz), 2.46-2.59(2H, m), 2.71-2.83(2H, m), 3.43(2H, q, J = 7.0 Hz), 3.89 (2H, q, J = 7.0 Hz), 6.69-6.78(2H, m), 6.87(1H, d, J = 8.0 Hz), 6.91 (1H, d, J = 1.8 Hz), 7.19(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.39-7.49(3H, m), 7.61-7.69(2H, m), 11.92-12.22(1H, m).
832	$-CF_3$	-H	$-C_2H_5$	-F	($CDCl_3$) 1.19(3H, t, J = 7.1 Hz), 2.67(2H, t, J = 7.7 Hz), 2.93(2H, t, J = 7.7 Hz), 3.43(2H, q, J = 7.1 Hz), 4.48(2H, s), 6.83(1H, d, J = 9.0 Hz), 6.90-7.20(4H, m), 7.34(2H, d, J = 8.2 Hz), 7.50-7.65(3H, m)

Table 113



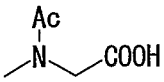
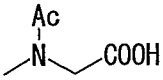
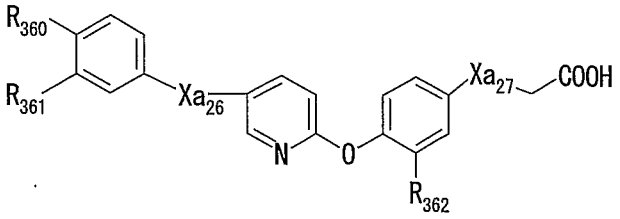
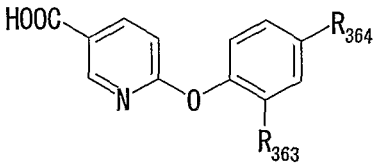
Reference Example No.	R_{355}	R_{356}	R_{357}	R_{358}	R_{359}	Form	^{1}H NMR (solvent) δppm
833	$-CF_3$	-H	$-CH_3$	-H	-COOH	free	(DMSO-d_6) 1.45(3H, d, J = 6.8 Hz), 4.61(1H, dt, J = 6.8 Hz, 6.8 Hz), 6.53 (1H, d, J = 6.8 Hz), 6.85(1H, d, J = 8.6 Hz), 6.97(2H, d, J = 8.7 Hz), 7.04(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.51(1H, d, J = 3.0 Hz), 7.62(2H, d, J = 8.3 Hz), 7.70 (2H, d, J = 8.3 Hz), 7.89(2H, d, J = 8.9 Hz), 12.79(1H, brs).
834	$-CF_3$	-H	$-CH_3$	$-CH_3$	-COOH	free	(DMSO-d_6) 1.54(3H, d, J = 6.8 Hz), 2.73(3H, s), 5.23(1H, q, J = 6.8 Hz), 7.00(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.7 Hz), 7.46(1H, dd, J = 9.1 Hz, 3.3 Hz), 7.54(2H, d, J = 8.1 Hz), 7.72(2H, d, J = 8.4 Hz), 7.84(1H, d, J = 3.3 Hz), 7.93(2H, d, J = 8.6 Hz)
835	$-CF_3$	-H	-H	$-CH_3$		dihydro-chloride	(DMSO-d_6) 1.81(3H, s), 3.05(3H, s), 4.22(2H, s), 4.67(2H, s), 6.95(1H, d, J = 8.7 Hz), 7.04(2H, d, J = 8.6 Hz), 7.28-7.40 (1H, m), 7.35(2H, d, J = 8.6 Hz), 7.45(2H, d, J = 8.1 Hz), 7.62-7.80 (1H, m), 7.70(2H, d, J = 8.1 Hz).
836	-Cl	-Cl	-H	$-CH_3$		dihydro-chloride	($CDCl_3$) 1.81(3H, s), 3.02(3H, s), 4.23 (2H, s), 4.57(2H, s), 6.95(1H, d, J = 8.8 Hz), 7.04(2H, d, J = 8.7 Hz), 7.22(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.32-7.40(1H, m), 7.35(2H, d, J = 8.7 Hz), 7.51(1H, d, J = 2.0 Hz), 7.59(1H, d, J = 8.2 Hz), 7.71(1H, d, J = 3.0 Hz).
837	$-CF_3$	-H	-H	$-(CH_2)_2OCH_3$	$-(CH_2)_2COOH$	free	(DMSO-d_6) 2.43-2.57(2H, m), 2.71-2.82(2H, m), 3.25(3H, s), 3.48-3.58(2H, m), 3.59-3.68(2H, m), 4.66 (2H, s), 6.80(1H, d, J = 8.9 Hz), 6.83-6.90(2H, m), 7.11-7.25(3H, m), 7.44(2H, d, J = 8.0 Hz), 7.56(1H, d, J = 3.1 Hz), 7.67(2H, d, J = 8.0 Hz), 12.09 (1H, brs).

Table 114



Reference Example No.	R_{360}	R_{361}	R_{362}	Xa_{26}	Xa_{27}	^{1}H NMR (solvent) δppm or MS
838	-Cl	-Cl	-OCH_3	-CH=CH- (trans)	-CH_2-	^{1}H NMR (DMSO-d_6) 2.57-2.63(2H, m), 2.83-2.88(2H, m), 3.68(3H, s), 6.84(1H, dd, J = 8.1 Hz, 1.7 Hz), 6.98-7.05(3H, m), 7.20 (1H, d, J = 16.5 Hz), 7.36(1H, d, J = 16.5 Hz), 7.54-7.65(2H, m), 7.87(1H, d, J = 1.8 Hz), 8.07-8.11(1H, m), 8.22(1H, d, J = 2.1 Hz), 12.20(1H, brs).
839	-CF_3	-H	-OCH_3	-CH=CH- (trans)	-CH_2-	^{1}H NMR (DMSO-d_6) 2.58-2.63(2H, m), 2.83-2.89(2H, m), 3.68(3H, s), 6.82-6.86 (1H, m), 6.99-7.06(3H, m), 7.31(1H, d, J = 16.5 Hz), 7.41(1H, d, J = 16.5 Hz), 7.71-7.81(4H, m), 8.15(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.27(1H, d, J = 2.1 Hz), 12.18(1H, brs).
840	-CF_3	-H	-OCH_3	-CO-	-CH_2-	^{1}H NMR (DMSO-d_6) 2.57-2.63(2H, m), 2.83-2.89(2H, m), 3.70(3H, s), 6.86(1H, dd, J = 8.1 Hz, 2.0 Hz), 7.06-7.15(3H, m), 7.90-7.97(4H, m), 8.18-8.22(1H, m), 8.50 (1H, dd, J = 2.5 Hz, 0.7 Hz), 12.19(1H, brs).
841	-CF_3	-H	-CH_3	-CO-	-N(C_2H_5)-	^{1}H NMR ($CDCl_3$) 1.23(3H, t, J = 7.1 Hz), 2.12(3H, s), 3.46(2H, q, J = 7.1 Hz), 4.04(2H, s), 5.77(1H, brs), 6.55-6.59(2H, m), 6.97(2H, d, J = 8.7 Hz), 7.73-7.89(4H, m), 8.17-8.21(1H, m), 8.58(1H, d, J = 2.3 Hz).
842	-Cl	-Cl	-H	-NHCONH-	none	MS 431(M^+)

Table 115



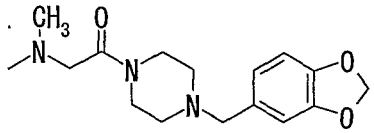
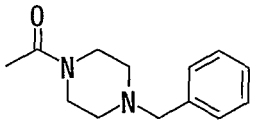
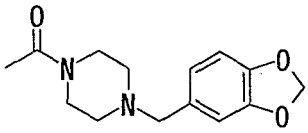
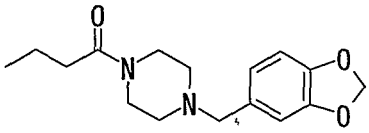
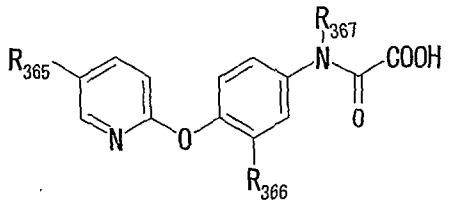
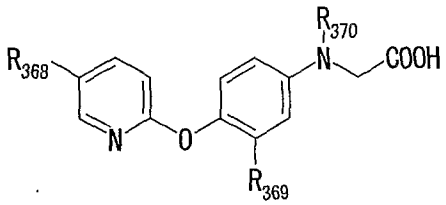
Reference Example No.	R_{363}	R_{364}	Form	^{1}H NMR (solvent) δppm
843	-H		hydro-chloride	(DMSO-d_6) 2.94(3H, s), 3.10-3.59(7H, m), 4.02-4.39(5H, m), 6.07(2H, s), 6.68(2H, d, J = 9.1 Hz), 6.74-7.06(5H, m), 7.25(1H, brs), 8.23(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.65(1H, d, J = 2.3 Hz), 11.23(1H, brs).
844	-H	$-NO_2$	free	($CDCl_3$) 7.13(1H, d, J = 8.5 Hz), 7.35(2H, d, J = 9.1 Hz), 8.33(2H, d, J = 9.1 Hz), 8.41(1H, dd, J = 8.5 Hz, 2.5 Hz), 8.89(1H, d, J = 2.5 Hz).
845	-H		free	(DMSO-d_6) 2.47(4H, brs), 3.31-3.53(6H, m), 7.16(1H, d, J = 8.6 Hz), 7.23-7.34(7H, m), 7.45-7.48(2H, m), 8.31(1H, dd, J = 8.6 Hz, 2.4 Hz), 8.68(1H, d, J = 2.4 Hz), 13.20(1H, brs).
846	-H		free	(DMSO-d_6) 3.36-3.55(8H, m), 3.58(2H, s), 6.00 (2H, s), 6.78-6.92(3H, m), 7.17(1H, d, J = 8.6 Hz), 7.26(2H, d, J = 8.6 Hz), 7.48(2H, d, J = 8.4 Hz), 8.31(1H, dd, J = 2.3 Hz, 8.6 Hz), 8.68(1H, d, J = 2.2 Hz).
847	-H		free	(DMSO-d_6) 2.50(4H, brs), 2.63-2.68(2H, m), 2.81-2.86(2H, m), 3.48-3.61(6H, m), 6.01(2H, s), 6.81-6.90(2H, m), 6.96(1H, s), 7.06-7.10(3H, m), 7.30(2H, d, J = 8.6 Hz), 8.25-8.33(1H, m), 8.66(1H, d, J = 2.7 Hz), 12.58(1H, brs).
848	$-CH_3$	$-NO_2$	free	(DMSO-d_6) 2.22(3H, s), 7.28(1H, dd, J = 8.6 Hz, 0.7 Hz), 7.40(1H, d, J = 8.9 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.28(1H, d, J = 2.6 Hz), 8.36(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.65(1H, dd, J = 2.3 Hz, 0.7 Hz).

Table 116



Reference Example No.	R_{365}	R_{366}	R_{367}	^{1}H NMR (solvent) δppm
849	-NO_2	-CH_3	-H	(DMSO-d_6) 2.06(3H, s), 7.14(1H, d, J = 8.6 Hz), 7.26(1H, d, J = 9.1 Hz), 7.64(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.74(1H, d, J = 2.5 Hz), 8.62(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.02(1H, d, J = 2.8 Hz), 10.75(1H, brs).
850	-NO_2	-CH_3	-CH_3	(DMSO-d_6) 2.09(3H, s), 3.26(3H, s), 7.20-7.36(4H, m), 8.64(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.6 Hz).
851	4-CF_3PhNHCO-	-CH_3	-H	(DMSO-d_6) 2.08(3H, s), 7.11(1H, d, J = 8.7 Hz), 7.16(1H, d, J = 8.7 Hz), 7.64(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.72-7.75(3H, m), 7.98(2H, d, J = 8.6 Hz), 8.37(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.69(1H, d, J = 2.5 Hz), 10.62(1H, brs), 10.74(1H, brs).
852	4-CF_3PhOCH_2-	-H	-H	(DMSO-d_6) 5.17(2H, s), 7.06(1H, d, J = 8.4 Hz), 7.13(2H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.6 Hz), 7.67(2H, d, J = 8.4 Hz), 7.79(2H, d, J = 9.1 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.25(1H, d, J = 2.0 Hz), 10.78(1H, brs).
853	4-CF_3PhOCH_2-	-CH_3	-H	($CDCl_3$) 2.18(3H, s), 5.05(2H, s), 7.01-7.08(5H, m), 7.51-7.58(4H, m), 7.83-7.87(1H, m), 8.20(1H, d, J = 2.1 Hz), 9.02(1H, brs).
854	4-CF_3PhOCH_2-	-CH_3	-CH_3	(DMSO-d_6) 2.09(3H, s), 3.25(3H, s), 5.17(2H, s), 7.10(1H, d, J = 8.4 Hz), 7.11(1H, d, J = 8.4 Hz), 7.17-7.23(3H, m), 7.32(1H, d, J = 2.3 Hz), 7.67(2H, d, J = 8.7 Hz), 7.98(1H, dd, J = 8.4 Hz, 2.3 Hz), 8.24(1H, d, J = 2.3 Hz).

Table 117



Reference Example No.	R_{368}	R_{369}	R_{370}	^{1}H NMR (solvent) δppm
855	3,4-Cl_2PhSO_2NH-	-F	-CH_3	(DMSO-d_6) 2.96(3H, s), 4.11(2H, s), 6.43(1H, dd, J = 8.9 Hz, 2.1 Hz), 6.58(1H, dd, J = 14.4 Hz, 3.0 Hz), 6.97-7.02(2H, m), 7.53(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.63(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.77(1H, d, J = 2.5 Hz), 7.86(1H, d, J = 8.6 Hz), 7.88(1H, d, J = 2.1 Hz), 10.40(1H, s), 12.61(1H, brs).
856	3,4-$Cl_2PhNHCO$-	-OCH_3	-C_2H_5	($CDCl_3$) 1.26(3H, t, J = 7.1 Hz), 3.45(2H, q, J = 7.1 Hz), 3.69(3H, s), 4.08(2H, s), 6.24(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.31(1H, d, J = 2.6 Hz), 6.95(1H, d, J = 8.7 Hz), 7.00(1H, d, J = 8.7 Hz), 7.29-7.50(1H, m), 7.55(1H, dd, J = 8.9 Hz, 2.5 Hz), 7.88(1H, d, J = 2.5 Hz), 8.24(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.56(1H, brs), 8.73(1H, d, J = 2.0 Hz).

Reference Example 857

Production of 3-{4-[5-(3,4-dichlorobenzylmethylamino)-pyridin-2-yloxy]phenyl}propionic acid

To a solution of ethyl 3-{4-[5-(3,4-dichlorobenzylamino)pyridin-2-yloxy]phenyl}propionate (1.63 g, 3.7 mmol) in ethanol (30 mL) were added 37% aqueous formaldehyde (2.0 mL, 22 mmol) and acetic acid (0.21 mL, 3.7 mmol), and the resulting solution was stirred at room temperature for 1 hour. To this solution was then added sodium cyanoborohydride (0.46 g, 7.3 mmol) at 0°C, and the resulting solution was stirred at the same temperature for 1 hour. To this

solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 1.55 g of ethyl 3-{4-[5-(3,4-dichlorobenzylmethylamino)-pyridin-2-yloxy]phenyl}propionate. This product was dissolved in ethanol (40 mL), and to the resulting solution was added 10% aqueous sodium hydroxide (2.7 mL, 6.7 mmol) and stirred at room temperature for 2 hours. The resulting solution was then acidified by adding 10% hydrochloric acid, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 1.44 g of the title compound.

Appearance: Colorless oil

^{1}H NMR (DMSO-d_6) δ 2.38-2.60(2H, m), 2.78(2H, t, J = 7.6 Hz), 4.52(2H, s), 6.81-6.92(3H, m), 7.12-7.23(3H, m), 7.28(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.48(1H, d, J = 1.9 Hz), 7.57(1H, d, J = 8.2 Hz), 7.63(1H, d, J = 3.3 Hz), 11.70-12.40(1H, m).

The following compound was produced in the same manner as in Reference Example 857.

Reference Example 858

3-(4-{5-[(3,4-Dichlorobenzyl)ethylamino]pyridin-2-yloxy}phenyl)propionic acid

^{1}H NMR (DMSO-d_6) δ 1.09(3H, t, J = 6.9 Hz), 2.37-2.59(2H, m), 2.64-2.83(2H, m), 3.45(2H, q, J = 6.9 Hz), 4.48(2H, s), 6.82(1H, d, J = 8.9 Hz), 6.85-6.92(2H, m), 7.12-7.25(4H, m), 7.48(1H, d, J = 1.8 Hz), 7.54-7.61(2H, m), 11.77-12.38(1H, m).

Reference Example 859

Production of N-[2-(4-formylphenoxy)-5-pyridyl]-3,4-dichlorobenzamide

To a solution of 4-[(5-amino-2-pyridyl)oxy]benzaldehyde ethylene acetal (5.27 g, 20.4 mmol) and triethylamine (3.41 mL, 24.5 mmol) in THF (80 mL) was added dropwise a solution of 3,4-dichlorobenzoyl chloride (4.49 g, 21.4 mmol) in THF (30 mL) under ice cooling. The resulting solution was stirred for 2 hours at the same temperature. The reaction solution was concentrated under reduced pressure, to the residue, 80% acetic acid (55 mL) was added, and the mixture was heated at 80°C with stirring for 1 hour. The reaction solution was concentrated under reduced pressure and to the residue was added water, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The obtained solid

was recrystallized from isopropanol, to thereby yield 5.63 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 7.05(1H, d, J = 8.7 Hz), 7.24(2H, d, J = 8.7 Hz), 7.57(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.82-7.93(3H, m), 7.97(1H, d, J = 2.1 Hz), 8.25(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.29(1H, d, J = 2.7 Hz), 9.96(1H, s).

Reference Example 860

Production of ethyl {4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]benzylamino}acetate

A solution of N-[2-(4-formylphenoxy)-5-pyridyl]-3,4-dichlorobenzamide (1.00 g, 2.58 mmol), glycine ethyl ester hydrochloride (0.400 g, 2.84 mmol) and sodium acetate (0.230 g, 2.84 mmol) in methanol (20 mL) was stirred for 30 minutes at 60°C. The reaction solution was cooled with ice, and then sodium cyanoborohydride (0.180 g, 2.84 mmol) was added. The resulting solution was stirred at the same temperature for 1 hour. To the reaction solution was added 5 M hydrochloric acid (2 mL) and concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with dichloromethane. The dichloromethane layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 :

2), to thereby yield 0.752 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.1 Hz), 3.43(2H, s), 3.81(2H, s), 4.20(2H, q, J = 7.1 Hz), 6.95(1H, d, J = 8.8 Hz), 7.09(2H, d, J = 8.5 Hz), 7.36(2H, d, J = 8.5 Hz), 7.57(1H, d, J = 8.3 Hz), 7.71(1H, dd, J = 2.1 Hz, 8.3 Hz), 7.84(1H, s), 7.98(1H, d, J = 2.1 Hz), 8.18(1H, dd, J = 2.7 Hz, 8.8 Hz), 8.24(1H, d, J = 2.7 Hz).

Reference Example 861

Production of (acetyl{4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]benzyl}amino)acetic acid

To a solution of ethyl {4-[5-(3,4-dichloro-benzoylamino)pyridin-2-yloxy]benzylamino}acetate (0.811 g, 1.59 mmol) in dichloromethane (5 mL) were added triethylamine (0.332 mL, 2.39 mmol) and acetyl chloride (0.136 mL, 1.91 mmol) at room temperature. The resulting solution was stirred for 1 hour at the same temperature. To the reaction solution was added water, and extracted with dichloromethane. The dichloromethane layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated, to thereby yield 0.785 g of residue. This residue was dissolved in ethanol (5 mL). To the resulting solution was added 5 M aqueous sodium hydroxide (0.350 mL, 1.75 mmol) at room temperature and stirred at the same temperature for 14 hours. To the resulting reaction solution were added 5 M hydrochloric acid (0.400 mL) and water, and

extracted with dichloromethane. The dichloromethane layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated, to thereby yield 0.776 g of the title compound.

Appearance: White amorphous powder

^{1}H NMR (DMSO-d_6 at 375 K) δ 2.10(3H, s), 4.02(2H, s), 4.60(2H, s), 7.03(1H, d, J = 8.8 Hz), 7.11(2H, d, J = 8.2 Hz), 7.32(2H, d, J = 8.2 Hz), 7.78(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 2.1 Hz, 8.4 Hz), 8.10-8.30(2H, m), 8.53(1H, d, J = 2.6 Hz), 10.23(1H, s).

Reference Example 862

Production of 1-(4-piperonylpiperazin-1-yl)-2-{methyl-[3-methyl-4-(5-nitropyridin-2-yloxy)phenyl]amino}-ethanone

To a solution of {methyl[3-methyl-4-(5-nitropyridin-2-yloxy)phenyl]amino}acetic acid (0.93 g, 2.9 mmol) in DMF (40 mL) were added 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (0.67 g, 3.5 mmol), 1-hydroxybenzotriazole monohydrate (0.54 g, 3.5 mmol), and 1-piperonylpiperazine (0.68 g, 3.08 mmol). The reaction mixture was stirred for 15 hours at room temperature under a nitrogen atmosphere. To the resulting solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with water and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-

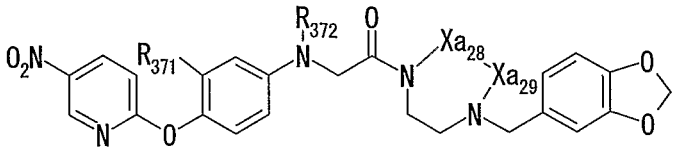
hexane : ethyl acetate = 2 : 1 → dichloromethane : methanol = 100 : 1), to thereby yield 1.2 g of the title compound.

Appearance: Yellow powder

Melting point: 142-143°C

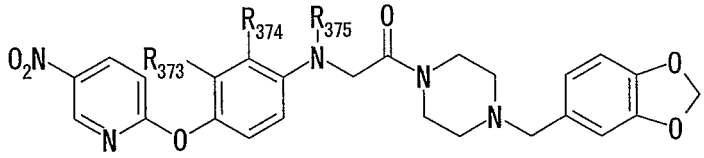
The following compounds were produced in the same manner as in Reference Example 862.

Table 118



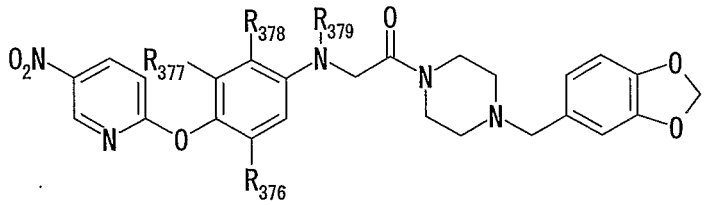
Reference Example No.	R_{371}	R_{372}	Xa_{28}	Xa_{29}	^{1}H NMR ($CDCl_3$) δppm
863	-CH_3	-CH_3	-CH_2-	-CO-	2.09(3H, s), 3.04(3H, s), 3.22-3.39(2H, m), 3.60-3.90(2H, m), 4.11(2H, s), 4.19-4.40(2H, m), 4.53(2H, s), 5.95(2H, s), 6.51-6.62(2H, m), 6.68-6.80(3H, m), 6.92(1H, d, J = 8.6 Hz), 6.94(1H, d, J = 9.0 Hz), 8.42(1H, dd, J = 9.0 Hz, 2.6 Hz), 9.04(1H, d, J = 2.6 Hz).
864	-OCH_3	-C_2H_5	-CH_2-	-CO-	1.21(3H, t, J = 6.7 Hz), 3.20-3.33(2H, m), 3.46(2H, q, J = 6.7 Hz), 3.71(3H, s), 3.65-3.85(2H, m), 4.07 (2H, s), 4.29(2H, s), 4.52(2H, s), 5.96(2H, s), 6.23 (1H, dd, J = 8.7 Hz, 2.6 Hz), 6.39(1H, d, J = 2.6 Hz), 6.65-6.85(3H, m), 6.97(2H, d, J = 8.7 Hz), 8.41 (1H, dd, J = 9.0 Hz, 2.8 Hz), 9.02(1H, d, J = 2.8 Hz).
865	-H	-CH_3	-CH_2-	-$CH(CH_3)$-	1.12-1.16(3H, m), 2.08-2.16(1H, m), 2.46-2.53(1H, m), 2.71-2.73(1H, m), 2.85-3.48(6H, m), 3.54-3.59 (1H, m), 3.84-4.19(4H, m), 5.94(2H, s), 6.68-6.74 (4H, m), 6.85(1H, brs), 6.94(1H, d, J = 9.1 Hz), 7.01 (2H, d, J = 8.9 Hz), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
866	-H	-C_2H_5	-CH_2-	-$CH(CH_3)$-	1.13-1.28(6H, m), 2.08-2.16(1H, m), 2.47-2.50(1H, m), 2.71-2.75(1H, m), 2.86-3.35(3H, m), 3.41-3.49 (2H, m), 3.58-3.62(1H, m), 3.85-4.16(4H, m), 5.94 (2H, s), 6.67(2H, d, J = 9.1 Hz), 6 .74(2H, brs), 6.85(1H, brs), 6.94(1H, d, J = 9.1 Hz), 6.99(2H, d, J = 9.1 Hz), 8.41(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.05(1H, d, J = 2.5 Hz).
867	-H	-CH_3	-$CH(CH_3)$-	-CH_2-	1.29-1.40(3H, m), 1.96-2.06(1H, m), 2.17(1H, brs), 2.65-2.70(1H, m), 2.81-2.86(1H, m), 2.96-3.06(4H, m), 3.32-3.49(3H, m), 3.97-4.71(3H, m), 5.95(2H, s), 6.70(2H, d, J = 9.2 Hz), 6.74-6.75(2H, m), 6.87 (1H, brs), 6.94(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.01(2H, d, J = 9.2 Hz), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.5 Hz).
868	-H	-C_2H_5	-$CH(CH_3)$-	-CH_2-	1.20(3H, t, J = 7.1 Hz), 1.26-1.40(3H, m), 1.98-2.05(1H, m), 2.16-2.17(1H, m), 2.65-2.69(1H, m), 2.81-2.85(1H, m), 3.02-3.56(6H, m), 4.03-4.71 (3H, m), 5.94(2H, s), 6.66(2H, d, J = 9.2 H), 6.74-6.75(2H, m), 6.87(1H, brs), 6.94(1H, dd, J = 9.1 Hz, 0.7 Hz), 6.99(2H, d, J = 9.1 Hz), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.7 Hz).

Table 119



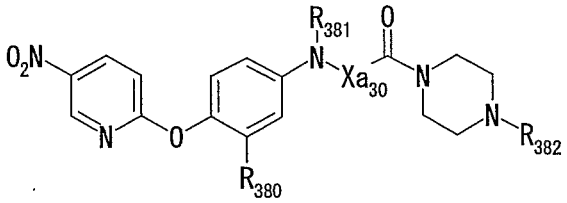
Reference Example No.	R_{373}	R_{374}	R_{375}	^{1}H NMR (solvent) δppm or MS
869	-COOCH$_3$	-H	-C$_2$H$_5$	MS 577(M$^+$)
870	-OCH$_3$	-H	-H	^{1}H NMR (DMSO-d$_6$) 2.32-2.40(4H, m), 3.42(2H, s), 3.50(4H, brs), 3.63(3H, s), 3.92(2H, d, J = 4.6 Hz), 5.65(1H, t, J = 4.8 Hz), 5.99(2H, s), 6.22(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.51(1H, d, J = 2.5 Hz), 6.76(1H, dd, J = 7.9 Hz, 1.5 Hz), 6.84-6.91(3H, m), 7.07(1H, dd, J = 9.1 Hz, 0.5 Hz), 8.54(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.00(1H, dd, J = 2.8 Hz, 0.5 Hz).
871	-OCH$_3$	-H	-CH$_3$	^{1}H NMR (CDCl$_3$) 2.35-2.52(4H, m), 3.07(3H, s), 3.44(2H, s), 3.41-3.55(2H, m), 3.56-3.70(2H, m), 3.73(3H, s), 5.95(2H, s), 6.24(1H, dd, J = 8.8 Hz, 2.8 Hz), 6.35(1H, d, J = 2.8 Hz), 6.64-6.79(2H, m), 6.85(1H, s), 6.89-7.04(2H, m), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.8 Hz).
872	-OCH$_3$	-H	-C$_2$H$_5$	^{1}H NMR (CDCl$_3$) 1.22(3H, t, J = 7.0 Hz), 2.33-2.52(4H, m), 3.49-3.58(6H, m), 3.59-3.69(2H, m), 3.72(3H, s), 4.06(2H, s), 5.95(2H, s), 6.22(1H, dd, J = 8.8 Hz, 2.7 Hz), 6.33(1H, d, J = 2.7 Hz), 6.69-6.79(2H, m), 6.85(1H, s), 6.95(1H, d, J = 9.1 Hz), 6.96 (1H, d, J = 8.8 Hz), 8.41(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
873	-CH$_3$	-H	-H	^{1}H NMR (CDCl$_3$) 2.08(3H, s), 2.43-2.48(4H, m), 3.45-3.48 (4H, m), 3.67-3.71(2H, m), 3.86(2H, d, J = 4.1 Hz), 4.93(1H, t, J = 4.1Hz), 5.96(2H, s), 6.47-6.52(2H, m), 6.71-6.78(2H, m), 6.86-6.96(3H, m), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
874	-CH$_3$	-H	-Ac	^{1}H NMR (CDCl$_3$) 1.98(3H, s), 2.16(3H, s), 2.32-2.51(4H, m), 3.35-3.48(4H, m), 3.53-3.69(2H, m), 4.46(2H, s), 5.95(2H, s), 6.65-6.79(2H, m), 6.85(1H, s), 7.08(2H, d, J = 8.7 Hz), 7.27-7.34 (1H, m), 7.35-7.42(1H, m), 8.51(1H, dd, J = 9.0 Hz, 2.8 Hz), 9.02 (1H, dd, J = 2.8 Hz, 0.3 Hz).
875	-CH$_3$	-H	-C$_2$H$_5$	^{1}H NMR (CDCl$_3$) 1.20(3H, t, J = 7.1 Hz), 2.08(3H, s), 2.37-2.55(4H, m), 3.37-3.72(8H, m), 4.05(2H, s), 5.95(2H, s), 6.42-6.58(2H, m), 6.63-6.79(2H, m), 6.81-6.99(3H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
876	-CH$_3$	-H		^{1}H NMR (CDCl$_3$) 0.64-0.69(2H, m), 0.80-0.87(2H, m), 2.09 (3H, s), 2.41-2.49(4H, m), 2.76-2.84(1H, m), 3.44(2H, s), 3.49-3.52(2H, m), 3.60-3.64(2H, m), 4.18(2H, s), 5.95(2H, s), 6.71-6.93(7H, m), 8.39-8.44(1H, m), 9.05-9.06(1H, m).
877	-CH$_3$	-CH$_3$	-CH$_3$	^{1}H NMR (CDCl$_3$) 2.05(3H, s), 2.28(3H, s), 2.37-2.43(4H, m), 2.72(3H, s), 3.42(2H, s), 3.52-3.56(2H, m), 3.62-3.65(2H, m), 3.77(2H, s), 5.95(2H, s), 6.71-6.77(2H, m), 6.85-6.90(2H, m), 6.97-7.06(2H, m), 8.45(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.04(1H, dd, J = 3.0 Hz, 0.5 Hz).

Table 120



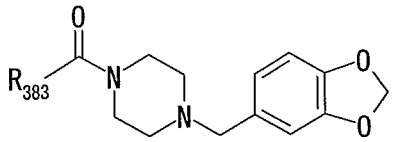
Reference Example No.	R_{376}	R_{377}	R_{378}	R_{379}	^{1}H NMR (solvent) δppm or MS
878	$-CH_3$	-H	$-CH_3$	$-C_2H_5$	MS 547(M^+)
879	-F	-H	-H	-H	^{1}H NMR ($CDCl_3$) 2.44-2.49(4H, m), 3.43-3.45(2H, m), 3.45 (2H, s), 3.68-3.71(2H, m), 3.84(2H, d, J = 4.1 Hz), 5.12(1H, brs), 5.96(2H, s), 6.40-6.45(2H, m), 6.71-6.80(2H, m), 6.85(1H, brs), 7.02(1H, t, J = 8.5 Hz), 7.05(1H, dd, J = 9.1 Hz, 0.5 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, dd, J = 2.8 Hz, 0.7 Hz).
880	-F	-H	-H	$-CH_3$	^{1}H NMR ($CDCl_3$) 2.44(4H, brs), 3.06(3H, s), 3.45(2H, s), 3.45-3.47(2H, m), 3.62-3.64(2H, m), 4.11(2H, s), 5.95(2H, s), 6.40-6.51(2H, m), 6.71-6.78(2H, m), 6.85(1H, brs), 7.04(1H, d, J = 9.1 Hz), 7.05(1H, t, J = 8.9 Hz), 8.46(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, d, J = 2.3 Hz)
881	-F	-H	-H	$-C_2H_5$	^{1}H NMR ($CDCl_3$) 1.22(3H, t, J = 7.2 Hz), 2.45(4H, brs), 3.40-3.49 (4H, m), 3.45(2H, s), 3.65(2H, brs), 4.05(2H, s), 5.95 (2H, s), 6.37-6.46(2H, m), 6.74-6.75(2H, m), 6.86(1H, brs), 6.99-7.06 (2H, m), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.03(1H, d, J = 2.5 Hz).
882	-F	-H	-H	allyl	^{1}H NMR ($CDCl_3$) 2.46(4H, brs), 3.45(2H, s), 3.48(2H, brs), 3.65(2H, brs), 4.00(2H, d, J = 5.0 Hz), 4.07(2H, s), 5.19-5.29(2H, m), 5.82-5.94(1H, m), 5.95(2H, s), 6.37-6.47(2H, m), 6.71-6.78 (2H, m), 6.86-6.87(1H, m), 6.98-7.05(2H, m), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, dd, J = 2.8 Hz, 0.5 Hz)
883	-F	-H	-F	$-CH_3$	^{1}H NMR ($CDCl_3$) 2.33-2.49(4H, m), 2.99(3H, s), 3.43(2H, s), 3.37-3.50(2H, m), 3.51-3.68(2H, m), 4.10(2H, s), 5.95(2H, s), 6.69-6.78(2H, m), 6.81(1H, dd, J = 8.2 Hz, 12.1 Hz), 6.85(1H, d, J = 0.96 Hz), 6.90(1H, dd, J = 7.1 Hz, 12.8 Hz), 7.09(1H, d, J = 9.1 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.01(1H, d, J = 2.8 Hz).
884	-F	-H	-F	$-C_2H_5$	^{1}H NMR ($CDCl_3$) 1.17(3H, t, J = 7.1Hz), 2.30-2.52(4H, m), 3.35 (2H, q, J = 7.1Hz), 3.37-3.70(6H, m), 4.04(2H, s), 5.95(2H, s), 6.68-6.78(2H, m), 6.82(1H, dd, J = 8.0 Hz, 12.1 Hz), 6.83-6.88 (1H, m), 6.91(1H, dd, J = 7.2 Hz, 12.5 Hz), 7.09(1H, d, J = 9.0 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.02(1H, d, J = 2.8 Hz).
885	-F	-F	-H	$-CH_3$	^{1}H NMR (DMSO-d_6) 2.20-2.45(4H, m), 2.91(3H, s), 3.34-3.53 (6H, m), 4.31(2H, s), 5.98(2H, s), 6.47(2H, d, J = 11.8 Hz), 6.70-6.79(1H, m), 6.80-6.91(2H, m), 7.42(1H, d, J = 9.1 Hz), 8.64(1H, dd, J = 2 .8 Hz, 9.1 Hz), 9.05(1H, d, J = 2.8 Hz).
886	$-CH_3$	-H	$-CH_3$	$-CH_3$	MS 533(M^+)
887	$-CF_3$	-H	-H	$-C_2H_5$	MS 587(M^+)
888	$-CF_3$	-H	-H	$-CH_3$	MS 573(M^+)
889	-H	-F	-F	$-CH_3$	^{1}H NMR ($CDCl_3$) 2.30-2.52(4H, m), 3.01(3H, s), 3.43(2H, s), 3.38-3.71(4H, m), 4.10(2H, s), 5.95(2H, s), 6.65-6.81(3H, m), 6.82-6.96(2H, m), 7.10(1H, d, J = 9.1 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.01(1H, d, J = 2.8 Hz).

Table 121



Reference Example No.	R_{380}	R_{381}	Xa_{30}	R_{382}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
890	$-CH_3$	$-CH_3$	$-CH_2-$	benzyl	^{1}H NMR 2.12(3H, s), 2.40-2.55(4H, m), 3.04(3H, s), 3.45-3.55(2H, m), 3.54(2H, s), 3.60-3.70 (2H, m), 4.10(2H, s), 6.50-6.61(2H, m), 6.91(1H, d, J = 8.5 Hz), 6.92(1H, d, J = 9.1 Hz), 7.22-7.40(5H, m), 8.42(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
891	$-CH_3$	$-C_2H_5$	$-CH_2-$	benzyl	mp 134-136
892	-H	$-CH_3$	$-CH_2CH_2-$	piperonyl	^{1}H NMR 2.34-2.41(4H, m), 2.56-2.61 (2H, m), 2.97(3H, s), 3.39-3.42(4H, m), 3.60-3.64 (2H, m), 3.71-3.76(2H, m), 5.94(2H, s), 6.72-6.76 (5H, m), 6.83(1H, brs), 6.97(1H, d, J = 9.1 Hz), 7.02 (1H, d, J = 9.1 Hz), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).
893	$-CH_3$	$-CH_3$	$-CH(CH_3)-$	piperonyl	^{1}H NMR 1.31(3H, d, J = 6.6 Hz), 2.11 (3H, s), 2.17-2.49(4H, m), 2.78(3H, s), 3.31-3.56(3H, m), 3.39(2H, s), 3.77(1H, brs), 4.57(1H, q, J = 6.6 Hz), 5.94(2H, s), 6.60-6.63(2H, m), 6.68-6.75(2H, m), 6.83(1H, brs), 6.93-6.98(2H, m), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
894	-H	$-CH_3$	$-CH(CH_3)-$	piperonyl	^{1}H NMR 1.32(3H, d, J = 6.6 Hz), 2.19-2.50(4H, m), 2.80(3H, s), 3.30-3.56(3H, m), 3.32(2H, s), 3.78(1H, brs), 4.58(1H, q, J = 6.6 Hz), 5.93(2H, s), 6.68-6.82 (3H, m), 6.77(2H, d, J = 9.1 Hz), 6.98(1H, dd, J = 8.6 Hz, 0.5 Hz), 7.04(2H, d, J = 9.2 Hz), 8.44(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, dd, J = 2.8 Hz, 0.5 Hz).
895	$-CH_3$	-H	-CO-	piperonyl	^{1}H NMR 2.15(3H, s), 2.49-2.55(4H, m), 3.45(2H, s), 3.71-3.75(2H, m), 4.25-4.28(2H, m), 5.96(2H, s), 6.75(2H, brs), 6.86(1H, brs), 7.04(1H, d, J = 9.1 Hz), 7.06(1H, d, J = 8.6 Hz), 7.49(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.61(1H, d, J = 2.5 Hz), 8.48(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.02(1H, d, J = 2.8 Hz), 9.23(1H, brs).
896	$-CH_3$	$-CH_3$	-CO-	piperonyl	^{1}H NMR 2.15(3H, s), 2.25-2.33(4H, m), 3.33-3.42(9H, m), 5.93(2H, s), 6.66-6.79(3H, m,) 7.04-7.21(4H, m), 8.51(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.99(1H, dd, J = 2.8 Hz, 0.5 Hz).

Table 122



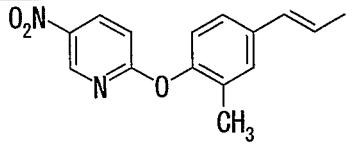
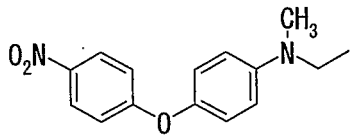
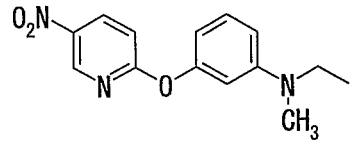
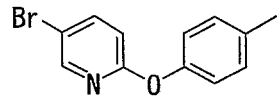
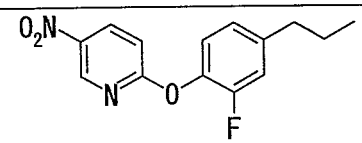
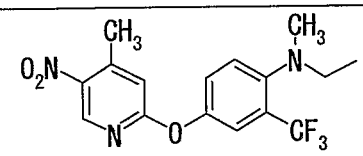
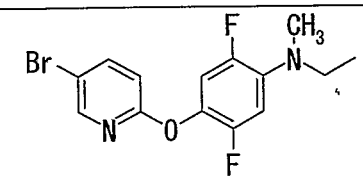
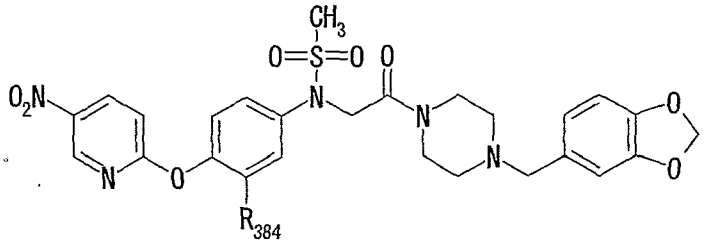
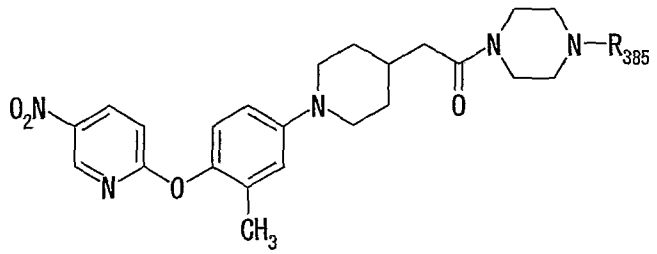
Reference Example No.	R_{383}	^{1}H NMR ($CDCl_3$) δppm or MS
897		MS 502(M^+)
898		^{1}H NMR 2.44(4H, brs), 3.07(3H, s), 3.44(2H, s), 3.47-3.51 (2H, m), 3.62-3.66(2H, m), 4.12(2H, s), 5.95 (2H, s), 6.67-6.75(4H, m), 6.86(1H, s), 6.93-6.99(4H, m), 8.16(2H, d, J = 9.2 Hz).
899		^{1}H NMR 2.42(4H, t, J = 4.9 Hz), 3.04(3H, s), 3.42(2H, s), 3.44(2H, t, J = 4.9 Hz), 3.62(2H, t, J = 4.9 Hz), 4.11(2H, s), 5.95(2H, s), 6.42-6.44(1H, m), 6.50-6.51 (1H, m), 6.54-6.58(1H, m), 6.70-6.77(2H, m), 6.84(1H, m), 6.96(1H, d, J = 9.1 Hz), 7.24-7.30(1H, m), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.08(1H, d, J = 2.8 Hz).
900		^{1}H NMR 2.44(4H, brs), 3.44(2H, s), 3.55(2H, brs), 3.73(2H, brs), 5.95(2H, s), 6.74(2H, s), 6.85(1H, s), 6.86(1H, d, J = 8.6 Hz), 7.14(2H, d, J = 8.6 Hz), 7.46(2H, d, J = 8.6 Hz), 7.79(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.22(1H, d, J = 2.5 Hz).
901		MS 508(M^+)
902		MS 587(M^+)
903		^{1}H NMR 2.31-2.50(4H, m), 2.96(3H, s), 3.42(2H, s), 3.40-3.52(2H, m), 3.53-3.67(2H, m), 4.05(2H, s), 5.95(2H, s), 6.65-6.95(6H, m), 7.77(1H, dd, J = 2.5 Hz, 8.7 Hz), 8.16(1H, dd, J = 0.5 Hz, 2.5 Hz).

Table 123



Reference Example No.	R_{384}	^{1}H NMR ($CDCl_3$) δppm
904	-H	2.29-2.34(4H, m), 3.15(3H, s), 3.34-3.43(6H, m), 4.63(2H, s), 5.98(2H, s), 6.72-6.76(1H, m), 6.83-6.86(2H, m), 7.27(2H, d, J = 8.9 Hz), 7.31(1H, d, J = 9.3 Hz), 7.54(2H, d, J = 8.9 Hz), 8.64(1H, dd, J = 9.2 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).
905	$-CH_3$	2.15(3H, s), 2.42-2.43(4H, m), 3.22(3H, s), 3.39-3.41(2H, m), 3.43(2H, s), 3.61-3.63(2H, m), 4.56(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 7.06(1H, d, J = 8.2 Hz), 7.07(1H, d, J = 9.1 Hz), 7.48-7.52(2H, m), 8.49(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).
906	$-OCH_3$	2.42-2.46(4H, m), 3.24(3H, s), 3.40(2H, brs), 3.43(2H, s), 3.63(2H, brs), 3.74(3H, s), 4.58(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 7.06-7.14(2H, m), 7.23-7.28(1H, m), 7.32(1H, d, J = 2.3 Hz), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.98(1H, d, J = 2.8 Hz).

Table 124



Reference Example No.	R_{385}	^{1}H NMR ($CDCl_3$) δppm
907	piperonyl	1.33-1.46(2H, m), 1.86-2.00(3H, m), 2.10(3H, s), 2.29(2H, d, J = 6.8 Hz), 2.39-2.43 (4H, m), 2.75(2H, t, J = 12.2 Hz), 3.40-3.48(4H, m), 3.62-3.66(4H, m), 5.94(2H, s), 6.73-6.85(5H, m), 6.91-6.96(2H, m), 8.43(1H, dd, J = 9.1 Hz, 3.0 Hz), 9.04(1H, d, J = 2.8 Hz).
908	benzyl	1.35-1.46(2H, m), 1.86-2.00(3H, m), 2.10(3H, s), 2.29(2H, d, J = 6.8 Hz), 2.41-2.45 (4H, m), 2.75(2H, t, J = 12.2 Hz), 3.47-3.53(4H, m), 3.61-3.65(4H, m), 6.79-6.96(4H, m), 7.24-7.33(5H, m), 8.43(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).

Reference Example 909

Production of (4-benzylpiperazin-1-yl){4-[methyl(5-nitropyridin-2-yl)amino]phenyl}methanone

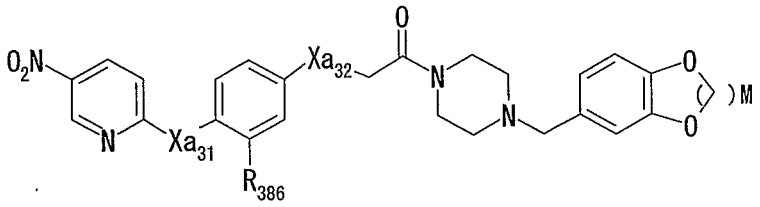
To a solution of 4-[methyl-(5-nitropyridin-2-yl)amino]benzoic acid (0.800 g, 2.93 mmol) and 1-benzylpiperazine (0.542 g, 3.08 mmol) in DMF (15 mL) were added triethylamine (1.02 mL, 7.32 mmol) and diethyl cyanophosphonate (0.593 mL, 3.52 mmol), and the resulting solution was stirred for 3 hours. To the resulting reaction solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, evaporated, and the residue was purified by silica gel column chromatography (ethyl acetate), to thereby yield 1.25 g of the title compound.

Appearance: Yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.25-2.65(4H, m), 3.49(2H, brs), 3.56(2H, s), 3.57(3H, s), 3.81(2H, brs), 6.43(1H, d, J = 9.5 Hz), 7.25-7.35(7H, m), 7.53(2H, d, J = 8.4 Hz), 8.06(1H, dd, J = 2.8 Hz, 9.5 Hz), 9.12(1H, d, J = 2.8 Hz).

The following compounds were produced in the same manner as in Reference Example 909.

Table 125



Reference Example No.	Xa_{31}	R_{386}	Xa_{32}	M	^{1}H NMR (DMSO-d_6) δppm
910	-NH-	-H	-CH_2-	1	2.20-2.30(4H, m), 2.59(2H, t, J = 7.3 Hz), 2.78(2H, t, J = 7.3 Hz), 3.35(2H, s), 3.36-3.45(4H, m), 5.98(2H, s), 6.72 (1H, dd, J = 1.3 Hz, 7.9 Hz), 6.80-6.90(3H, m), 7.21(2H, d, J = 8.4 Hz), 7.57(2H, d, J = 8.4 Hz), 8.26(1H, dd, J = 2.9 Hz, 9.3 Hz), 9.01(1H, d, J = 2.9 Hz), 10.06(1H, s).
911	-O-	-H	-NH-	1	2.32(2H, brs), 2.39(2H, brs), 3.41(2H, s), 3.50(4H, brs), 3.91(2H, d, J = 5.2 Hz), 5.68(1H, t, J = 5.2 Hz), 5.99(2H, s), 6.70(2H, d, J = 8.9 Hz), 6.74-6.77(1H, m), 6.83-6.88 (2H, m), 6.94(2H, d, J = 8.9 Hz), 7.11(1H, d, J = 9.1 Hz), 8.56(1H, dd, J = 2.9 Hz, 9.1 Hz), 9.02(1H, d, J = 2.9 Hz).
912	-O-	-OCH_3	-NH-	2	2.48(2H, brs), 2.49(2H, brs), 3.39(2H, s), 3.50(4H, brs), 3.63(3H, s), 3.92(2H, d, J = 4.8 Hz), 4.22(4H, s), 5.65(1H, brt), 6.22(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.51(1H, d, J = 2.5 Hz), 6.73-6.81(3H, m), 6.89(1H, d, J = 8.6 Hz), 7.07(1H, d, J = 9.1 Hz), 8.54(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.00(1H, d, J = 2.8 Hz).

Reference Example 913

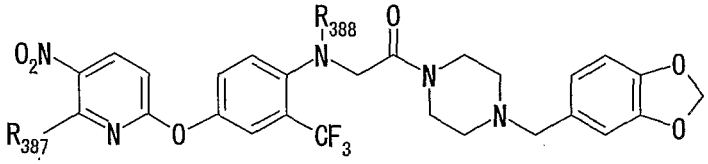
Production of N-[4-(5-nitropyridin-2-yloxy)phenyl]-N-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]acetamide

To a solution of ethyl {acetyl [4-(5-nitropyridin-2-yloxy)phenyl]amino}acetate (2.30 g, 6.40 mmol) in ethanol (50 mL) was added 5 M aqueous sodium hydroxide (1.92 mL, 9.60 mmol), and the resulting solution was stirred at room temperature for 30 minutes. To this reaction solution were added 5 M hydrochloric acid (2 mL) and water, and extracted with

ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, evaporated, and the obtained residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 1), to thereby yield 1.68 g of an oil. To a solution of this oil in DMF (10 mL) were added 1-piperonylpiperazine (1.29 g, 5.86 mmol), triethylamine (1.85 mL, 13.3 mmol) and diethyl cyanophosphonate (1.07 mL, 6.36 mmol), and the resulting solution was stirred for 1 hour at room temperature. To this reaction solution was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1), to thereby yield 2.21 g of the title compound.
Appearance: Yellow amorphous powder
^{1}H NMR ($CDCl_3$) δ 1.98(3H, s), 2.40-2.50(4H, m), 3.40-3.45(4H, m), 3.62(2H, brs), 4.48(2H, s), 5.94(2H, s), 6.70-6.76(2H, m), 6.85(1H, s), 7.09(1H, d, J = 9.1 Hz), 7.20(2H, d, J = 8.7 Hz), 7.51(2H, d, J = 8.7 Hz), 8.51(1H, dd, J = 2.8 Hz, 9.1 Hz), 9.04(1H, d, J = 2.8 Hz).

The following compounds were produced in the same manner as in Reference Example 913.

Table 126



Reference Example No.	R_{387}	R_{388}	MS (M^+)
914	$-CH_3$	$-CH_3$	587
915	-H	$-C_2H_5$	587

Reference Example 916

Production of 3-[3-methoxy-4-(5-nitropyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propan-1-one

3-[3-methoxy-4-(5-nitropyridin-2-yloxy)phenyl]propionic acid (3.18 g, 10 mmol) was dissolved in dichloromethane (30 mL). To the resulting solution were added thionyl chloride (0.88 mL, 12 mmol) and DMF (1 drop), and refluxed for 2 hours. The reaction solution was concentrated under reduced pressure, and the residue was dissolved in dichloromethane (20 mL). To the resulting solution were added triethylamine (1.67 mL, 12 mmol) and a solution of 1-piperonylpiperazine (2.20 g, 10 mmol) in dichloromethane (30 mL) under ice cooling, and the resulting solution was stirred for 1 hour at 0°C. The resulting reaction solution was washed with water and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was recrystallized from ethyl acetate, to thereby yield 4.95 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 2.33-2.42(4H, m), 2.63-2.69(2H, m), 2.97-3.03(2H, m), 3.42(4H, brs), 3.62-3.66(2H, m), 3.74(3H, s), 5.95(2H, s), 6.73-6.75(2H, m), 6.85-6.90(3H, m), 7.04(1H, d, J = 9.1 Hz), 7.06(1H, d, J = 7.9 Hz), 8.45(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.01(1H, d, J = 2.8 Hz).

The following compound was produced in the same manner as in Reference Example 916.

Reference Example 917

6-Chloro-N-(4-trifluoromethylphenyl)nicotinamide

^{1}H NMR (DMSO-d_6) δ7.74(1H, d, J = 8.4 Hz), 7.76(2H, d, J = 8.7 Hz), 8.00(2H, d, J = 8.7 Hz), 8.38(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.97(1H, d, J = 2.5 Hz), 10.80(1H, brs).

Reference Example 918

Production of 3-{3-methoxy-4-[methyl(5-nitropyridin-2-yl)amino]phenyl}-1-(4-piperonylpiperazin-1-yl)propan-1-one

To a solution of ethyl 3-{3-methoxy-4-[methyl-(5-nitropyridin-2-yl)amino]phenyl}propionate (3.85 g, 11 mmol) in ethanol (80 mL) was added 2 N aqueous sodium hydroxide (6.4 mL, 13 mmol), and the resulting solution was stirred at room temperature for 2.5 hours. To the resulting reaction solution was

added 6 N hydrochloric acid (2.2 mL, 13 mmol), and the solvent was removed under reduced pressure. To the residue were added THF (80 mL) and N,N'-carbonyldiimidazole (2.08 g, 13 mmol), and the resulting solution was stirred at room temperature for 3 hours. To the resulting reaction solution were added 1-piperonylpiperazine (2.60 g, 12 mmol) and DMF (40 mL), and stirred at room temperature for 21 hours. The solvent was evaporated under reduced pressure, and the residue was extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution, dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (ethyl acetate), to thereby yield 4.59 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 2.36-2.43(4H, m), 2.64-2.70(2H, m), 2.99-3.05(2H, m), 3.42-3.46(7H, m), 3.63-3.67(2H, m), 3.77(3H, s), 5.95(2H, s), 6.12(1H, brd, J = 9.1 Hz), 6.70-6.77(2H, m), 6.85-6.90(3H, m), 7.12(1H, d, J = 8.1 Hz), 7.97-8.01(1H, m), 9.11(1H, d, J = 2.6 Hz).

Reference Example 919

Production of 5-{methyl[2-oxo-2-(4-piperonylpiperazin-1-yl)ethyl]amino}-2-(5-nitropyridin-2-yloxy)-benzonitrile

To a solution of *t*-butyl 2-((3-cyano-4-(5-nitropyridin-2-yloxy)phenyl)(methyl)amino)acetate (1.2

g, 3.1 mmol) in dichloromethane (12 mL) was added trifluoroacetic acid (12 mL), and the resulting reaction solution was stirred at room temperature for 5 hours. The solvent was evaporated, and water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, to thereby yield crude 2-((3-cyano-4-(5-nitropyridin-2-yloxy)phenyl)(methyl)amino)-acetic acid. To a solution of this compound in DMF (24 mL) were added 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide hydrochloride (659 mg, 3.4 mmol), 1-hydroxybenzotriazole monohydrate (526 mg, 3.4 mmol) and 1-piperonylpiperazine (757 mg, 3.4 mmol), and the resulting reaction solution was stirred for 8 hours at room temperature. Water was added to the reaction solution and extracted with ethyl acetate. The ethyl acetate layer was then washed with, in order, saturated aqueous sodium bicarbonate solution, water and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel chromatography (ethyl acetate), to thereby yield 412 g of the title compound.

Appearance: Yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.40-2.55(4H, m), 3.09(3H, s), 3.45-3.50(4H, m), 3.55-3.70(2H, m), 4.14(2H, s), 5.95(2H, s), 6.70-6.80(2H, m), 6.80-6.95(3H, m), 7.10-7.20(2H, m), 8.50(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.99(1H, d, J = 2.8 Hz).

Reference Example 920

Production of 2-{(2,3-difluoro-4-*t*-butoxycarbonyl-amino)phenoxy}-5-nitropyridine

To a solution of {2,3-difluoro-4-(5-nitropyridin-2-yloxy)}benzoic acid (1.22 g, 4.1 mmol) in *t*-butanol (50 mL) were added diphenylphosphorylazide (0.98 mL, 4.5 mmol) and triethylamine (0.63 mL, 4.5 mmol), and the resulting solution was refluxed for 4 hours under a nitrogen atmosphere. After cooling, water was added to the reaction solution and extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 6 : 1), to thereby yield 1.2 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.54(9H, s), 6.59-6.78(1H, m), 6.90-7.04(1H, m), 7.13(1H, d, J = 9.0 Hz), 7.84-8.02(1H, m), 8.51(1H, dd, J = 2.8 Hz, 9.0 Hz), 8.99(1H, d, J = 2.8 Hz).

Reference Example 921

Production of 3,4-dichloro-N-[3-fluoro-4-(4-formylphenoxy)phenyl]benzamide

3,4-Dichloro-N-[4-(4-[1,3]dioxsolane-2-ylphenoxy)-3-fluorophenyl]benzamide (17.4 g, 38.9 mmol) was added to 80% acetic acid, and the resulting solution was stirred for 1.5 hours at 80°C. The

reaction solution was concentrated under reduced pressure, wherein the obtained residue was recrystalized from 80% ethanol to thereby yield 12.8 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR (DMSO-d_6) δ 7.13(2H, d, J = 8.6 Hz), 3.40(1H, t, J = 9.0 Hz), 7.63(1H, d, J = 9.0 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90-8.00(4H, m), 8.22(1H, d, J = 1.9 Hz), 9.93(1H, s), 10.67(1H, s).

Reference Example 922

Production of N-[6-(4-aminophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide dihydrochloride

t-Butyl {4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]phenyl}carbamate (4.31 g, 9.09 mmol) was dissolved in a mixed solution of chloroform-methanol-ethyl acetate. The resulting solution was concentrated to a volume of about 20 mL. To the residue solution was added a solution of 4 N hydrogen chloride in ethyl acetate (70 mL), and left to cool for 2 hours at room temperature. The precipitated white powder was filtered, and washed with ethyl acetate, to thereby yield 4.04 g of the title compound.

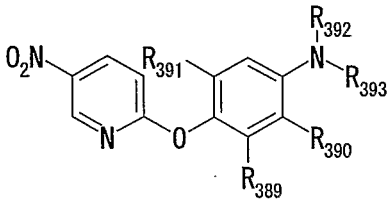
Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 5.20(2H, brs), 7.14(1H, d, J = 8.5 Hz), 7.25(2H, d, J = 8.9 Hz), 7.42(2H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.5 Hz), 7.97(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.24(1H, dd, J = 8.5 Hz, 2.6 Hz), 8.25(1H, d, J =

2.0 Hz), 8.51(1H, d, J = 2.6 Hz), 10.65(1H, s).

The following compounds were produced in the same manner as in Reference Example 922.

Table 127



Reference Example No.	R_{389}	R_{390}	R_{391}	R_{392}	R_{393}	^{1}H NMR ($CDCl_3$) δppm or MS
923	-F	-H	-F	-H	$-CH_3$	^{1}H NMR 2.83(3H, d, J = 5.2 Hz), 3.90-4.05 (1H, m), 6.18-6.27(2H, m), 7.15(1H, d, J = 9.0Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.02(1H, d, J = 2.8Hz).
924	-F	-F	-H	-H	$-CH_3$	^{1}H NMR 2.92(3H, d, J = 3.8 Hz), 3.90-4.16 (1H, m), 6.46(1H, td, J = 2.2 Hz, 8.8 Hz), 6.89(1H, td, J = 2.4 Hz, 7.8 Hz), 7.08(1H, d, J = 9.0 Hz), 8.49(1H, dd, J = 2.8 Hz, 9.0 Hz), 9.02(1H, d, J = 2.8 Hz).
925	$-COOCH_3$	-H	-H	$-CH_2COOH$	$-C_2H_5$	MS 375(M^+)

Reference Example 926

Production of 4-(tetrahydropyran-2-yloxy)benzylamine

To a solution of lithium aluminum hydride (2.66 g, 70 mmol) in THF (200 mL) was added dropwise under ice cooling a solution of 4-(tetrahydropyran-2-yloxy)benzonitrile in THF (70 mL). The resulting solution was then refluxed for 1 hour. The resulting reaction solution was again cooled with ice, and then

to the solution was added dropwise, in order, water (2.66 mL), 1 N aqueous sodium hydroxide (2.66 mL) and water (7.98 mL). Insoluble matter was removed by filtration. The filtrate was concentrated under reduced pressure, after which the residue was purified by silica gel column chromatography (chloroform : methanol = 7 : 1), to thereby yield 11.41 g of the title compound.

Appearance: Colorless oil

^{1}H NMR ($CDCl_3$) δ 1.56(2H, s), 1.45-1.78(3H, m), 1.78-2.12(3H, m), 3.53-3.66(1H, m), 3.80(2H, s), 3.84-3.99(1H, m), 5.41(1H, t, J = 3.2 Hz), 7.02(2H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.7 Hz).

Reference Example 927

Production of 4-(2-fluoro-4-nitrophenoxy)phenylamine hydrochloride

N-[4-(2-fluoro-4-nitrophenoxy)phenyl]-acetamide (1.00 g, 3.45 mmol) was added to 6 M hydrochloric acid (10 mL), and the resulting solution was refluxed for 2 hours. The resulting reaction solution was concentrated under reduced pressure, to thereby yield 0.910 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR (DMSO-d_6) δ 3.40-4.00(2H, m), 7.18(1H, t, J = 8.7 Hz), 7.24(2H, d, J = 8.9 Hz), 7.32(2H, d, J = 8.9 Hz), 8.10(1H, ddd, J = 1.4 Hz, 2.6 Hz, 8.9 Hz), 8.35(1H, dd, J = 2.6 Hz, 10.8 Hz).

Reference Example 928

Production of {4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]phenyl}carbamate phenyl ester

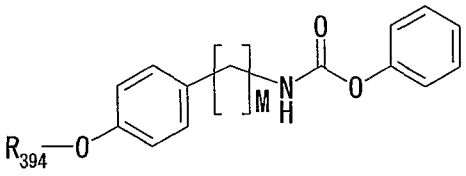
To a suspension of N-[6-(4-aminophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide dihydrochloride (700 mg, 1.57 mmol) in THF (20 mL) was added triethylamine (1.1 mL, 7.89 mmol). To the resulting solution was then added dropwise phenyl chlorocarbonate (0.39 mL, 3.14 mmol) under ice cooling. The resulting reaction solution was stirred for 1 hour at room temperature. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, whereupon the residue solidified into a powder. The powder was filtered, and washed with diethyl ether, to thereby yield 470 mg of the title compound.

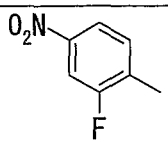
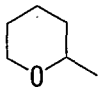
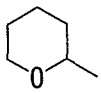
Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 7.04(1H, d, J = 8.9 Hz), 7.11(2H, d, J = 8.9 Hz), 7.19-7.31(3H, m), 7.38-7.49(2H, m), 7.53(2H, d, J = 8.0 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.2 Hz), 8.22(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.2 Hz), 10.26(1H, s), 10.54(1H, s).

The following compounds were produced in the same manner as in Reference Example 928.

Table 128



Reference Example No.	R_{394}	M	^{1}H NMR (solvent) δppm
929		0	(DMSO-d_6) 7.08(1H, t, J = 8.7 Hz), 7.15-7.30(5H, m), 7.35-7.50(2H, m), 7.60(2H, d, J = 8.9 Hz), 8.07(1H, dd, J = 1.1 Hz, 9.0 Hz), 8.31(1H, dd, J = 2.6 Hz, 10.9 Hz), 10.36(1H, s).
930		0	($CDCl_3$) 1.50-1.80(3H, m), 1.80-2.15(3H, m), 3.55-3.67(1H, m), 3.85-4.00(1H, m), 5.37(1H, t, J = 3.3 Hz), 6.83(1H, brs), 7.03(2H, d, J = 9.1 Hz), 7.14-7.30(3H, m), 7.30-7.47(4H, m).
931		1	($CDCl_3$) 1.50-1.79(3H, m), 1.79-2.15(3H, m), 3.55-3.60(1H, m), 3.82-4.00(1H, m), 3.39(2H, d, J = 6.0 Hz), 5.26(1H, brs), 5.42(1H, t, J = 3.1 Hz), 7.05(2H, d, J = 8.7 Hz), 7.27(2H, d, J = 8.7 Hz), 7.10-7.40(5H, m).

Reference Example 932

Production of 4-piperonylpiperazine-1-carboxylic acid [4-(2-fluoro-4-nitrophenoxy)phenyl]amide

To a solution of [4-(2-fluoro-4-nitrophenoxy)phenyl] carbamate phenyl ester (0.700 g, 1.90 mmol) in DMF (15 mL) was added 1-piperonylpiperazine (0.460 g, 2.09 mmol), and the resulting solution was stirred for 2 hours at room temperature. water was added to the resulting reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine. The ethyl acetate layer was dried over anhydrous sodium sulfate, and evaporated, to thereby yield 0.939 g of the title compound.

Appearance: Yellow oil

^{1}H NMR (DMSO-d_6) δ 2.30-2.40(4H, m), 3.35-3.50(6H, m), 6.00(2H, s), 6.70-6.90(2H, m), 7.00-7.15(2H, m), 7.55(2H, d, J = 9.1 Hz), 8.05-8.10(1H, m), 8.30(1H, dd, J = 2.8 Hz, 10.9 Hz), 9.31(1H, s).

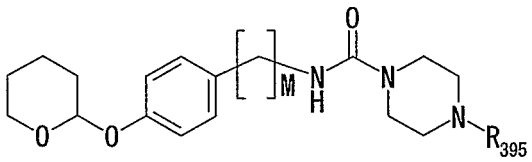
The following compounds were produced in the same manner as in Reference Example 932.

Reference Example 933

Ethyl 3-(4-{5-[3-(3,4-dichlorophenyl)-3-ethylureido]-pyridin-2-yloxy}phenyl)propionate

MS 501(M^+).

Table 129



Reference Example No.	R_{395}	M	^{1}H NMR ($CDCl_3$) δppm
934	benzyl	0	1.50-1.87(3H, m), 1.87-2.15(3H, m), 2.48(4H, t, J = 5.1 Hz), 3.48(4H, t, J = 5.1 Hz), 3.54(2H, s), 3.50-3.65(1H, m), 3.85-4.00(1H, m), 5.34(1H, t, J = 3.2 Hz), 6.21(1H, brs), 6.98(2H, d, J = 8.9 Hz), 7.22(2H, d, J = 8.9 Hz), 7.25-7.38 (5H, m).
935	piperonyl	1	1.48-1.77(3H, m), 1.77-2.11(3H, m), 2.40(4H, t, J = 5.0 Hz), 3.36(4H, t, J = 5.0 Hz), 3.41(2H, s), 3.50-3.67(1H, m), 3.81-3.96(1H, m), 4.34(2H, d, J = 5.1 Hz), 4.61(1H, t, J = 5.1 Hz), 5.40(1H, t, J = 3.2 Hz), 5.94(2H, s), 6.74(2H, s), 6.84(1H, s), 7.00(2H, d, J = 8.6 Hz), 7.22(2H, d, J = 8.6 Hz).

Reference Example 936

Production of 4-piperonylpiperazine-1-carboxylic acid 4-hydroxybenzylamide

To a solution of 4-piperonylpiperazine-1-

carboxylic acid 4-(tetrahydropyran-2-yloxy)benzylamide (1.1 g, 2.43 mmol) in methanol (50 mL) was added *p*-toluenesulfonic acid monohydrate (1.0 g, 5.26 mmol), and the resulting solution was stirred for 1 hour at room temperature. The resulting reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 330 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.41(4H, t, J = 5.0 Hz), 3.37(4H, t, J = 5.0 Hz), 3.42(2H, s), 4.32(2H, d, J = 5.2 Hz), 4.68(1H, t, J = 5.2 Hz), 5.94(2H, s), 6.15(1H, brs), 6.70-6.80(2H, m), 6.75(2H, d, J = 8.6 Hz), 6.84(1H, s), 7.13(2H, d, J = 8.6 Hz).

The following compound was produced in the same manner as in Reference Example 936.

Reference Example 937

4-Benzylpiperazine-1-carboxylic acid (4-hydroxyphenyl)methylamide hydrochloride

^{1}H NMR (DMSO-d_6) δ 2.69-2.91(2H, m), 3.03(3H, s), 2.92-3.23(4H, m), 3.68(2H, d, J = 13.7 Hz), 4.26(2H, s), 6.75(2H, d, J = 8.7 Hz), 6.98(2H, d, J = 8.7 Hz),

7.45(3H, brs), 7.54(2H, brs), 9.52(1H, s).

Reference Example 938

Production of 3,4-dichloro-N-{6-[4-(3-hydroxypropyl)-phenoxy]pyridin-3-yl}benzamide

To 2-{4-[3-(*t*-butyldimethylsilanyloxy)propyl]phenoxy}-5-nitropyridine (950 mg, 1.8 mmol) were added acetic acid (10 mL) and water (5 mL), and the resulting solution was stirred for 1 hour at room temperature. The resulting reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was recrystallized from ethyl acetate, to thereby yield 520 mg of the title compound.

Appearance: White prisms

^{1}H NMR (DMSO-d_6) δ 1.70-1.78(2H, m), 2.59-2.65(2H, m), 3.32-3.47(2H, m), 4.46-4.49(1H, m), 7.00-7.05(3H, m), 7.23(2H, d, J = 8.2 Hz), 7.84(1H, d, J = 8.2 Hz), 7.95(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.16-8.22(2H, m), 8.48(1H, d, J = 2.6 Hz), 10.54(1H, s).

The following compound was produced in the same manner as in Reference Example 938.

Reference Example 939

3,4-Dichloro-N-{6-[4-(2-hydroxyethyl)phenoxy]pyridin-3-yl}benzamide

^{1}H NMR (DMSO-d_6) δ 2.73(2H, t, J = 6.9 Hz), 3.59-3.66(2H, m), 4.65(1H, t, J = 5.3 Hz), 7.00-7.06(3H, m), 7.25(2H, d, J = 8.3 Hz), 7.84(1H, d, J = 8.3 Hz), 7.95(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.16-8.23(2H, m), 8.47(1H, d, J = 2.6 Hz), 10.54(1H, s).

Reference Example 940

Production of 3,4-dichloro-N-{6-[4-(5-hydroxypentyl)-phenoxy]pyridin-3-yl}benzamide

To a solution of ethyl 5-{4-[5-(3,4-dichloro-benzoylamino)pyridin-2-yloxy]phenyl}pentanoate (8.79 g, 18.0 mmol) in THF (140 mL) was added sodium borohydride (3.14 g, 144 mmol), and the resulting solution was refluxed for 3 hours under a nitrogen atmosphere. The resulting reaction solution was cooled with ice, and treated with 1 N hydrochloric acid. The resulting solution was extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 2), to thereby yield 7.07 g of the title compound.

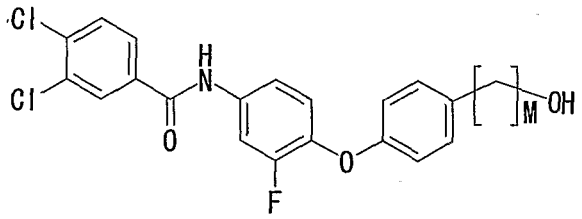
Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.25-1.75(7H, m), 2.62(2H, t, J = 7.6

Hz), 3.65(2H, t, J = 6.6 Hz), 6.92(1H, d, J = 8.5 Hz), 7.02(2H, d, J = 8.5 Hz), 7.19(2H, d, J = 8.5 Hz), 7.56(1H, d, J = 8.5 Hz), 7.69(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.93(1H, s), 7.97(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 8.5 Hz, 2.5 Hz), 8.22(1H, d, J = 2.5 Hz).

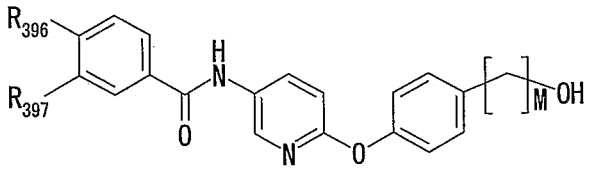
The following compounds were produced in the same manner as in Reference Example 940.

Table 130



Reference Example No.	M	mp (°C)
941	1	162-163
942	2	104-105
943	3	111-113
944	4	102-104

Table 131



Reference Example No.	R_{396}	R_{397}	M	^{1}H NMR (DMSO-d_6) δppm
945	-Cl	-Cl	1	4.49(2H, d, J = 5.6 Hz), 5.17(1H, brs), 7.03-7.08(3H, m), 7.35(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.6 Hz), 7.93-7.97(1H, m), 8.17-8.22(2H, m), 8.47(1H, d, J = 2.6 Hz), 10.53(1H, s).
946	-CF_3	-H	1	4.50(2H, d, J = 5.7 Hz), 5.18(1H, t, J = 5.7 Hz), 7.04-7.09(3H, m), 7.35 (2H, d, J = 8.4 Hz), 7.93(2H, d, J = 8.4 Hz), 8.15-8.24(3H, m), 8.50(1H, d, J = 2.7 Hz), 10.61(1H, s).
947	-Cl	-Cl	4	1.35-1.70(4H, m), 2.59(2H, t, J = 7.5 Hz), 3.42(2H, q, J = 6.0 Hz), 4.37 (1H, t, J = 5.5 Hz), 7.02(2H, d, J = 8.2 Hz), 7.04(1H, d, J = 8.6 Hz), 7.22 (2H, d, J = 8.2 Hz), 7.84(1H, d, J = 8.2 Hz), 7.94(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.6 Hz), 10.53(1H, s).

Reference Example 948

Production of 4-cyano-N-[6-(4-hydroxymethylphenoxy)-pyridin-3-yl]benzamide

A suspension of 4-[5-(4-cyanobenzoylamino)-pyridin-2-yloxy]benzoic acid (1.80 g, 5.01 mmol) in THF (20 mL) was cooled with ice-common salt, and to the solution was added triethylamine (0.77 mL, 5.51 mmol), and then ethyl chlorformate (0.53 mL, 5.51 mmol). The resulting solution was stirred at room temperature. Thirty minutes later, the reaction solution was filtered and insoluble matter was removed. The resulting filtrate was poured while stirring under ice cooling into an aqueous solution of sodium borohydride (0.95 g, 25.05 mmol) in 80% methanol (40 mL). After

stirring for 30 minutes at room temperature, water (200 mL) was added to the reaction solution. The obtained mixture was extracted with ethyl acetate (200 mL). The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated under reduced pressure. The residue was recrystallized from a mixed solution of ethyl acetate-*n*-hexane, to thereby yield 1.26 g of the title compound.

Appearance: Slightly yellow powder

^{1}H NMR (DMSO-d_6) δ 4.50(2H, d, J = 5.3 Hz), 5.19(1H, t, J = 5.6 Hz), 7.04-7.09(3H, m), 7.35(2H, d, J = 8.6 Hz), 8.04(2H, d, J = 8.9 Hz), 8.12(2H, d, J = 8.6 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.49(1H, d, J = 2.3 Hz), 11.63(1H, s).

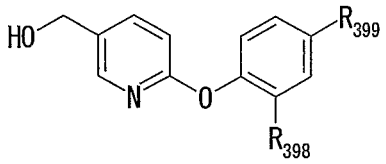
The following compounds were produced in the same manner as in Reference Example 948.

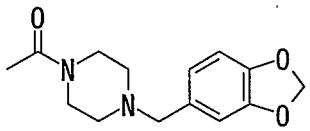
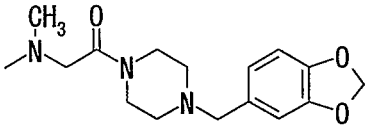
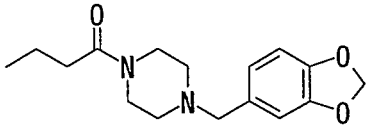
Reference Example 949

4-Chloro-N-[6-(4-hydroxymethylphenoxy)pyridin-3-yl]benzamide

^{1}H NMR (DMSO-d_6) δ 4.50(2H, d, J = 5.3 Hz), 5.18(1H, t, J = 5.6 Hz), 7.03-7.08(3H, m), 7.35(2H, d, J = 8.6 Hz), 7.63(2H, d, J = 8.6 Hz), 8.00(2H, d, J = 8.6 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.48(1H, d, J = 2.3 Hz), 10.46(1H, s).

Table 132



Reference Example No.	R_{398}	R_{399}	^{1}H NMR ($CDCl_3$) δppm
950	-H	$-NO_2$	4.71(2H, s), 7.05(1H, d, J = 8.4 Hz), 7.25(2H, d, J = 8.9 Hz), 7.83(1H, dd, J = 8.3 Hz, 2.3 Hz), 8.19(1H, d, J = 2.5 Hz), 8.27(2H, d, J = 8.9 Hz).
951	$-CH_3$	$-NO_2$	2.30(4H, brs), 4.67(2H, s), 7.02(1H, d, J = 8.41 Hz,), 7.12(1H, d, J = 8.90 Hz), 7.80(1H, dd, J = 8.41 Hz, 2.47 Hz), 8.05-8.17(3H, m).
952	-H		2.45(4H, brs), 3.45(2H, s), 3.57(2H, brs), 3.69(2H, brs), 4.67(2H, s), 5.95(2H, s), 6.74-6.77(2H, m), 6.85(1H, s), 6.94(1H, d, J = 8.4 Hz), 7.14(2H, d, J = 8.4 Hz), 7.44 (2H, d, J = 8 .4 Hz), 7.76(1H, dd, J = 2.5 Hz, 8.4 Hz), 8.16(1H, d, J = 2.5 Hz).
953	-H		1.96(1H, brs), 2.40-2.44(4H, m), 3.02(3H, s), 3.43(2H, brs), 3.47-3.49(2H, m), 3.62(2H, brs), 4.07(2H, s), 4.62 (2H, s), 5.94(2H, s), 6.68-6.77(4H, m), 6.81(1H, d, J = 8.6 Hz), 6.85(1H, brs), 6.99(2H, d, J = 9.2 Hz), 7.66(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.13(1H, d, J = 2.5 Hz).
954	-H		1.75-2.01(1H, m), 2.22-2.50(4H, m), 2.51-2.70 (2H, m), 2.88-3.07(2H, m), 3.30-3.51(4H, m), 3.52-3.78(2H, m), 4.67(2H, s), 5.96(2H, s), 6.69-6.81(2H, m), 6.83-6.88(1H, m), 6.91(1H, d, J = 8.4 Hz), 7.01-7.11(2H, m), 7.19-7.29(2H, m), 7.74(1H, dd, J = 2.5 Hz, 8.4 Hz), 8.16(1H, dd, J = 0.5 Hz, 2.5 Hz).

Reference Example 955

Production of 2-[4-(1-bromoethyl)phenoxy]-5-nitropyridine

2-(4-ethylphenoxy)-5-nitropyridine (7.33 g, 30 mmol) was dissolved in carbon tetrachloride (100

mL), and to the resulting solution were added N-bromosuccimide (5.34 g, 30 mmol) and benzoyl peroxide (0.73 g, 3 mmol). This solution was refluxed overnight under a nitrogen atmosphere. The reaction solution was allowed to cool, after which insoluble matter was removed by filtration. The resulting filtrate was washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 10 : 1), to thereby yield 1.34 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.08(3H, d, J = 6.9 Hz), 5.26(1H, q, J = 6.9 Hz), 7.05(1H, d, J = 9.1 Hz), 7.15(2H, d, J = 8.6 Hz), 7.53(2H, d, J = 8.7 Hz), 8.49(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.04(1H, d, J = 2.8 Hz).

Reference Example 956

Production of N-[6-(4-chloromethylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

To a solution of N-[6-(4-hydroxymethylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide (3.06 g, 7.9 mmol) in dichloromethane (90 mL) was added thionyl chloride (1.7 mL, 23.3 mmol), and the resulting solution was stirred for 4 hours at room temperature. To the residue was added a saturated sodium bicarbonate solution, and

extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was washed with diethyl ether, to thereby yield 2.95 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 4.61(2H, s), 7.00(1H, d, J = 8.9 Hz), 7.11-7.14(2H, m), 7.41-7.44(2H, m), 7.77(2H, d, J = 8.4 Hz), 7.89(1H, brs), 8.00(2H, d, J = 8.4 Hz), 8.22-8.28(2H, m).

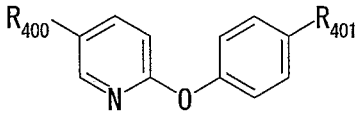
The following compounds were produced in the same manner as in Reference Example 956.

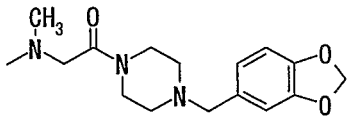
Reference Example 957

3,4-Dichloro-N-[4-(4-chloromethylphenoxy)-3-fluorophenyl]benzamide

^{1}H NMR ($CDCl_3$) δ 4.58(2H, s), 6.95(2H, d, J = 8.6 Hz), 7.10(1H, t, J = 8.6 Hz), 7.20-7.30(1H, m), 7.30-7.40(3H, m), 7.59(1H, d, J = 8.3 Hz), 7.65-7.78(2H, m), 7.96(1H, d, J = 2.1 Hz).

Table 133



Reference Example No.	R_{400}	R_{401}	^{1}H NMR ($CDCl_3$) δppm
958	-NO_2	-CH_2Cl	4.63(2H, s), 7.06(1H, d, J = 8.9 Hz), 7.16(2H, dd, J = 6.6 Hz, 2.0 Hz), 7.47 (2H, d, J = 8.3 Hz), 8.47-8.51(1H, m), 9.04(1H, d, J = 2.6 Hz)
959	3,4-Cl_2PhCONH-	-CH_2Cl	4.59(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.10(2H, d, J = 8.6 Hz), 7.40 (2H, d, J = 8.6 Hz), 7.54(1H, d, J = 8.2 Hz), 7.71-7.75(1H, m), 7.99 (1H, d, J = 2.3 Hz), 8.18-8.22 (2H, m), 8.30(1H, d, J = 2.6 Hz).
960	4-CNPhCONH-	-CH_2Cl	4.60(2H, s), 6.99(1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.6 Hz), 7.42 (2H, d, J = 8.6 Hz), 7.79(2H, d, J = 8.3 Hz), 7.97-8.00(3H, m), 8.21 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.27 (1H, d, J = 2.6 Hz).
961	4-ClPhCONH-	-CH_2Cl	4.61(2H, s), 6.99(1H, d, J = 9.6 Hz), 7.12(2H, d, J = 8.3 Hz), 7.42 (2H, d, J = 8.3 Hz), 7.48(2H, d, J = 8.3 Hz), 7.75(1H, brs), 7.85 (2H, d, J = 8.3 Hz), 8.20-8.25 (2H, m).
962	-CH_2Cl		2.41-2.45(4H, m), 3.03(3H, s), 3.43 (2H, brs), 3.49(2H, brs), 3.63(2H, brs), 4.08(2H, s), 4.54 (2H, s), 5.94 (2H, s), 6.70(2H, d, J = 9.2 Hz), 6.73-6.77(2H, m), 6.82(1H, d, J = 8.6 Hz), 6.85(1H, brs), 7.00(2H, d, J = 9.2 Hz), 7.67(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.15(1H, d, J = 2.5Hz).

(CNPh means a cyanophenyl group. Hereinafter CNPh indicates the same meaning.)

Reference Example 963

Production of 3,4-dichloro-N-{6-[4-(5-chloropentyl)-phenoxy]pyridin-3-yl}benzamide hydrochloride

To 3,4-dichloro-N-{6-[4-(5-hydroxypentyl)-

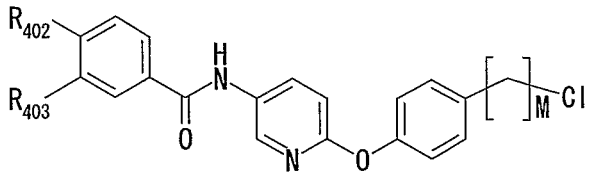
phenoxy]pyridin-3-yl}benzamide (6.83 g, 15.34 mmol) was added thionyl chloride (35 mL). The resulting solution was stirred for 20 minutes at room temperature, followed by stirring for 1 hour at 50°C. Excess thionyl chloride was evaporated, after which to the resulting residue was added ethyl acetate (100 mL). The obtained white powder was filtered, and washed with ethyl acetate, to thereby yield 6.98 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 1.33-1.50(2H, m), 1.50-1.68(2H, m), 1.68-1.85(2H, m), 2.59(2H, t, J = 7.6 Hz), 3.64(2H, t, J = 6.6 Hz), 7.02(2H, d, J = 8.5 Hz), 7.03(1H, d, J = 9.0 Hz), 7.23(2H, d, J = 8.5 Hz), 7.83(1H, d, J = 8.5 Hz), 7.97(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.20(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25(1H, d, J = 2.0 Hz), 8.50(1H, d, J = 2.5 Hz), 10.63(1H, s).

The following compounds were produced in the same manner as in Reference Example 963.

Table 134



Reference Example No.	R_{402}	R_{403}	M	Form	^{1}H NMR (solvent) δppm
964	-Cl	-Cl	2	free	($CDCl_3$) 3.04-3.10(2H, m), 3.69-3.75(2H, m), 6.95(1H, d, J = 8.6 Hz), 7.06-7.09(2H, m), 7.24(2H, d, J = 8.2 Hz), 7.56(1H, d, J = 8.2 Hz), 7.69(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.93(1H, brs), 7.97(1H, d, J = 2.0 Hz), 8.15-8.19(1H, m), 8.24(1H, d, J = 2.6 Hz).
965	-Cl	-Cl	3	free	($CDCl_3$) 2.04-2.12(2H, m), 2.76-2.81(2H, m), 3.53-3.58(2H, m), 6.94(1H, d, J = 8.9 Hz), 7.04-7.07(2H, m), 7.20-7.26(2H, m), 7.56(1H, d, J = 8.1 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.2 Hz), 7.90 (1H, brs), 7.97(1H, d, J = 2.2 Hz), 8.14-8.18(1H, m), 8.24(1H, d, J = 2.7 Hz).
966	$-CF_3$	-H	3	free	($CDCl_3$) 2.04-2.14(2H, m), 2.75-2.81(2H, m), 3.53-3.57(2H, m), 6.93(1H, d, J = 8.7 Hz), 7.03-7.07(2H, m), 7.20-7.23(2H, m), 7.73(2H, d, J = 8.2 Hz), 7.97(2H, d, J = 8.2 Hz), 8.09(1H, brs), 8.16-8.21(1H, m), 8.25(1H, d, J = 2.6 Hz).
967	-Cl	-Cl	4	hydrochloride	(DMSO-d_6) 1.60-1.85(4H, m), 2.62(2H, t, J = 6.3 Hz), 3.68(2H, t, J = 6.3 Hz), 7.03(2H, d, J = 8.5 Hz), 7.04(1H, d, J = 9.0 Hz), 7.24(2H, d, J = 8.5 Hz), 7.83(1H, d, J = 8.6 Hz), 7.97(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.20(1H, dd, J = 9.0 Hz, 2.7 Hz), 8.25(1H, d, J = 2.2 Hz), 8.50(1H, d, J = 2.7 Hz), 10.64(1H, s).

Reference Example 968

Production of N-{6-[4-(2-bromoacetyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide

N-[6-(4-acetylphenoxy)pyridin-3-yl}-3,4-dichlorobenzamide (4.0 g, 10 mmol) was dissolved in chloroform (200 mL). To the resulting solution was added copper bromide (5.76 g, 25 mmol), and refluxed

overnight. The resulting reaction solution was filtered, and the filtrate was washed with saturated sodium thiosulfate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. To the filtered product from the earlier step was added ethyl acetate, and washed with saturated sodium thiosulfate water and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residues were combined for purification by silica gel column chromatography (*n*-hexane : ethyl acetate = 3 : 1), to thereby yield 1.86 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 4.43(2H, s), 7.06(1H, d, J = 8.7 Hz), 7.21(2H, d, J = 8.9 Hz), 7.57(1H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.03(2H, d, J = 8.9 Hz), 8.09(1H, brs), 8.27(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.32(1H, d, J = 2.2 Hz).

The following compound was produced in the same manner as in Reference Example 968.

Reference Example 969

N-{4-[4-(2-Bromoacetyl)phenoxy]-3-fluorophenyl}-3,4-dichlorobenzamide

^{1}H NMR (DMSO-D_6) δ 4.88(2H, s), 7.06(2H, d, J = 8.9 Hz), 7.30-7.50(1H, m), 7.60-7.70(1H, m), 7.80-8.20(5H, m), 8.22(1H, d, J = 2.0 Hz), 10.67(1H, brs).

Reference Example 970

Production of 4'-[4-(3-bromopropyl)phenoxy]-3,4-dichloro-3'-fluorobenzanilide

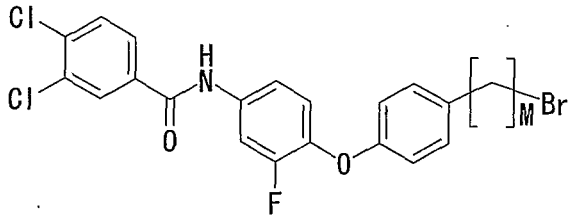
To a suspension of 3,4-dichloro-3'-fluoro-4'-[4-(3-hydroxypropyl)phenoxy]benzanilide (2.32 g, 5.34 mmol) in dichloromethane (46 mL) were added carbon tetrabromide (2.13 g, 6.41 mmol) and triphenylphosphine (1.54 g, 5.88 mmol), and the resulting solution was stirred for 12 hours at room temperature. The reaction solution was concentrated under reduced pressure, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 5 : 1), to thereby yield 2.41 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.08-2.11(2H, m), 2.73(2H, t, J = 7.3 Hz), 3.38(2H, t, J = 6.5 Hz), 6.88(2H, d, J = 8.5 Hz), 7.02(1H, dd, J = 9.0 Hz, 8.0 Hz), 7.13(2H, d, J = 8.5 Hz), 7.17-7.28(1H, m), 7.54(1H, d, J = 8.3 Hz), 7.60-7.74(2H, m), 7.85(1H, brs), 7.93(1H, d, J = 2.0 Hz).

The following compounds were produced in the same manner as in Reference Example 970.

Table 135



Reference Example No.	M	^{1}H NMR ($CDCl_3$) δppm
971	2	3.13(2H, t, J = 7.5 Hz), 3.55(2H, t, J = 7.5 Hz), 6.91(2H, d, J = 6.6 Hz), 7.08(1H, t, J = 8.7 Hz), 7.15(2H, d, J = 6.6 Hz), 7.18-7.25(1H, m), 7.56(1H, d, J = 8.3 Hz), 7.65-7.75(2H, m), 7.90-8.00(2H, m).
972	4	1.67-1.79(2H, m), 1.81-1.94(2H, m), 2.60(2H, t, J = 7.5 Hz), 3.40(2H, t, J = 6.6 Hz), 6.88(2H, d, J = 8.6 Hz), 7.02(1H, dd, J = 9.0 Hz, 8.0 Hz), 7.11(2H, d, J = 8.6 Hz), 7.14-7.21(1H, m), 7.55(1H, d, J = 8.3 Hz), 7.60-7.73(2H, m), 7.78(1H, brs), 7.93(1H, d, J = 1.9 Hz).

Reference Example 973

Production of *t*-butyl 4-[4-(5-nitropyridin-2-yloxy)benzyl]piperazine-1-carboxylate

To a solution of 2-(4-chloromethylphenoxy)-5-nitropyridine (12.32 g, 47 mmol) in DMF (120 mL) were added triethylamine (19.4 mL, 140 mmol) and *t*-butyl piperazine-1-carboxylate (11.27 g, 61 mmol), and the resulting solution was stirred for 3 hours at 50°C. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with water and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 1), to thereby yield 11.26 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 1.46(9H, s), 2.40-2.44(4H, m), 3.43-

3.46(4H, m), 3.54(2H, s), 7.04(1H, d, J = 8.9 Hz), 7.09-7.14(2H, m), 7.38-7.44(2H, m), 8.48(1H, dd, J = 8.9 Hz, 2.8 Hz), 9.05(1H, d, J = 2.8 Hz).

The following compound was produced in the same manner as in Reference Example 973.

Reference Example 974

4-{1-[4-(5-Nitropyridin-2-yloxy)phenyl]ethyl}morpholine

^{1}H NMR ($CDCl_3$) δ 1.38(3H, d, J = 6.8 Hz), 2.36-2.54(4H, m), 3.37(1H, q, J = 6.8 Hz), 3.69-3.72(4H, m), 7.02(1H, dd, J = 9.1 Hz, 0.5 Hz), 7.11(2H, d, J = 8.6 Hz), 7.40(2H, d, J = 8.5 Hz), 8.47(1H, dd, J = 9.1 Hz, 2.8 Hz), 9.06(1H, dd, J = 2.8 Hz, 0.5 Hz).

Reference Example 975

Production of methanesulfonic acid 6-(4-nitrophenoxy)-pyridin-3-ylmethyl ester

[6-(4-nitrophenoxy)pyridin-3-yl]methanol (6.1 g, 24.8 mmol) was dissolved in dichloromethane (150 mL), and to the resulting solution was added triethylamine (4.15 mL, 29.8 mmol) under ice cooling. To the resulting solution was added dropwise methanesulfonic acid chloride (2.11 mL, 27.3 mmol), and then stirred under a nitrogen atmosphere for 30 minutes at 0°C. The reaction solution was washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium

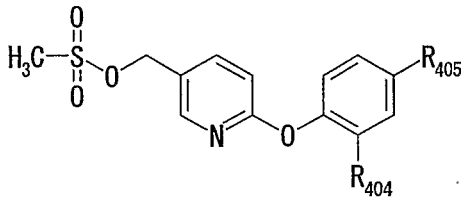
sulfate, and evaporated. To the residue was added a mixed solvent (50 mL) of *n*-hexane : ethyl acetate = 1 : 1. The precipitated crystals were removed by suction filtration, to thereby yield 7.9 g of the title compound.

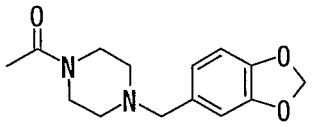
Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 3.04(3H, s), 5.23(2H, s), 7.09(1H, d, J = 8.4 Hz), 7.29(2H, d, J = 9.1 Hz), 7.88(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.23(1H, d, J = 2.3 Hz), 8.28(2H, d, J = 9.1 Hz).

The following compounds were produced in the same manner as in Reference Example 975.

Table 136



Reference Example No.	R_{404}	R_{405}	^{1}H NMR ($CDCl_3$) δppm
976	-CH_3	-NO_2	2.29(3H, s), 3.03(3H, s), 5.22(2H, s), 7.08(1H, dd, J = 8.4 Hz, 0.5 Hz), 7.18(1H, d, J = 8.9 Hz), 7.86(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.11(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.17(1H, dd, J = 2.5 Hz, 0.5 Hz), 8.19(1H, d, J = 2.8 Hz).
977	-H		2.65(4H, brs), 3.01(3H, s), 3.65-3.75(6H, m), 5.22(2H, s), 5.97(2H, s), 6.79(2H, s), 6.92(1H, s), 7.00(1H, d, J = 8.4 Hz), 7.18(2H, d, J = 8.6 Hz), 7.47(2H, d, J = 8.7 Hz), 7.81(1H, dd, J = 2.5 Hz, 8.4 Hz), 8.20(1H, d, J = 2.0 Hz).

Reference Example 978

Production of 2-(4-nitrophenoxy)-5-(4-trifluoromethyl-phenoxymethyl)pyridine

Methanesulfonic acid 6-(4-nitrophenoxy)-pyridin-3-ylmethyl ester (4.86 g, 15 mmol) was dissolved in DMF (250 mL), and to the resulting solution were added 4-hydroxybenzotrifluoride (2.92 g, 18 mmol) and potassium carbonate (3.11 g, 22.5 mmol). The resulting solution was stirred under a nitrogen atmosphere for 1 hour at 50°C. The reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate, and washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 80 : 1), to thereby yield 5.8 g of the title compound.

Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 5.09(2H, s), 7.02-7.10(3H, m), 7.26-7.31(2H, m), 7.56-7.59(2H, m), 7.88(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.25-8.31(3H, m).

The following compound was produced in the same manner as in Reference Example 978.

Reference Example 979

2-(2-Methyl-4-nitrophenoxy)-5-(4-trifluoromethyl-

phenoxymethyl)pyridine

^{1}H NMR ($CDCl_3$) δ 2.31(3H, s), 5.07(2H, s), 7.03(2H, d, J = 8.6 Hz), 7.08(1H, d, J = 8.4 Hz), 7.17(1H, d, J = 8.9 Hz), 7.57(2H, d, J = 8.4 Hz), 7.87(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.18(1H, d, J = 2.6 Hz), 8.21(1H, d, J = 2.5 Hz).

Example 1

Production of N-{6-[4-(4-benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide

To a solution of 4-[5-(4-trifluoromethyl-benzoylamino)pyridin-2-yloxy]benzoic acid (1.19 g, 2.3 mmol) in DMF (30 mL) were added 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (530 mg, 2.8 mmol), 1-hydroxybenzotriazole monohydrate (370 mg, 2.7 mmol) and benzylpiperazine (0.475 mL, 2.7 mmol) under ice cooling. The resulting solution was stirred for 1 day gradually warming up to room temperature. To the residue was added a saturated sodium bicarbonate solution and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (methanol : chloroform = 1 : 19), to thereby yield 800 mg of the title compound.

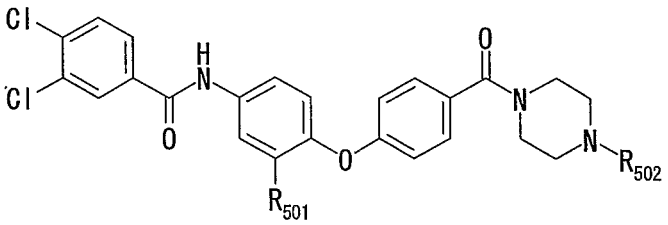
Appearance: White needles

^{1}H NMR ($CDCl_3$) δ 2.46(4H, brs), 3.55(2H, s), 3.72(4H,

brs), 6.96(1H, d, J = 8.9 Hz), 7.10-7.13(2H, m), 7.28-7.40(7H, m), 7.74(2H, d, J = 8.3 Hz), 8.02(2H, d, J = 8.3 Hz), 8.16-8.21(1H, m), 8.32(1H, d, J = 2.6 Hz), 8.53(1H, brs).

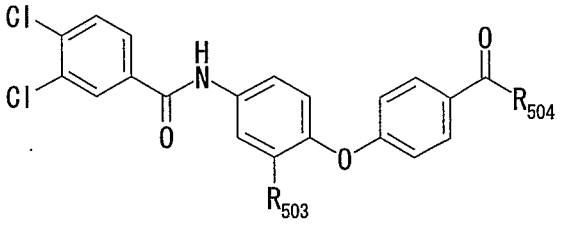
The following compounds were produced in the same manner as in Example 1.

Table 137



Example No.	R_{501}	R_{502}	Form	mp (°C)
2	-H	$-CH_3$	hydrochloride	175-176
3	-H	benzyl	hydrochloride	187-189
4	-H	piperonyl	free	182-183
5	-H	$-COOC(CH_3)_3$	free	217-220
6	-H	-Ac	free	152-154
7	-H	$-(CH_2)_2OH$	hydrochloride	153-155
8	-F	benzyl	free	172-173
9	-F	piperonyl	free	170-171

Table 138



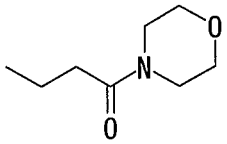
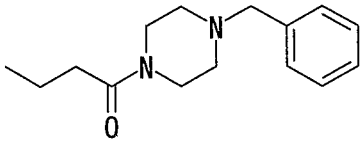
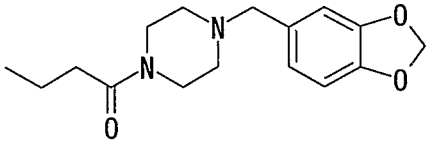
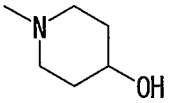
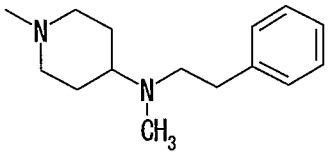
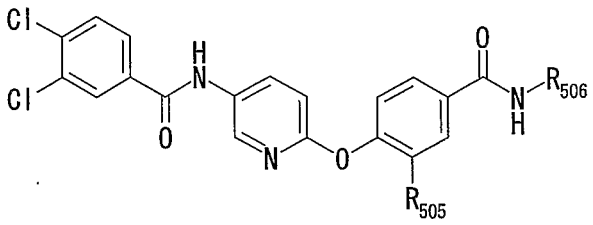
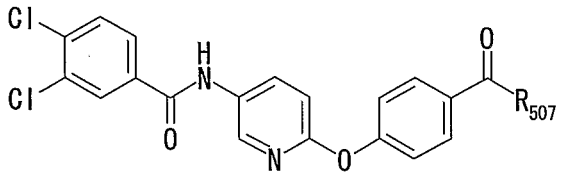
Example No.	R_{503}	R_{504}	Form	mp (°C)
10	-H	morpholino	free	189-192
11	-F	morpholino	free	203-204
12	-F		free	210-211
13	-F		hydrochloride	233-235
14	-F		hydrochloride	247-249
15	-H		free	174-175
16	-H		hydrochloride	213-216

Table 139



Example No.	R_{505}	R_{506}	^{1}H NMR (DMSO-d_6) δppm
17	-CH_3	-NHAc	1.92(3H, s), 2.17(3H, s), 7.13(1H, d, J = 8.2 Hz), 7.14(1H, d, J = 8.9 Hz), 7.74(1H, dd, J = 8.2 Hz, 2.2 Hz), 7.84(1H, d, J = 8.2 Hz), 7.84(1H, d, J = 2.2 Hz), 7.95(1H, dd, J = 8.2 Hz, 2.2 Hz), 8.22(1H, d, J = 2.2 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.46 (1H, d, J = 2.6 Hz), 9.89(1H, s), 10.24(1H, s), 10.57(1H, s).
18	-H	cyclopropyl	0.51-0.60(2H, m), 0.66-0.74(2H, m), 2.80-2.89(1H, m), 7.10-7.20(3H, m), 7.81-7.89(3H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.19-8.28(2H, m), 8.42(1H, brd), 8.52(1H, d, J = 2.7 Hz), 10.59(1H, s).
19	-H	cyclohexyl	1.06-1.19(1H, m), 1.21-1.36(4H, m), 1.55-1.65(1H, m), 1.69-1.78(2H, m), 1.78-1.87(2H, m), 3.69-3.80(1H, m), 7.10-7.20(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.86-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.17(1H, brd), 8.20-8.29(2H, m), 8.52(1H, d, J = 2.7 Hz), 10.58(1H, s).
20	-H	cyclopentyl	1.46-1.60(4H, m), 1.63-1.76(2H, m), 1.82-1.94(2H, m), 4.17-4.28(1H, m), 7.10-7.20(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.87-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.19-8.28(3H, m), 8.52(1H, d, J = 2.6 Hz), 10.58(1H, s).
21	-H	cycloheptyl	1.36-1.71(10H, m), 1.80-1.90(2H, m), 3.88-4.00(1H, m), 7.10-7.20(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.86-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.17-8.28(3H, m), 8.51(1H, d, J = 2.6 Hz), 10.58(1H, s).
22	-H	cyclododecanyl	1.20-1.57(20H, m), 1.61-1.73(2H, m), 4.08-4.21(1H, m), 7.10-7.21(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.88-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.09(1H, brd), 8.20-8.29(2H, m), 8.51(1H, d, J = 2.7 Hz), 10.58(1H, s).
23	-H	cyclooctyl	1.44-1.65(8H, m), 1.65-1.80(6H, m), 3.98-4.09(1H, m), 7.10-7.20(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.88-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.17-8.27(3H, m), 8.51(1H, d, J = 2.7 Hz), 10.58(1H, s).
24	-H	cyclopropyl-methyl	0.19-0.26(2H, m), 0.38-0.47(2H, m), 0.99-1.09(1H, m), 3.12-3.19(2H, m), 7.12-7.21(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.89-7.94(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21-8.29 (2H, m), 8.53(1H, d, J = 2.8 Hz), 8.54(1H, brt), 10.60(1H, s).
25	-H	-$(CH_2)_2$NHAc	1.81(3H, s), 3.15-3.24(2H, m), 3.24-3.33(2H, m), 7.10-7.20(3H, m), 7.80-8.00(5H, m), 8.20-8.26(2H, m), 8.48(1H, brt), 8.52(1H, d, J = 2.6 Hz), 10.59(1H, s).

Table 140



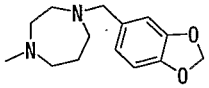
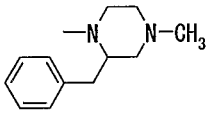
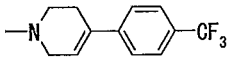
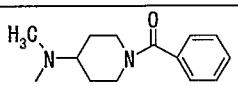
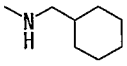
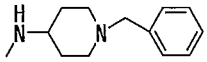
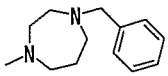
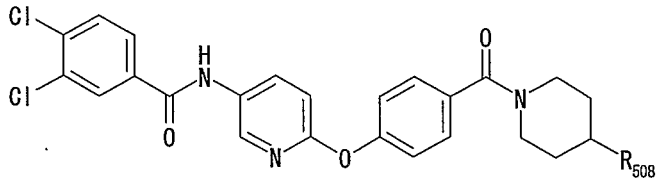
Example No.	R_{507}	Form	^{1}H NMR (solvent) δppm or MS
26	morpholino	hydro-chloride	^{1}H NMR (DMSO-d_6) 3.50-3.65(8H, m), 7.13-7.19(3H, m), 7.47(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.2 Hz), 7.97(1H, dd, J = 8.3 Hz, 2.0Hz), 8.23-8.27(2H, m), 8.54(1H, d, J = 2.6Hz), 10.63(1H, s).
27		free	^{1}H NMR ($CDCl_3$) 1.81-1.95(2H, m), 2.59-2.77(4H, m), 3.51-3.57(4H, m), 3.75(2H, brs), 5.94(2H, s), 6.71-6.75(2H, m), 6.83-6.93(2H, m), 7.05-7.10(2H, m), 7.32-7.37(2H, m), 7.54(1H, d, J = 8.2 Hz), 7.79(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.06-8.10(2H, m), 8.30(1H, s), 8.96(1H, s).
28		free	MS 574(M^+)
29		free	MS 611(M^+)
30	-NH$(CH_2)_2OCH_3$	free	^{1}H NMR (DMSO-d_6) 3.32(3H, s), 3.39-3.48(4H, m), 7.15-7.20(3H, m), 7.85(1H, d, J = 8.3 Hz), 7.86-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.20-8.26(2H, m), 8.50(1H, brt), 8.52(1H, d, J = 2.5 Hz), 10.59(1H, s).
31		free	MS 601(M^+-1)
32		free	^{1}H NMR (DMSO-d_6) 0.86-0.99(2H, m), 1.10-1.27(3H, m), 1.50-1.65(2H, m), 1.65-1.78(4H, m), 3.06-3.15(2H, m), 7.11-7.22(3H, m), 7.85(1H, d, J = 8.4 Hz), 7.88-7.92(2H, m), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.20-8.28(2H, m), 8.40(1H, brt), 8.52(1H, d, J = 2.7 Hz), 10.58(1H, s).
33	-NH$(CH_2)_2$OPh	free	^{1}H NMR (DMSO-d_6) 3.63(2H, t, J = 5.8 Hz), 4.12(2H, t, J = 5.9 Hz), 6.90-7.01(3H, m), 7.13-7.24(3H, m), 7.26-7.35(2H, m), 7.85(1H, d, J = 8.4 Hz), 7.90-8.00(3H, m), 8.20-8.30(2H, m), 8.52(1H, d, J = 2.6 Hz), 8.69(1H, brt), 10.59(1H, s).
34		free	MS 574(M^+)
35		free	^{1}H NMR ($CDCl_3$) 1.80-1.96(2H, m), 2.61-2.79(4H, m), 3.45-3.57(2H, m), 3.62-3.67(2H, m), 3.75-3.77(2H, m), 6.94(1H, d, J = 8.6 Hz), 7.08-7.13(2H, m), 7.24-7.41(7H, m), 7.56(1H, d, J = 8.6 Hz), 7.76(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.04(1H, d, J = 2.0 Hz), 8.07-8.14(1H, m), 8.29(1H, d, J = 2.0 Hz), 8.39(1H, s).

Table 141



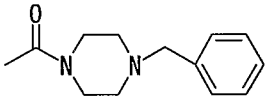
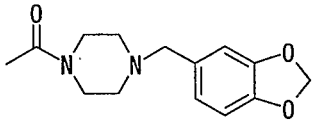
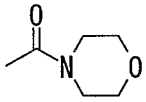
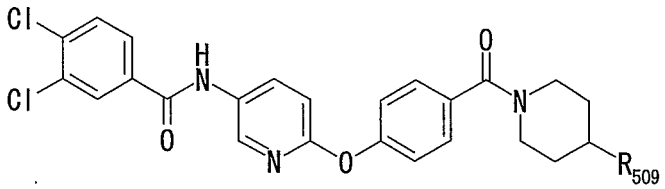
Example No.	R_{508}	Property
36		mp 221-224°C
37		mp 228-230°C
38		mp 193-194°C
39	$-N(CH_3)COOC(CH_3)_3$	^{1}H NMR ($CDCl_3$) δ 1.47(9H, s), 1.45-1.81(4H, m), 2.73 (3H, s), 2.90(2H, brs), 4.10(2H, brs), 4.75(1H, brs), 6.95 (1H, d, J = 8.7 Hz), 7.11(2H, d, J = 8.7 Hz), 7.39(2H, d, J = 8.7 Hz), 7.55(1H, d, J = 8.2 Hz), 7.77(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.05(1H, d, J = 2.0 Hz), 8.14(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.30(1H, d, J = 2.6 Hz), 8.77(1H, s).
40	-OPh	MS 560(M^+-1)
41	4-CF_3PhO-	MS 629(M^+)
42	4-CF_3OPhO-	MS 644(M^+-1)
43	4-CNPhO-	MS 586(M^+)
44	$-C_2H_5$	MS 496(M^+-1)
45	$-COOC_2H_5$	^{1}H NMR ($CDCl_3$) δ 1.27(3H, t, J = 7.0 Hz), 1.73(2H, brs), 1.95(2H, brs), 2.58(1H, m), 3.08(2H, brs), 3.86(1H, brs), 4.16(2H, q, J = 7.0 Hz), 4.50(1H, brs), 6.97(1H, d, J = 9.0 Hz), 7.12(2H, d, J = 8.5 Hz), 7.40(2H, d, J = 8.5 Hz), 7.57(1H, d, J = 8.5 Hz), 7.75(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.03(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 9.0 Hz, 3.0 Hz), 8.30(1H, d, J = 3.0 Hz), 8.34(1H, brs).
46	$-(CH_2)_2N(CH_3)Ph$	MS 602(M^+)
47	2-$FPhCH_2O$-	MS 592(M^+-1)
48	$PhCH_2O$-	MS 574(M^+-1)
49	cyclohexyl	MS 550(M^+-1)
50	4-ClPh-	MS 580(M^++1)
51	-Ph	MS 544(M^+-1)
52	$-CHPh_2$	MS 635(M^+)
53	2-NH_2PhCO-	MS 587(M^+-1)
54	4-CH_3OPhCONH-	MS 617(M^+-1)
55	-NHCOPh	MS 587(M^+-1)
56	4-CF_3PhCH_2O-	mp 186-187°C
57	4-$ClPhCH_2O$-	mp 176-177°C

Table 142



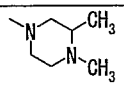
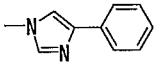
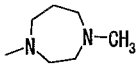
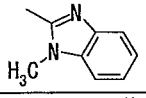
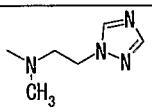
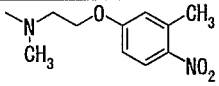
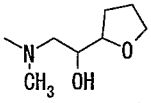
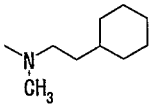
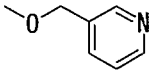
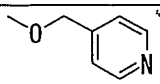
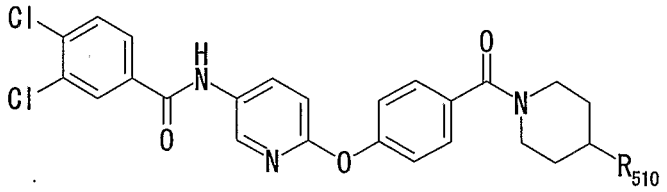
Example No.	R_{509}	MS
58		580(M^{+}-1)
59		610(M^{+}-1)
60		580(M^{+}-1)
61		598(M^{+}-1)
62		592(M^{+}-1)
63	$Ph(CH_2)_2N(CH_3)$-	600(M^{+}-2)
64	$Ph_2CH(CH_2)_2N(CH_3)$-	691(M^{+}-1)
65	4-$CH_3SPh(CH_2)_2N(CH_3)$-	648(M^{+})
66		678(M^{+}+H)
67		613(M^{+}+H)
68	4-$CH_3OPh(CH_2)_4N(CH_3)$-	660(M^{+})
69	4-$CH_3Ph(CH_2)_2N(CH_3)$-	617(M^{+}+H)
70	$PhO(CH_2)_2N(CH_3)$-	618(M^{+})
71	$PhN(CH_3)(CH_2)_2N(CH_3)$-	631(M^{+})
72		608(M^{+})
73	-$O(CH_2)_2Ph$	588(M^{+}-1)
74		575(M^{+}-1)
75		576(M^{+})
76	4-$ClPhCH_2$-	594(M^{+}+1)
77	4-CF_3PhNH-	644(M^{+})

Table 143



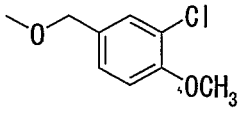
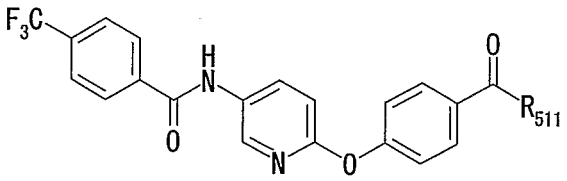
Example No.	R_{510}	MS
78	4-CH3PhO$(CH_2)_2N(CH_3)$-	633(M^++H)
79	Ph$(CH_2)_3N(CH_3)$-	616(M^+)
80	2-phenylmorpholino	630(M^+)
81	4-CH_3PhCH_2-	572(M^+-1)
82	morpholino	554(M^+)
83	4-CH_3OPhCH_2O-	606(M^++H)
84	3-$ClPhCH_2O$-	608(M^+-1)
85	2-$ClPhCH_2O$-	608(M^+-1)
86	3,4-Cl_2PhCH_2O-	644(M^++1)
87	3-CH_3OPhCH_2O-	604(M^+-1)
88	3,5-$(CH_3O)_2PhCH_2O$-	634(M^+-1)
89	4-CH_3PhCH_2O-	588(M^+-1)
90	3-CH_3PhCH_2O-	588(M^+-1)
91	2-CH_3PhCH_2O-	588(M^+-1)
92	3,4-$(CH_3)_2PhCH_2O$-	602(M^+-1)
93	4-$FPhCH_2O$-	592(M^+-1)
94	3-$FPhCH_2O$-	592(M^+-1)
95	3,5-F_2PhCH_2O-	610(M^+-1)
96	2-CF_3PhCH_2O-	642(M^+-1)
97	4-CF_3OPhCH_2O-	658(M^+-1)
98	3-CF_3OPhCH_2O-	658(M^+-1)
99	2-CF_3OPhCH_2O-	658(M^+-1)
100		638(M^+-1)

Table 144



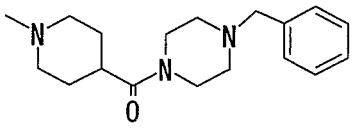
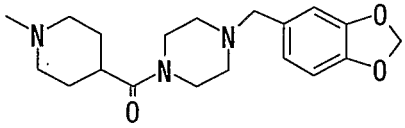
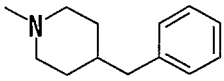
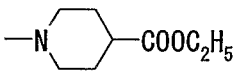
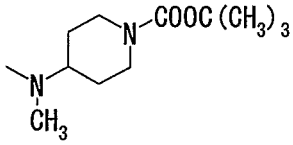
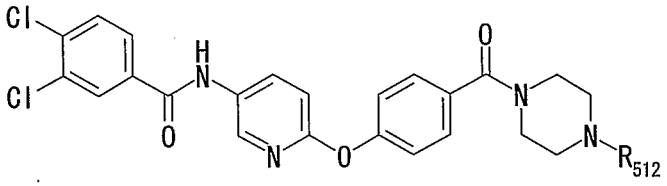
Example No.	R_{511}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
101		mp 218-220
102		mp 227-231
103		^{1}H NMR 1.09-1.30(1H, m), 1.60-1.87(4H, m), 2.55-2.95 (4H, m), 3.80(1H, brs), 4.59(1H, brs), 6.92(1H, d, J = 8.7 Hz), 7.05-7.35(9H, m), 7.71(2H, d, J = 8.6 Hz), 8.04(2H, d, J = 8.1 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.34(1H, d, J = 2.6 Hz), 8.99(1H, s).
104		^{1}H NMR 1.27(3H, t, J = 7.0 Hz), 1.74(2H, brs), 1.95(2H, brs), 2.58(1H, m), 3.08(2H, brs), 3.92(1H, brs), 4.17(2H, q, J = 7.0 Hz), 4.51(1H, brs), 7.01(1H, d, J = 9.0 Hz), 7.16 (2H, d, J = 8.5 Hz), 7.44(2H, d, J = 8.5 Hz), 7.78(2H, d, J = 8.0 Hz), 7.88(1H, brs), 8.01(2H, d, J = 8.0 Hz), 8.24(1H, dd, J = 9.0 Hz, 3.0 Hz), 8.32(1H, d, J = 3.0 Hz)
105		^{1}H NMR 1.46(9H, s), 1.50-1.90(4H, m), 2.35-3.00(2H, m), 2.89(3H, s), 4.10-4.70(3H, m), 6.99(1H, d, J = 8.7 Hz), 7.14 (2H, d, J = 8.3 Hz), 7.40(2H, d, J = 8.3 Hz), 7.76(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.22(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.33(1H, d, J = 2.6 Hz), 8.34(1H, brs).

Table 145



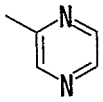
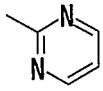
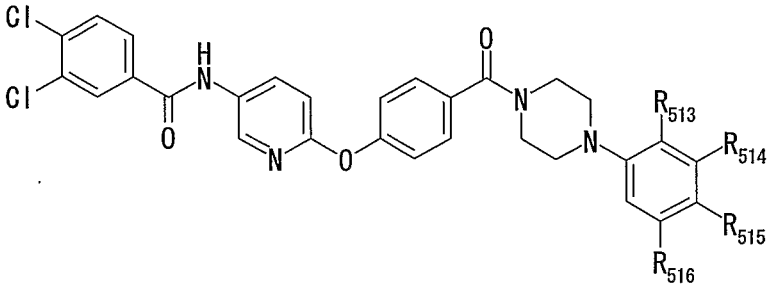
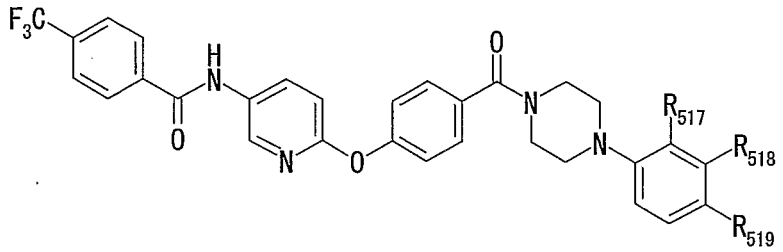
Example No.	R_{512}	^{1}H NMR ($CDCl_3$) δppm or MS
106	4-$CH_3OPhCH(Ph)$-	MS 665(M^+-1)
107	4-$CH_3OPhCOCH_2$-	^{1}H NMR 2.63(4H, brs), 3.65(4H, brs), 3.82(2H, s), 3.88(3H, s), 6.92-6.98(3H, m), 7.12(2H, d, J = 8.7 Hz), 7.41(2H, d, J = 8.7 Hz), 7.56(1H, d, J = 8.2 Hz), 7.75(1H, dd, J = 8.2 Hz, 2.1 Hz), 7.97(2H, d, J = 8.9 Hz), 8.03(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.30(1H, d, J = 2.8 Hz), 8.39(1H, s).
108	4-$ClPhCOCH_2$-	^{1}H NMR 2.63(4H, brs), 3.66(4H, brs), 3.83(2H, s), 6.97(1H, d, J = 8.7 Hz), 7.13(2H, d, J = 8.6 Hz), 7.39-7.47(4H, m), 7.56(1H, d, J = 8.4 Hz), 7.74(1H, dd, J = 8.2 Hz, 2.1 Hz), 7.94(2H, d, J = 8.6 Hz), 8.02(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.30(1H, d, J = 2.8 Hz), 8.37(1H s).
109	3-pyridyl	^{1}H NMR 3.20(4H, brs), 3.78(4H, brs), 6.93(1H, d, J = 8.7 Hz), 7.11 (2H, d, J = 8.6 Hz), 7.19-7.21(2H, m), 7.39(2H, d, J = 8.6 Hz), 7.46 (1H, d, J = 8.4 Hz), 7.76(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.03(1H, d, J = 2.0 Hz), 8.11-8.25(3H, m), 8.36(1H, d, J = 2.5 Hz), 9.81(1H, s).
110	-$CH_2CONHPh$	MS 603(M^+)
111	2-pyridyl	MS 547(M^+)
112	4-pyridyl	MS 547(M^+)
113		MS 548(M^+)
114		MS 548(M^+)
115	-$(CH_2)_4Ph$	MS 603(M^++H)
116	-$CH(C_2H_5)_2$	MS 540(M^+)
117	-$CH(CH_3)_2$	MS 511(M^+-1)
118	-$(CH_2)_2N(CH_3)_2$	MS 540(M^+-1)

Table 146



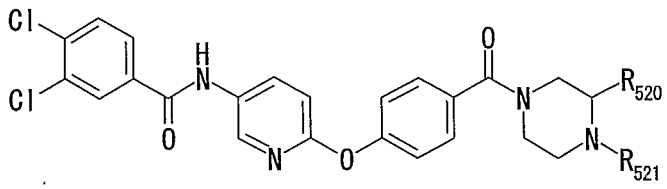
Example No.	R_{513}	R_{514}	R_{515}	R_{516}	MS (M^+)
119	-F	-H	-H	-H	564
120	-Cl	-H	-H	-H	582
121	$-CF_3$	-H	-H	-H	614
122	$-OCH_3$	-H	-H	-H	576
123	$-CH_3$	-H	-H	-H	560
124	-H	$-CF_3$	-H	-H	614
125	-H	-Cl	-H	-H	582
126	-H	$-OCH_3$	-H	-H	576
127	-H	$-CH_3$	-H	-H	560
128	-H	-H	-CN	-H	571
129	-H	-H	$-OCF_3$	-H	630
130	-H	-H	$-CO_2C(CH_3)_3$	-H	646
131	-H	-H	-F	-H	564
132	-H	-H	-Cl	-H	580
133	-H	-H	$-OCH_3$	-H	576
134	-H	-H	$-CH_3$	-H	560
135	-H	-H	$-CF_3$	-H	614
136	-H	-H	-Ph	-H	622
137	-Cl	-Cl	-H	-H	616
138	$-CH_3$	$-CH_3$	-H	-H	574
139	-H	$-CH_3$	$-CH_3$	-H	574
140	-F	-H	-F	-H	582
141	$-OCH_3$	-H	-H	-Cl	612

Table 147



Example No.	R_{517}	R_{518}	R_{519}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
142	-H	-H	-H	^{1}H NMR 3.20(4H, brs), 3.79(4H, brs), 6.89-6.96(3H, m), 7.00(1H, d, J = 8.9 Hz), 7.14-7.19(2H, m), 7.27-7.33(2H, m), 7.43-7.48(2H, m), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.31-8.34(2H, m).
143	-F	-H	-H	mp 193-194
144	-Cl	-H	-H	^{1}H NMR 3.07(4H, brs), 3.82(4H, brs), 7.00-7.06(3H, m), 7.18(2H, d, J = 8.4 Hz), 7.22-7.26(1H, m), 7.38-7.41(1H, m), 7.48(2H, d, J = 8.6 Hz), 7.77(2H, d, J = 8.1 Hz), 8.04(2H, d, J = 8.1 Hz), 8.24(1H, dd, J = 8.9 Hz, 2.4 Hz), 8.30(1H, brs), 8.35(1H, d, J = 2.4 Hz).
145	-H	-Cl	-H	^{1}H NMR 3.19(4H, brs), 3.76(4H, brs), 6.77-6.81(1H, m), 6.86-6.88 (2H, m), 6.99(1H, d, J = 8.9 Hz), 7.13-7.22(3H, m), 7.40-7.45(2H, m), 7.73(2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.4 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.34(1H, d, J = 2.7 Hz), 8.56(1H, s).
146	-H	$-CH_3$	-H	^{1}H NMR 2.31(3H, s), 3.15(4H, brs), 3.74(4H, brs), 6.71-6.73(3H, m), 6.97(1H, d, J = 8.9 Hz), 7.11-7.18(3H, m), 7.42(2H, d, J = 8.1 Hz), 7.72(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.18-8.21(1H, m), 8.34(1H, brs), 8.54(1H, brs).
147	-H	$-OCH_3$	-H	^{1}H NMR 3.07(4H, brs), 3.73(4H, brs), 3.88(3H, s), 6.88-7.08(5H, m), 7.13-7.17(2H, m), 7.42-7.47(2H, m), 7.75(2H, d, J = 8.4 Hz), 8.03 (2H, d, J = 7.8 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.4 Hz), 8.34(1H, d, J = 2.4 Hz), 8.45(1H, brs).
148	-H	$-CF_3$	-H	mp 174-177
149	-H	-H	-OH	mp 241-242
150	-H	-H	$-OCH_3$	^{1}H NMR 3.06(4H, brs), 3.63-3.91(7H, m), 6.83-6.93(4H, m), 6.99(1H, d, J = 8.6 Hz), 7.15(2H, d, J = 8.4 Hz), 7.44(2H, d, J = 8.4 Hz), 7.75 (2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.1 Hz), 8.22(1H, dd, J = 8.9 Hz, 2.4 Hz), 8.33(1H, d, J = 2.4 Hz), 8.40(1H, brs).
151	-H	-H	-CN	^{1}H NMR 3.23(4H, brs), 3.79(4H, brs), 7.01(1H, d, J = 8.9 Hz), 7.12-7.19(5H, m), 7.33-7.39(1H, m), 7.43-7.48(2H, m), 7.74(2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.4 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.35(1H, d, J = 2.7 Hz), 8.47(1H, s).

Table 148



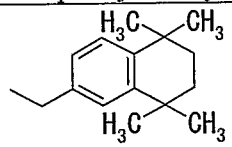
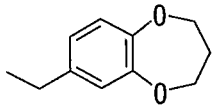
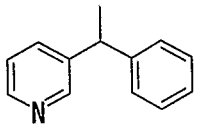
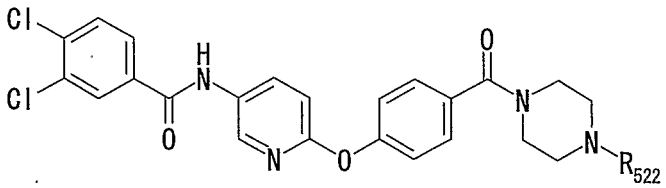
Example No.	R_{520}	R_{521}	^{1}H NMR (solvent) δppm or MS
152	-H	piperonyl	^{1}H NMR ($CDCl_3$) 2.38-2.45(4H, m), 3.45(2H, s), 3.49-3.74 (4H, m), 5.95(2H, s), 6.74(2H, s), 6.85(1H, s), 6.97(1H, d, J = 8.6 Hz), 7.10(2H, d, J = 8.9 Hz), 7.41(2H, d, J = 8.9 Hz), 7.58 (1H, d, J = 8.3 Hz), 7.74(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.02 (1H, d, J = 2.3 Hz), 8.13-8.20(2H, m), 8.29(1H, d, J = 2.6 Hz).
153	-H	$-COOC(CH_3)_3$	^{1}H NMR (DMSO-d_6) 1.41(9H, s), 3.39-3.50(8H, m), 7.13-7.19(3H, m), 7.45-7.48(2H, m), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21-8.26(2H, m), 8.52(1H, d, J = 2.3 Hz), 10.58(1H, s).
154	-H	2-naphthylmethyl	MS 611(M^{+}+1)
155	-H		MS 671(M^{+}+1)
156	-H	1-naphthylmethyl	MS 611(M^{+}+H)
157	$-CH_3$	3,4-$(CH_3O)_2PhCH_2$-	MS 633(M^{+}+1)
158	-H		MS 631(M^{+}-1)
159	-H	$-CH(CH_3)Ph$	MS 573(M^{+}-1)
160	-H		MS 637(M^{+})
161	-H	$(4\text{-}FPh)_2CH$-	MS 671(M^{+}-1)
162	-H	$-(CH_2)_3CH_3$	MS 526(M^{+})
163	-H	$-(CH_2)_3Ph$	MS 588(M^{+})
164	-H	cyclopentyl	MS 538(M^{+})
165	-H	cycloheptyl	MS 565(M^{+}-1)

Table 149



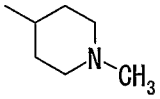
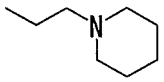
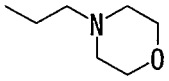
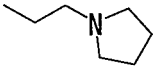
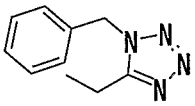
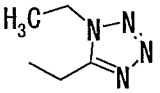
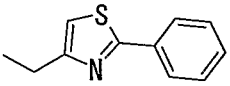
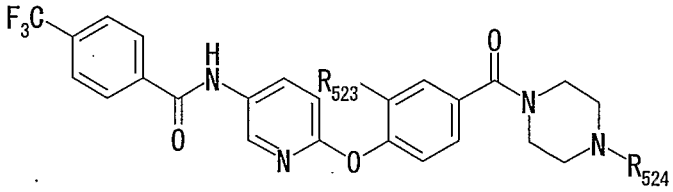
Example No.	R_{522}	MS
166		567(M+)
167		581(M+)
168		583(M+)
169		567(M+)
170	4-pyridylmethyl	561(M+)
171	2-pyridylmethyl	562(M++H)
172		643(M++H)
173		580(M+)
174		643(M+)

Table 150



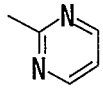
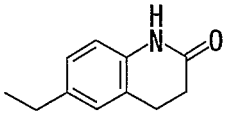
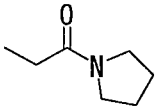
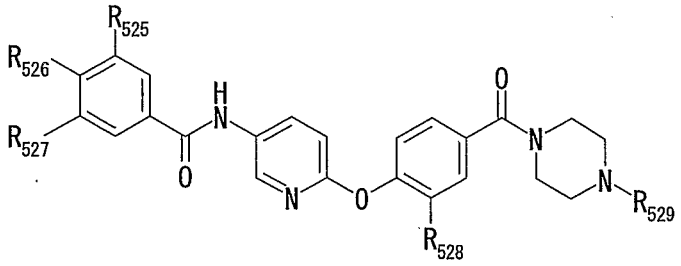
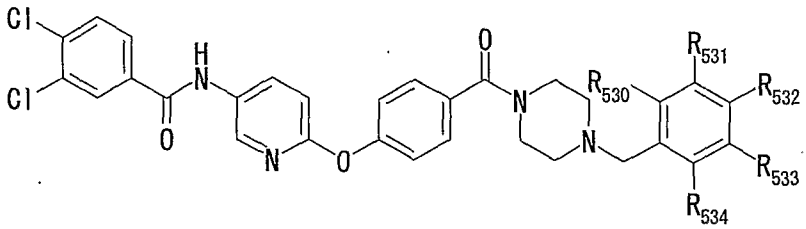
Example No.	R_{523}	R_{524}	mp (°C) or ^{1}H NMR (solvent) δppm
175	-H	3-pyridyl	^{1}H NMR ($CDCl_3$) 3.21(4H, brs), 3.78(4H, brs), 6.98(1H, d, J = 8.7 Hz), 7.13-7.21(4H, m), 7.41-7.44(2H, m), 7.70(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.12-8.14(1H, m), 8.20-8.27 (2H, m), 8.35(1H, d, J = 2.6 Hz), 8.99(1H, s).
176	-H	2-pyridyl	mp 222-224
177	-F	3-pyridyl	^{1}H NMR ($CDCl_3$) 3.21(4H, brs), 3.79(4H, brs), 7.05(1H, d, J = 8.4 Hz), 7.20-7.30(5H, m), 7.71(2H, d, J = 8.2 Hz), 8.00(2H, d, J = 8.2 Hz), 8.14(1H, brs), 8.21-8.25(3H, m), 8.78(1H, s).
178	-H		mp 205-206
179	-H		^{1}H NMR (DMSO-d_6) 2.38(4H, brs), 2.43(2H, t, J = 7.5 Hz), 2.86(2H, t, J = 7.5 Hz), 3.41(2H, s), 3.45(4H, brs), 6.80(1H, d, J = 7.9 Hz), 7.06(1H, d, J = 7.9 Hz), 7.10(1H, s), 7.15(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.4 Hz), 7.44(2H, d, J = 8.4 Hz), 7.94(2H, d, J = 8.0 Hz), 8.17(2H, d, J = 8.0 Hz), 8.26(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.54(1H, d, J = 2.6 Hz), 10.06(1H, s), 10.68(1H, s).
180	-H		^{1}H NMR ($CDCl_3$) 1.71-2.05(4H, m), 2.58(4H, brs), 3.16(2H, s), 3.36-3.53(4H, m), 3.55(2H, brs), 3.74(2H, brs), 7.00(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.6 Hz), 7.42(2H, d, J = 8.6 Hz), 7.76(2H, d, J = 8.1 Hz), 8.04(2H, d, J = 8.1 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.34(1H, d, J = 2.6 Hz), 8.50(1H, s).
181	-H	$-COOC(CH_3)_3$	^{1}H NMR ($CDCl_3$) 1.48(9H, s), 3.45(4H, brs), 3.58(4H, brs), 6.99(1H, d, J = 8.7 Hz), 7.15(2H, d, J = 8.7 Hz), 7.41(2H, d, J = 8.7 Hz), 7.74(2H, d, J = 8.2 Hz), 8.02(2H, d, J = 8.2 Hz), 8.21(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.33(1H, d, J = 2.6 Hz), 8.43 (1H, brs).
182	-H	$-CH_2COOC_2H_5$	^{1}H NMR ($CDCl_3$) 1.28(3H, t, J = 7.1 Hz), 2.61(4H, brs), 3.26 (2H, s), 3.57(2H, brs), 3.78(2H, brs), 4.19(2H, q, J = 7.1 Hz), 6.97(1H, d, J = 8.7 Hz), 7.12(2H, d, J = 8.7 Hz), 7.40(2H, d, J = 8.7 Hz), 7.74(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.19(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.33(1H, d, J = 2.6 Hz), 8.61 (1H, brs).
183	-H	$-CH_2CONHNHCOOC(CH_3)_3$	^{1}H NMR ($CDCl_3$) 1.46(9H, s), 2.60(4H, brs), 3.17(2H, s), 3.67 (4H, brs), 6.48(1H, brs), 7.00(1H, d, J = 8.7 Hz), 7.14(2H, d, J = 8.5 Hz), 7.41(2H, d, J = 8.5 Hz), 7.75(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.24(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.33 (1H, d, J = 2.6 Hz), 8.53(2H, s).

Table 151



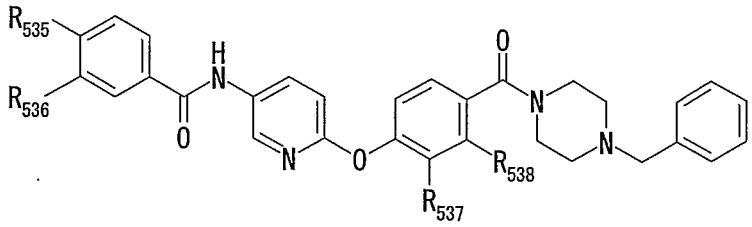
Example No.	R_{525}	R_{526}	R_{527}	R_{528}	R_{529}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
184	-Cl	-Cl	-H	-F	3-pyridyl	free	^{1}H NMR ($CDCl_3$) 3.21(4H, brs), 3.79 (4H, brs), 7.02(1H, d, J = 8.7 Hz), 7.18-7.28(5H, m), 7.49(1H, d, J = 8.2 Hz), 7.74(1H, dd, J = 8.2 Hz, 1.7 Hz), 8.00(1H, d, J = 1.7 Hz), 8.13(1H, brs), 8.17-8.21(1H, m), 8.26(2H, d, J = 2.3 Hz), 9.33(1H, brs).
185	-H	-Cl	-H	-H	4-CNPhCH_2-	free	mp 199-201
186	-OCF_3	-H	-H	-H	3-pyridyl-methyl	free	^{1}H NMR ($CDCl_3$) 2.43-2.55(4H, m), 3.43-3.71(6H, m), 6.90(1H, d, J = 8.7 Hz), 7.05-7.08(2H, m), 7.25-7.46(5H, m), 7.66-7.69(1H, m), 7.82-7.88(2H, m), 8.15(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.36(1H, d, J = 2.5 Hz), 8.48(1H, dd, J = 4.8 Hz, 1.7 Hz), 8.51(1H, d, J = 1.7 Hz), 9.84(1H, s).
187	-CF_3	-H	-H	-H	4-CNPhCH_2-	free	mp 193-197
188	-F	-H	-CF_3	-H	4-CNPhCH_2-	oxalate	mp 136-139
189	-CH_3	-CH_3	-H	-H	-COOC(CH_3)$_3$	free	^{1}H NMR ($CDCl_3$) 1.48(9H, s), 2.34 (6H, s), 3.46(4H, brs), 3.60(4H, brs), 6.99(1H, d, J = 8.7 Hz), 7.14-7.17 (2H, m), 7.23-7.26(1H, m), 7.42-7.47 (2H, m), 7.61(1H, dd, J = 7.8 Hz, 2.0 Hz), 7.67 (1H, d, J = 2.0 Hz), 7.93 (1H, brs), 8.25-8.31(2H, m).

Table 152



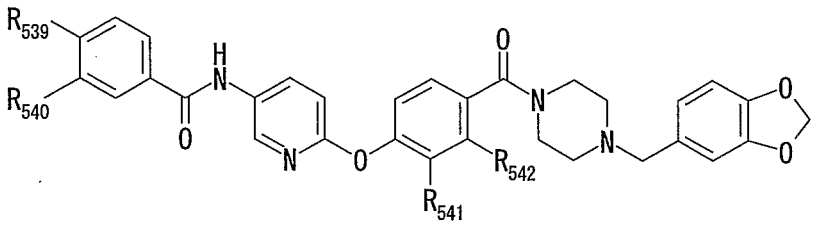
Example No.	R_{530}	R_{531}	R_{532}	R_{533}	R_{534}	MS
190	-Cl	-H	-H	-H	-H	594(M^+)
191	$-OCH_3$	-H	-H	-H	-H	590(M^+)
192	$-CH_3$	-H	-H	-H	-H	574(M^+)
193	-F	-H	-H	-H	-H	578(M^+)
194	$-NO_2$	-H	-H	-H	-H	603(M^+-2)
195	$-CF_3$	-H	-H	-H	-H	628(M^+)
196	$-OCF_3$	-H	-H	-H	-H	645(M^++1)
197	-H	-Cl	-H	-H	-H	595(M^++1)
198	-H	-F	-H	-H	-H	579(M^++1)
199	-H	$-NO_2$	-H	-H	-H	605(M^+)
200	-H	$-CF_3$	-H	-H	-H	628(M^+)
201	-H	$-OCF_3$	-H	-H	-H	644(M^+)
202	-H	$-COOCH_3$	-H	-H	-H	618(M^+)
203	-H	-H	-Cl	-H	-H	594(M^+)
204	-H	-H	-F	-H	-H	578(M^+)
205	-H	-H	$-NO_2$	-H	-H	605(M^+)
206	-H	-H	$-COOCH_3$	-H	-H	618(M^+)
207	-H	-H	-Ph	-H	-H	636(M^+)
208	-H	-H	$-C_2H_5$	-H	-H	588(M^+)
209	-Cl	-Cl	-H	-H	-H	630(M^+)
210	-Cl	-H	-Cl	-H	-H	630(M^+)
211	-H	-F	-H	-F	-H	596(M^+)
212	-H	$-OCH_3$	-H	$-OCH_3$	-H	622(M^++2)
213	-F	-H	-F	-H	-H	596(M^+)
214	-H	-Cl	-Cl	-H	-H	630(M^+)
215	-F	-H	-H	-H	-F	596(M^+)
216	-Cl	-H	-H	-H	-Cl	630(M^+)
217	-F	-H	-H	-F	-H	596(M^+)
218	-Cl	-H	-H	-Cl	-H	629(M^++1)
219	-H	-Cl	$-OCH_3$	-H	-H	624(M^+)

Table 153



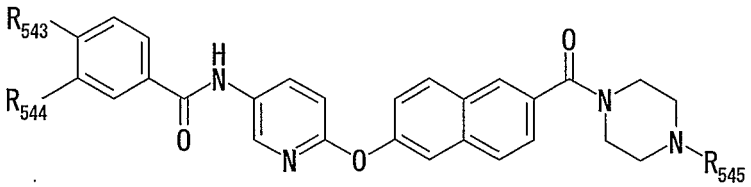
Example No.	R_{535}	R_{536}	R_{537}	R_{538}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
220	-Cl	-Cl	-H	-H	mp 164-166
221	-Cl	-Cl	-F	-H	^{1}H NMR 2.46(4H, brs), 3.39-3.82(6H, m), 7.00(1H, d, J = 8.9 Hz), 7.13-7.33(8H, m), 7.52(1H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.00(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz), 8.61(1H, brs).
222	-CF_3	-H	-F	-H	^{1}H NMR 2.44(4H, brs), 3.42-3.78(6H, m), 6.97(1H, d, J = 8.7 Hz), 7.09-7.36(8H, m), 7.66(2H, d, J = 8.1 Hz), 7.96(2H, d, J = 8.1 Hz), 8.16(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.26(1H, d, J = 2.5 Hz), 9.04(1H, brs).
223	-Cl	-Cl	-Cl	-H	^{1}H NMR 2.47(4H, brs), 3.42-3.83(6H, m), 7.00(1H, d, J = 8.9 Hz), 7.17(1H, d, J = 8.2 Hz), 7.25-7.33(6H, m), 7.46(1H, d, J = 1.8 Hz), 7.53(1H, d, J = 8.4 Hz), 7.74(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.01(1H, d, J = 2.1 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz), 8.64(1H, brs).
224	-CF_3	-H	-Cl	-H	^{1}H NMR 2.47(4H, brs), 3.42-3.82(6H, m), 7.02(1H, d, J = 8.9 Hz), 7.19(1H, d, J = 8.4 Hz), 7.27-7.33(6H, m), 7.47(1H, d, J = 1.8 Hz), 7.73(2H, d, J = 8.4 Hz), 8.00(2H, d, J = 7.9 Hz), 8.20-8.26(2H, m), 8.46(1H, brs).
225	-Cl	-Cl	-CH_3	-H	^{1}H NMR 2.15(3H, s), 2.45(4H, brs), 3.46-3.75(6H, m), 6.85 (1H, d, J = 8.9 Hz), 6.95(1H, d, J = 8.4 Hz), 7.13-7.33(7H, m), 7.50(1H, d, J = 8.6 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.03 (1H, d, J = 2.2 Hz), 8.08(1H, dd, J = 8.9 Hz, 3.0 Hz), 8.27(1H, d, J = 3.0 Hz), 9.06(1H, s).
226	-CF_3	-H	-CH_3	-H	^{1}H NMR 2.17(3H, s), 2.44(4H, brs), 3.40-3.82(6H, m), 6.88 (1H, d, J = 8.9 Hz), 6.98(1H, d, J = 8.1 Hz), 7.14-7.18(1H, m), 7.23-7.33(6H, m), 7.70(2H, d, J = 8.4 Hz), 8.01(2H, d, J = 8.1 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.90(1H, brs).
227	-Cl	-Cl	-OCH_3	-H	mp 197-199
228	-CF_3	-H	-OCH_3	-H	mp 152-154
229	-Cl	-Cl	-H	-CH_3	mp 182-183
230	-CF_3	-H	-H	-CH_3	mp 188-190
231	-Cl	-Cl	-H	-OCH_3	mp 196-198
232	-CF_3	-H	-H	-OCH_3	^{1}H NMR 2.32-2.50(4H, m), 3.30(2H, brs), 3.53(2H, s), 3.70-3.81(5H, m), 6.61-6.65(2H, m), 6.91(1H, d, J = 8.9 Hz), 7.11-7.15(1H, m), 7.26-7.36(5H, m), 7.72(2H, d, J = 8.4 Hz), 8.05-8.13(3H, m), 8.36(1H, d, J = 2.4 Hz), 9.07(1H, s).

Table 154



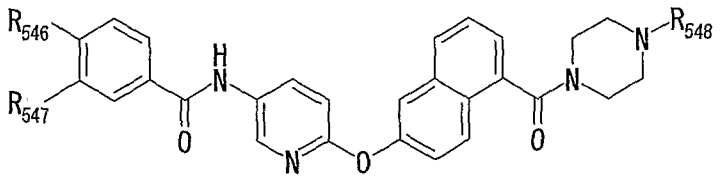
Example No.	R_{539}	R_{540}	R_{541}	R_{542}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
233	$-CF_3$	-H	-H	-H	hydro-chloride	^{1}H NMR (DMSO-d_6) 2.90-3.70(6H, m), 3.80-4.60(2H, m), 4.24(2H, brs), 6.07(2H, s), 6.98(1H, d, J = 8.0 Hz), 7.05(1H, dd, J = 8.0 Hz, 1.5 Hz), 7.16(1H, d, J = 8.7 Hz), 7.20(2H, d, J = 8.6 Hz), 7.27(1H, s), 7.52(2H, d, J = 8.6 Hz), 7.93(2H, d, J = 8.3 Hz), 8.21(2H, d, J = 8.3 Hz), 8.30(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.60(1H, d, J = 2.6 Hz), 10.80(1H, s).
234	-Cl	-Cl	-F	-H	free	^{1}H NMR ($CDCl_3$) 2.42(4H, brs), 3.37-3.79(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 6.96(1H, d, J = 8.7 Hz), 7.10-7.22(3H, m), 7.47(1H, d, J = 8.2 Hz), 7.72(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz), 9.14(1H, brs).
235	$-CF_3$	-H	-F	-H	free	^{1}H NMR ($CDCl_3$) 2.41(4H, brs), 3.37-3.79(6H, m), 5.94(2H, s), 6.69-6.76(2H, m), 6.84(1H, s), 6.99(1H, d, J = 8.9 Hz), 7.10-7.26(3H, m), 7.67(2H, d, J = 8.1 Hz), 7.97(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.26(1H, d, J = 2.5 Hz), 8.89(1H, brs).
236	-Cl	-Cl	-Cl	-H	free	^{1}H NMR ($CDCl_3$) 2.45(4H, brs), 3.38-3.81(6H, m), 5.95(2H, s), 6.71-6.78(2H, m), 6.85(1H, s), 7.01(1H, d, J = 8.7 Hz), 7.17-7.30(2H, m), 7.45-7.47(1H, m), 7.54(1H, d, J = 8.4 Hz), 7.70-7.74(1H, m), 8.00(1H, d, J = 1.8 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz), 8.48(1H, s).
237	$-CF_3$	-H	-Cl	-H	free	^{1}H NMR ($CDCl_3$) 2.45(4H, brs), 3.40-3.81(6H, m), 5.95(2H, s), 6.71-6.77(2H, m), 6.85(1H, s), 7.03(1H, d, J = 8.6 Hz), 7.20(1H, d, J = 8.2 Hz), 7.28-7.31(1H, m), 7.48(1H, d, J = 2.0 Hz), 7.74(2H, d, J = 8.4 Hz), 8.00(2H, d, J = 8.2 Hz), 8.21-8.26(2H, m), 8.34(1H, brs).
238	$-CF_3$	-H	$-CH_3$	-H	free	^{1}H NMR ($CDCl_3$) 2.16(3H, s), 2.42(4H, brs), 3.44-3.70(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.85-6.89(2H, m), 6.97(1H, d, J = 8.4 Hz), 7.14-7.23(2H, m), 7.69(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.13-8.17(1H, m), 8.30(1H, d, J = 2.7 Hz), 8.97(1H, brs).
239	-Cl	-Cl	$-OCH_3$	-H	free	mp 194-196
240	$-CF_3$	-H	$-OCH_3$	-H	free	mp 134-136
241	$-CF_3$	-H	-H	$-CH_3$	free	mp 199-201
242	$-CF_3$	-H	-H	$-OCH_3$	free	mp 192-193

Table 155



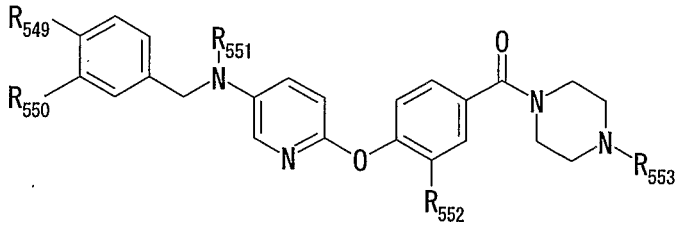
Example No.	R_{543}	R_{544}	R_{545}	^{1}H NMR ($CDCl_3$) δppm
243	-Cl	-Cl	benzyl	2.39-2.62(4H, m), 3.42-3.91(6H, m), 6.94(1H, d, J = 8.9 Hz), 7.28-7.33(6H, m), 7.41(1H, dd, J = 8.4 Hz, 1.6 Hz), 7.50-7.53 (2H, m), 7.72-7.75(2H, m), 7.81-7.84(2H, m), 8.02(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.28(1H, d, J = 2.7 Hz), 8.66(1H, s).
244	-Cl	-Cl	piperonyl	2.41-2.74(4H, m), 3.42-3.91(6H, m), 5.94(2H, s), 6.73(2H, brs), 6.84(1H, brs), 6.97(1H, d, J = 8.9 Hz), 7.29-7.33(1H, m), 7.42 (1H, d, J = 8.2 Hz), 7.52-7.57(2H, m), 7.71-7.85(4H, m), 8.02 (1H, d, J = 2.0 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.28(1H, d, J = 2.8 Hz), 8.48(1H, brs).
245	-Cl	-Cl	3-pyridyl	3.25(4H, brs), 3.82(4H, brs), 7.01(1H, d, J = 8.7 Hz), 7.21-7.22 (2H, m), 7.35(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.47-7.50(1H, m), 7.52-7.56(2H, m), 7.74(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.80(1H, d, J = 8.6 Hz), 7.86-7.91(2H, m), 8.01(1H, d, J = 2.0 Hz), 8.13-8.15(1H, m), 8.18-8.22(1H, m), 8.29-8.31(2H, m), 8.42 (1H, brs).
246	$-CF_3$	-H	benzyl	2.35-2.58(4H, m), 3.37-3.87(6H, m), 6.96(1H, d, J = 8.9 Hz), 7.28-7.34(6H, m), 7.41(1H, dd, J = 8.4 Hz, 1.5 Hz), 7.52(1H, d, J = 2.0 Hz), 7.64-7.76(3H, m), 7.83(2H, d, J = 9.1 Hz), 8.00(2H, d, J = 8.2 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.30(1H, d, J = 2.6 Hz), 8.68(1H, brs).
247	$-CF_3$	-H	piperonyl	2.30-2.58(4H, m), 3.35-3.87(6H, m), 5.94(2H, s), 6.70-6.77 (2H, m), 6.85(1H, brs), 6.95(1H, d, J = 8.7 Hz), 7.31(1H, dd, J = 8.9 Hz, 2.1 Hz), 7.39(1H, d, J = 8.4 Hz), 7.51(1H, brs), 7.66-7.83(5H, m), 7.99(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.30(1H, brs), 8.89(1H, brs).
248	$-CF_3$	-H	3-pyridyl	3.22(4H, brs), 3.79(4H, brs), 6.99(1H, d, J = 8.7 Hz), 7.17-7.23 (2H, m), 7.33(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.45(1H, dd, J = 8.4 Hz, 1.5 Hz), 7.54(1H, d, J = 2.3 Hz), 7.66(2H, d, J = 8.4 Hz), 7.76-7.86(3H, m), 7.99(2H, d, J = 8.1 Hz), 8.13(1H, brs), 8.21-8.25(1H, m), 8.28(1H, brs), 8.33(1H, d, J = 2.5 Hz), 9.13(1H, s).

Table 156



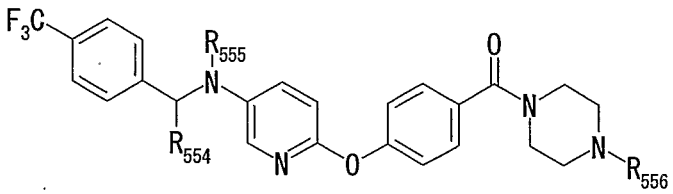
Example No.	R_{546}	R_{547}	R_{548}	^{1}H NMR ($CDCl_3$) δppm
249	-Cl	-Cl	benzyl	2.27-2.34(2H, m), 2.58-2.61(2H, m), 3.20-3.29(2H, m), 3.53 (2H, s), 3.90-3.99(2H, m), 6.91(1H, d, J = 8.7 Hz), 7.29-7.32 (7H, m), 7.39-7.45(1H, m), 7.53-7.56(2H, m), 7.71-7.81(3H, m), 8.00-8.04(2H, m), 8.25(1H, d, J = 2.6 Hz), 8.47(1H, s).
250	-Cl	-Cl	piperonyl	2.25-2.31(2H, m), 2.55-2.59(2H, m), 3.22(2H, brs), 3.44(2H, s), 3.86-4.01(2H, m), 5.94(2H, s), 6.69-6.76(2H, m), 6.84-6.91 (2H, m), 7.25-7.29(2H, m), 7.38-7.44(1H, m), 7.52-7.55(2H, m), 7.71-7.80(3H, m), 7.97-8.03(2H, m), 8.24(1H, d, J = 2.8 Hz), 8.60(1H, s).
251	$-CF_3$	-H	benzyl	2.27-2.34(2H, m), 2.57-2.61(2H, m), 3.23-3.25(2H, m), 3.53 (2H, s), 3.89-3.98(2H, m), 6.96(1H, d, J = 8.7 Hz), 7.27-7.31 (7H, m), 7.40-7.45(1H, m), 7.55(1H, d, J = 2.3 Hz), 7.72-7.83 (4H, m), 8.00(2H, d, J = 8.1 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.30(1H, d, J = 2.6 Hz), 8.40(1H, brs).
252	$-CF_3$	-H	piperonyl	2.25-2.31(2H, m), 2.55-2.58(2H, m), 3.23(2H, m), 3.43(2H, s), 3.85-4.00(2H, m), 5.94(2H, s), 6.70-6.76(2H, m), 6.84(1H, s), 6.96(1H, d, J = 8.9 Hz), 7.28-7.31(2H, m), 7.40-7.46(1H, m), 7.55(1H, d, J = 2.5 Hz), 7.72-7.83(4H, m), 8.00(2H, d, J = 7.9 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.30(1H, d, J = 2.6 Hz), 8.44(1H, brs).

Table 157



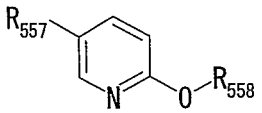
Example No.	R_{549}	R_{550}	R_{551}	R_{552}	R_{553}	Form	^{1}H NMR (solvent) δppm
253	-CF_3	-H	-CH_3	-H	3-pyridyl	free	($CDCl_3$) 3.06(3H, s), 3.22(4H, brs), 3.81(4H, brs), 4.55(2H, s), 6.87(1H, d, J = 8.9 Hz), 7.09 (2H, d, J = 8.7 Hz), 7.14(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.19-7.21(2H, m), 7.35(2H, d, J = 7.9 Hz), 7.44(2H, d, J = 8.7 Hz), 7.60(2H, d, J = 8.1Hz), 7.74(1H, d, J = 3.0 Hz), 8.14-8.17(1H, m), 8.31-8.33(1H, m).
254	-CF_3	-H	-H	-F	benzyl	free	($CDCl_3$) 2.46(4H, brs), 3.54(6H, brs), 4.11(1H, brs), 4.38(2H, brs), 6.85(1H, d, J = 8.7 Hz), 7.01(1H, dd, J = 8.7 Hz, 3.1 Hz), 7.16-7.25(3H, m), 7.28-7.33(5H, m), 7.46(2H, d, J = 8.1 Hz), 7.52(1H, d, J = 2.6 Hz), 7.60(2H, d, J = 8.1Hz).
255	-CF_3	-H	-CH_3	-H	piperonyl	hydro-chloride	(DMSO-d_6) 2.49-2.52(2H, m), 3.06(5H, brs), 3.35(4H, brs), 4.22(2H, brs), 4.68(2H, brs), 6.07(2H, s), 6.94-7.05(5H, m), 7.23(1H, brs), 7.32(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.43-7.46(4H, m), 7.69-7.72(3H, m), 11.23(1H, brs).
256	-Cl	-Cl	-H	-F	benzyl	free	($CDCl_3$) 2.47(4H, brs), 3.49-3.68(6H, m), 4.29 (2H, s), 6.86(1H, d, J = 8.7 Hz), 7.01(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17-7.22(4H, m), 7.32(5H, brs), 7.41(1H, d, J = 8.3 Hz), 7.45(1H, d, J = 1.8 Hz), 7.51(1H, d, J = 3.0 Hz).
257	-CF_3	-H	-CH_3	-H	4-CH_3OPhCH_2-	hydro-chloride	(DMSO-d_6) 2.49-2.52(2H, m), 3.06(5H, brs), 3.32-3.38(4H, m), 3.78(3H, s), 4.27(2H, d, J = 4.1 Hz), 4.68(2H, brs), 6.96(1H, d, J = 8.9 Hz), 7.00-7.05(4H, m), 7.32(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.43-7.49(6H, m), 7.68-7.72(3H, m), 10.72(1H, brs).
258	-CF_3	-H	-CH_3	-H	4-pyridyl-methyl	hydro-chloride	(DMSO-d_6) 2.49-2.52(2H, m), 3.05-3.44(9H, m), 4.26(2H, brs), 4.68(2H, brs), 6.96(1H, d, J = 8.9 Hz), 7.03(2H, d, J = 8.7 Hz), 7.32(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.42-7.47(4H, m), 7.68-7.72(5H, m), 8.71(2H, dd, J = 4.6 Hz, 1.5 Hz).

Table 158



Example No.	R_{554}	R_{555}	R_{556}	Form	^{1}H NMR (solvent) δppm
259	-CH_3	-H	benzyl	hydro-chloride	(DMSO-d_6) 1.44(3H, d, J = 6.8 Hz), 2.44-2.52(2H, m), 3.08-3.15(2H, m), 3.30-3.38(4H, m), 4.33(2H, brs), 4.55-4.62(1H, m), 6.51(1H, d, J = 6.3 Hz), 6.82(1H, d, J = 8.7 Hz), 6.97(2H, d, J = 8.7 Hz), 7.04(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.41(2H, d, J = 8.6 Hz), 7.45-7.47(4H, m), 7.57(2H, brs), 7.61(2H, d, J = 8.3 Hz), 7.69(2H, d, J = 8.4 Hz), 10.99(1H, brs).
260	-CH_3	-CH_3	benzyl	free	($CDCl_3$) 1.58(3H, d, J = 6.9 Hz), 2.46(4H, brs), 2.72(3H, s), 3.46-3.53(6H, m), 4.97(1H, q, J = 6.9 Hz), 6.86(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.6 Hz), 7.23(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.27-7.36(5H, m), 7.40(2H, d, J = 8.6 Hz), 7.43(2H, d, J = 7.3 Hz), 7.60(2H, d, J = 8.3 Hz), 7.82(1H, d, J = 3.3 Hz).
261	-CH_3	-CH_3	piperonyl	free	($CDCl_3$) 1.58(3H, d, J = 6.9 Hz), 2.43(4H, brs), 2.72(3H, s), 3.44(2H, s), 3.48-3.68(4H, m), 4.97(1H, q, J = 6.9Hz), 5.95(2H, s), 6.74(2H, brs), 6.85(1H, brs), 6.87(1H, d, J = 9.1 Hz), 7.07(2H, d, J = 8.7 Hz), 7.23(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.40(2H, d, J = 8.6 Hz), 7.43(2H, d, J = 7.9 Hz), 7.60(2H, d, J = 8.3 Hz), 7.82(1H, d, J = 3.1 Hz).
262	-CH_3	-H	piperonyl	hydro-chloride	(DMSO-d_6) 1.44(3H, d, J = 6.8 Hz), 2.49-2.52(2H, m), 3.01-3.06(2H, m), 3.29-3.45(4H, m), 4.23(2H, brs), 4.58-4.62(1H, m), 6.07(2H, s), 6.51(1H, d, J = 6.6 Hz), 6.82(1H, d, J = 8.7 Hz), 6.96-6.99(4H, m), 7.04(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.20(1H, brs), 7.41(2H, d, J = 8.6 Hz), 7.46(1H, d, J = 3.0 Hz), 7.61(2H, d, J = 8.3 Hz), 7.69(2H, d, J = 8.4 Hz), 10.99(1H, brs).
263	-H	-C_2H_5	benzyl	hydro-chloride	(DMSO-d_6) 1.14(3H, d, J = 6.9 Hz), 2.50-2.51(2H, m), 3.11(2H, brs), 3.35(4H, brs), 3.51(2H, q, J = 6.9 Hz), 4.33 (2H, brs), 4.63(2H, brs), 6.94(1H, d, J = 8.9 Hz), 7.03(2H, d, J = 8.6 Hz), 7.25(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.42-7.48(7H, m), 7.57(2H, brs), 7.62(1H, d, J = 3.1 Hz), 7.70(2H, d, J = 8.1 Hz), 11.03(1H, brs).
264	-H	-C_2H_5	piperonyl	hydro-chloride	(DMSO-d_6) 1.14(3H, d, J = 6.9 Hz), 2.50-2.51(2H, m), 3.06(2H, brs), 3.36(4H, brs), 3.52(2H, q, J = 6.9 Hz), 4.22 (2H, brs), 4.64(2H, brs), 6.07(2H, s), 6.94(1H, d, J = 8.9 Hz), 6.99(2H, brs), 7.03(2H, d, J = 8.6 Hz), 7.23(1H, brs), 7.25(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.42-7.49(4H, m), 7.62 (1H, d, J = 3.1 Hz), 7.71(2H, d, J = 8.1 Hz), 11.29(1H, brs).

Table 159



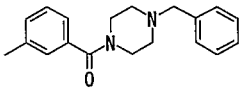
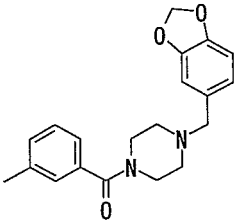
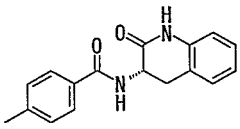
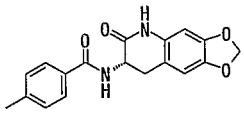
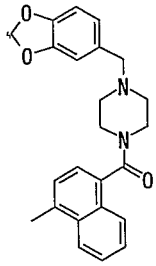
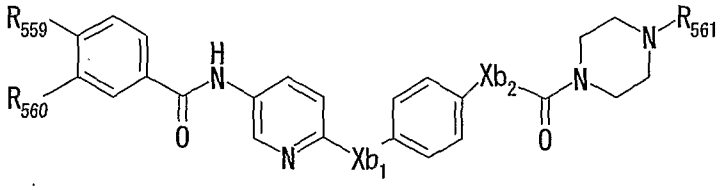
Example No.	R_{557}	R_{558}	^{1}H NMR (solvent) δppm
265	3,4-Cl_2PhCONH-		($CDCl_3$) 2.39-2.49(4H, m), 3.39-3.79 (6H, m), 6.87(1H, d, J = 8.9 Hz), 7.06-7.15(3H, m), 7.27-7.37(6H, m), 7.51(1H, d, J = 8.4 Hz), 7.74-7.78(1H, m), 8.01-8.05(2H, m), 8.28(1H, d, J = 2.6 Hz), 9.10(1H, brs).
266	3,4-Cl_2PhCONH-		($CDCl_3$) 2.37-2.48(4H, m), 3.43-3.75 (6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 6.92(1H, d, J = 8.9 Hz), 7.09-7.17(3H, m), 7.34-7.40(1H, m), 7.55(1H, d, J = 8.4 Hz), 7.73-7.77(1H, m), 8.04(1H, d, J = 2.1 Hz), 8.09(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.28(1H, d, J = 2.8 Hz), 8.63(1H, brs).
267	4-$CF_3PhCH_2N(CH_3)$-		(DMSO-d_6) 3.03-3.13(5H, m), 4.69-4.75(3H, m), 6.88-6.98(3H, m), 7.06(2H, d, J = 8.6 Hz), 7.16-7.23(2H, m), 7.33(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.46(2H, d, J = 8.3 Hz), 7.69-7.73(3H, m), 7.91(2H, d, J = 8.7 Hz), 8.61(1H, d, J = 8.1 Hz), 10.35(1H, brs).
268	4-$CF_3PhCH_2N(CH_3)$-		(DMSO-d_6) 2.89-3.06(2H, m), 3.06(3H, s), 4.61-4.72(3H, m), 5.96(2H, s), 6.50 (1H, s), 6.84(1H, s), 6.97(1H, d, J = 8.9 Hz), 7.06(2H, d, J = 8.7 Hz), 7.33(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.46(2H, d, J = 8.1 Hz), 7.69-7.73(3H, m), 7.89(2H, d, J = 8.7 Hz), 8.56(1H, d, J = 8.3 Hz), 10.15 (1H, brs).
269	3,4-Cl_2PhCONH-		($CDCl_3$) 2.28-2.30(2H, m), 2.58-2.60 (2H, m), 3.25-3.29(2H, m), 3.44(2H, s), 3.92-3.98(2H, m), 5.94(2H, s), 6.73(2H, s), 6.84(1H, s), 6.96(1H, d, J = 8.7 Hz), 7.14(1H, d, J = 7.8 Hz), 7.37(1H d, J = 7.8 Hz), 7.50-7.59(3H, m), 7.73(1H, dd, J = 8.2 Hz, 2.1 Hz), 7.83(1H, dd, J = 7.6 Hz, 3.0 Hz), 8.03(1H, d, J = 2.1 Hz), 8.06-8.13(2H, m), 8.17(1H, s), 8.24(1H, d, J = 3.0 Hz).

Table 160



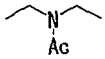
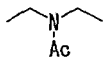
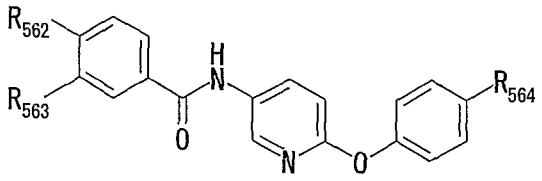
Example No.	R_{559}	R_{560}	Xb_1	Xb_2	R_{561}	Form	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
270	-Cl	-Cl	-O-		piperonyl	free	^{1}H NMR (at 375 K) 2.00(3H, brs), 2.30-2.38 (4H, m), 3.34-3.43(6H, m), 4.12(2H, s), 4.51 (2H, brs), 5.91(2H, s), 6.73(1H, d, J = 7.9 Hz), 6.77(1H, d, J = 7.9 Hz), 6.81(1H, s), 6.98(1H, d, J = 8.8 Hz), 7.05(2H, d, J = 8.2 Hz), 7.26(2H, d, J = 8.2 Hz), 7.73(1H, d, J = 8.4 Hz), 7.91(1H, dd, J = 2.1 Hz, 8.4 Hz), 8.12-8.18(3H, m), 8.48 (1H, d, J = 2.6 Hz), 10.17(1H, s).
271	-Cl	-Cl	-O-		benzyl	free	^{1}H NMR (at 375 K) 2.00(3H, brs), 2.33-2.40 (4H, m), 3.38-3.42(4H, m), 3.49-3.53(2H, m), 4.13(2H, s), 4.51(2H, brs), 6.98(1H, d, J = 8.8 Hz), 7.02-7.10(2H, m), 7.16-7.30(7H, m), 7.73 (1H, d, J = 8.4 Hz), 7.91(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.11-8.17(2H, m), 8.48(1H, d, J = 2.5 Hz), 10.17(1H, s).
272	-CF_3	-H	-O-	-CH=CH- (trans)	benzyl	free	^{1}H NMR 2.39(4H, brs), 3.52(2H, s), 3.58(2H, brs), 3.71(2H, brs), 7.13(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.7 Hz), 7.24(1H, d, J = 15.3 Hz), 7.18-7.41(5H, m), 7.50(1H, d, J = 15.3Hz), 7.76(2H, d, J = 8.7 Hz), 7.94(2H, d, J = 8.3 Hz), 8.17(2H, d, J = 8.3 Hz), 8.25(1H, dd, J = 8.9Hz, 2.7 Hz), 8.54(1H, d, J = 2.7 Hz), 10.66(1H, s).
273	-CF_3	-H	-O-	-CH=CH- (trans)	piperonyl	free	^{1}H NMR 2.37(4H, brs), 3.42(2H, s), 3.58(2H, brs), 3.70(2H, brs), 5.99(2H, s), 6.76(1H, dd, J = 8.0 Hz, 2.4 Hz), 6.85(1H, d, J = 8.0 Hz), 6.88 (1H, d, J = 1.5 Hz), 7.13(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.7 Hz), 7.20(1H, d, J = 15.4 Hz), 7.50(1H, d, J = 15.4 Hz), 7.76(2H, d, J = 8.7 Hz), 7.94(2H, d, J = 8.2 Hz), 8.17(2H, d, J = 8.2 Hz), 8.25(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.54 (1H, d, J = 2.6 Hz), 10.65(1H, s).
274	-CF_3	-H	-N(CH_3)-	none	piperonyl	dihydro-chloride	^{1}H NMR 2.98-3.12(2H, m), 3.12-3.36(2H, m), 3.50(3H, s), 3.71-4.68(6H, m), 6.06(2H, s), 6.93-7.06(3H, m), 7.26(1H, s), 7.42(2H, d, J = 8.3 Hz), 7.53(2H, d, J = 8.3 Hz), 7.92(2H, d, J = 8.3 Hz), 8.12(1H, d, J = 9.2 Hz), 8.20(2H, d, J = 8.3 Hz), 8.67(1H, s), 10.79(1H, s), 11.47(1H, brs).
275	-CF_3	-H	-N(CH_3)-	none	benzyl	free	mp 213-214

Table 161



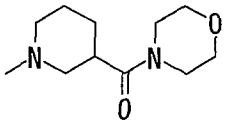
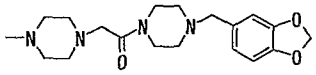
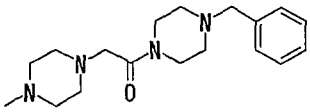
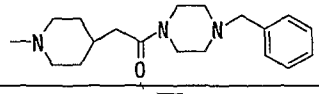
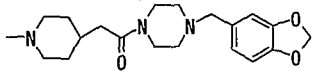
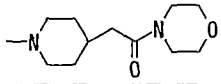
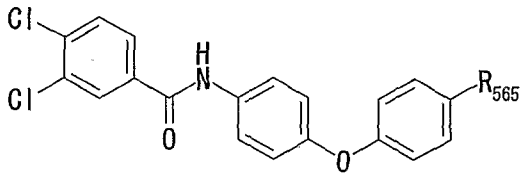
Example No.	R_{562}	R_{563}	R_{564}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
276	-Cl	-Cl		^{1}H NMR 1.62-1.80(2H, m), 1.82-1.87(2H, m), 2.71(1H, dt, J = 3 Hz, 11.0 Hz), 2.84 (1H, brs), 2.94(1H, t, J = 11.0 Hz), 3.55-3.70(10H, m), 6.89(1H, d, J = 9.0 Hz), 6.93(2H, dd, J = 7.0 Hz, 2.0 Hz), 7.02 (2H, dd, J = 7.0 Hz, 2.0 Hz), 7.56(1H, d, J = 8.0 Hz), 7.71(1H, dd, J = 9.0 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.10(1H, s), 8.15 (1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25(1H, d, J = 2.5 Hz).
277	-Cl	-Cl		^{1}H NMR 2.38-2.42(4H, m), 2.62-2.67(4H, m), 3.14-3.17(4H, m), 3.22(2H, s), 3.42 (2H, s), 3.61-3.63(4H, m), 5.95(2H, s), 6.70-6.75(2H, m), 7.03(2H, d, J = 8.0 Hz), 7.55(1H, d, J = 8.0 Hz), 7.70(1H, brs), 7.73(2H, d, J = 8.0 Hz), 8.01(1H, s), 8.15 (1H, brd, J = 9.0 Hz), 8.27(1H, d, J = 2.5 Hz).
278	-Cl	-Cl		^{1}H NMR 2.40-2.45(4H, m), 2.60-2.64(4H, m), 3.13(4H, brs), 3.20(2H, brs), 3.48(2H, brs), 3.62(4H, brs), 6.85-6.91(3H, m), 7.01 (2H, d, J = 8.0 Hz), 7.26-7.32(5H, m), 7.52 (1H, d, J = 8.5 Hz), 7.70(1H, brs), 7.74(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.03(1H, d, J = 2.0 Hz), 8.15(1H, brd, J = 9.0, Hz), 8.29(1H, d, J = 2.5 Hz).
279	-H	$-CF_3$		mp 180-183
280	-H	$-CF_3$		mp 197-199
281	-H	$-CF_3$		mp 133-135

Table 162



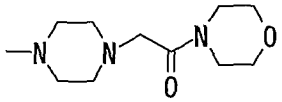
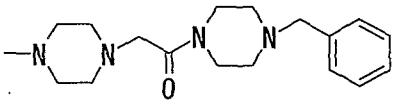
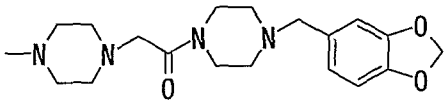
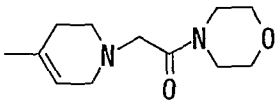
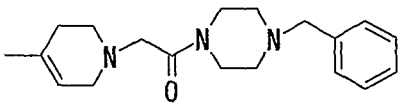
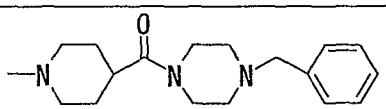
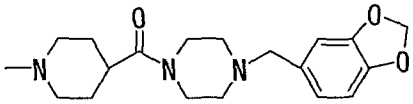
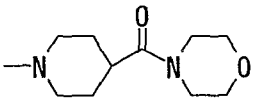
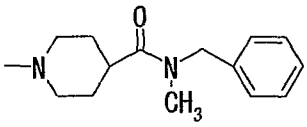
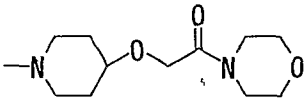
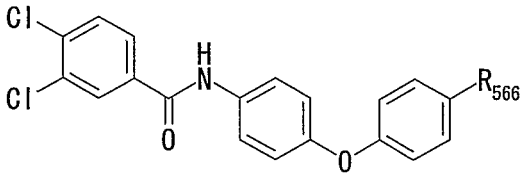
Example No.	R_{565}	Form	mp (°C)
282		free	108-110
283		free	136-138
284		free	133-136
285		free	147-151
286		dihydrochloride	180-183
287		free	111-113
288		free	111-113
289		free	246-249
290		free	148-151
291		free	120-121

Table 163



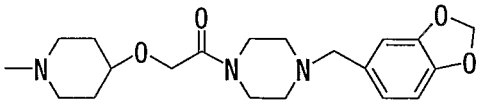
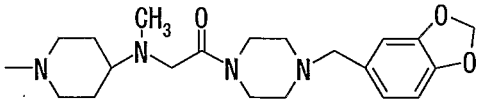
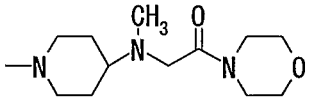
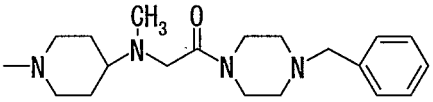
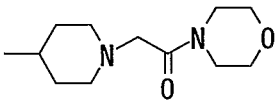
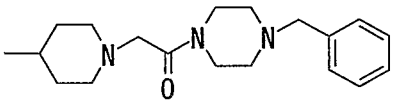
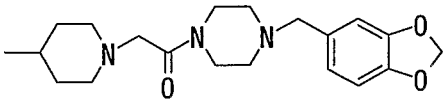
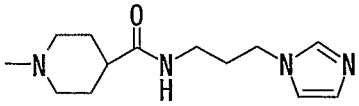
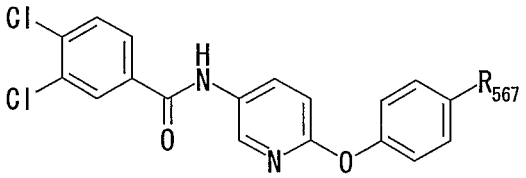
Example No.	R_{566}	Form	mp (°C)
292		free	83-86
293		free	130-133
294		free	145-146
295		trihydro-chloride	180-185
296		free	184-186
297		free	173-176
298		free	181-183
299		free	166-170

Table 164



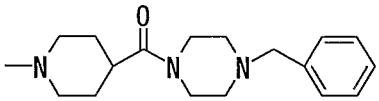
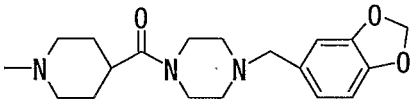
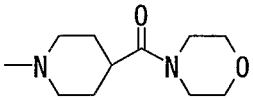
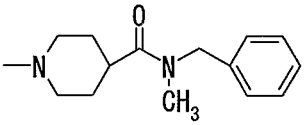
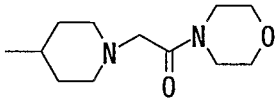
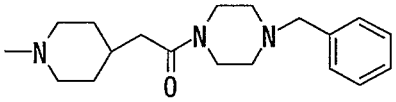
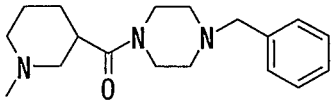
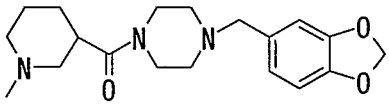
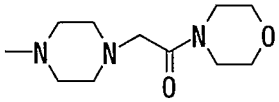
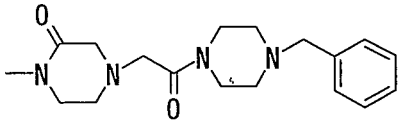
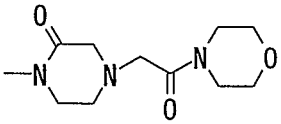
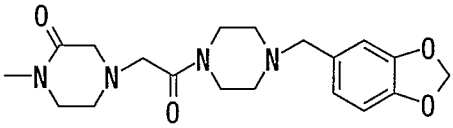
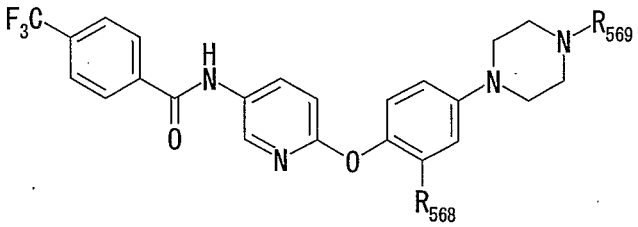
Example No.	R_{567}	mp (°C)
300		102-104
301		106-109
302		261-264
303		173-175
304		164-166
305		158-160
306		174-176
307		206-207
308		165-166
309		164-167
310		188-190
311		130-132

Table 165



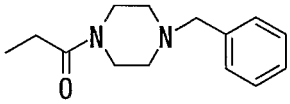
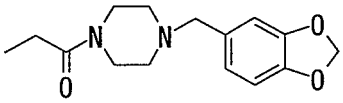
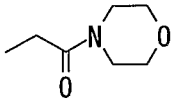
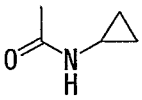
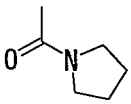
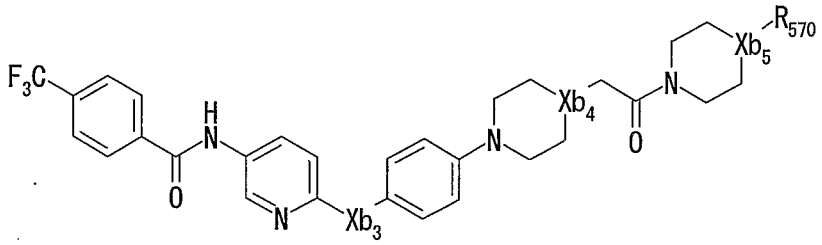
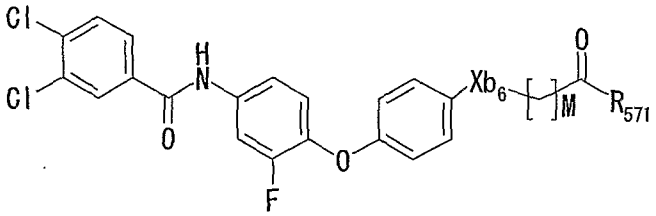
Example No.	R_{568}	R_{569}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
312	-H		mp 166-167
313	-H		mp 157-158
314	-H		mp 218-219
315		benzyl	^{1}H NMR 0.25-0.31(2H, m), 0.61-0.69(2H, m), 2.67-2.73(1H, m), 2.86(4H, brs), 3.18(4H, brs), 3.83(2H, s), 6.80-6.92(3H, m), 7.16-7.62(8H, m), 8.11(2H, d, J = 8.1 Hz), 8.39(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.45(1H, d, J = 2.5 Hz), 10.23(1H, s), 10.93(1H, brs).
316	-CONHPh	benzyl	^{1}H NMR 3.07(4H, brs), 3.26(4H, brs), 3.98(2H, s), 6.83-7.59(14H, m), 7.65(2H, d, J = 8.3 Hz), 8.06(2H, d, J = 8.1 Hz), 8.37(1H, d, J = 2.6 Hz), 8.49(1H, dd, J = 8.9 Hz, 2.6 Hz), 9.30(1H, s), 9.71(1H, brs).
317		benzyl	^{1}H NMR 1.87(4H, brs), 2.72(4H, brs), 3.19(4H, brs), 3.40(4H, brs), 3.69(2H, s), 6.58(1H, d, J = 8.7 Hz), 6.80(1H, s), 6.92(1H, d, J = 9.2 Hz), 7.02(1H, d, J = 8.9 Hz), 7.26-7.34(5H, m), 7.57 (2H, d, J = 7.9 Hz), 7.90(1H, d, J = 7.1 Hz), 8.05 (2H, d, J = 8.1 Hz), 8.40(1H, s), 9.73(1H, s).

Table 166



Example No.	Xb_3	Xb_4	Xb_5	R_{570}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
318	-O-			benzyl	mp 162-163
319	-O-			piperonyl	mp 136-137
320	-O-		-O-	none	mp 176-177
321	-N(CH_3)-			benzyl	^{1}H NMR 2.43(4H, brs), 2.67(4H, t, J = 4.8 Hz), 3.22 (4H, t, J = 4.8 Hz), 3.24(2H, s), 3.42(3H, s), 3.52(2H, s), 3.63(4H, brs), 6.46 (1H, d, J = 9.1 Hz), 6.95(2H, d, J = 8.9 Hz), 7.15(2H, d, J = 8.9 Hz), 7.20-7.40(5H, m), 7.65-7.80(2H, m), 7.74(2H, d, J = 8.2 Hz), 7.98 (2H, d, J = 8.2 Hz), 8.26(1H, d, J = 2.5 Hz).
322	-N(CH_3)-			piperonyl	^{1}H NMR 2.41(4H, brs), 2.67(4H, t, J = 4.8 Hz), 3.22 (4H, t, J = 5.1 Hz), 3.24(2H, s), 3.42(5H, s), 3.62(4H, t, J = 4.5 Hz), 5.94(2H, s), 6.46(1H, d, J = 9.1 Hz), 6.74(2H, s), 6.85(1H, s), 6.95(2H, d, J = 8.9 Hz), 7.15 (2H, d, J = 8.9 Hz), 7.65-7.75(1H, m), 7.74(2H, d, J = 8.1 Hz), 7.83(1H, brs), 7.99(2H, d, J = 8.1 Hz), 8.26 (1H, d, J = 2.5 Hz).
323	-N(CH_3)-			benzyl	^{1}H NMR 1.31-1.52(2H, m), 1.88(2H, d, J = 12.3 Hz), 1.88-2.15(1H, m), 2.29(2H, d, J = 6.7 Hz), 2.44(4H, t, J = 5.1 Hz), 2.76(2H, t, J = 11.2 Hz), 3.42(3H, s), 3.49(2H, t, J = 4.9 Hz), 3.53(2H, s), 3.59-3.78(4H, m), 6.47(1H, d, J = 9.1 Hz), 6.96(2H, d, J = 8.9 Hz), 7.13 (2H, d, J = 8.9 Hz), 7.20-7.41(5H, m), 7.61-7.78 (2H, m), 7.75(2H, d, J = 8.1 Hz), 7.98 (2H, d, J = 8.1 Hz), 8.25(1H, d, J = 2.3 Hz).
324	-N(CH_3)-			piperonyl	^{1}H NMR 1.30-1.51(2H, m), 1.88(2H, d, J = 2.9 Hz), 1.98-2.11(1H, m), 2.29(2H, d, J = 6.7 Hz), 2.41(4H, m), 2.76(2H, t, J = 11.2 Hz), 3.42(3H, s), 3.43(2H, s), 3.49(2H, t, J = 4.8 Hz), 3.55-3.78(4H, m), 5.95(2H, s), 6.47(1H, d, J = 9.0 Hz), 6.74(2H, s), 6.86(1H, s), 6.96(2H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.9 Hz), 7.70 (1H, brs), 7.71(1H, dd, J = 9.0 Hz, 2.7 Hz), 7.75(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.26(1H, d, J = 2.7 Hz).

Table 167



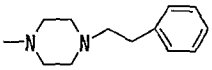
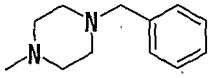
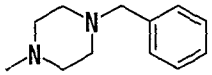
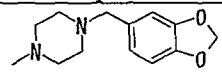
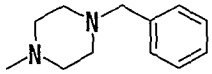
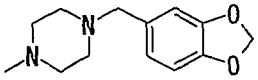
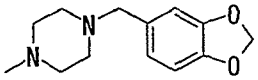
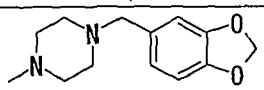
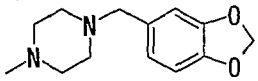
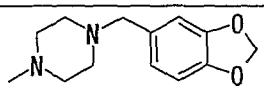
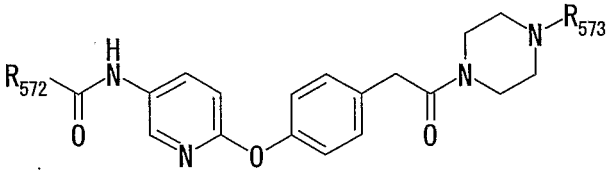
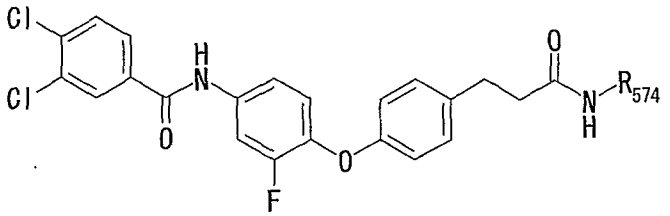
Example No.	Xb_6	M	R_{571}	Form	δmp (°C) or ^{1}H NMR
325	-N(Ac)-	1		hydro-chloride	mp 214-216
326	-N(Ac)-	1		free	^{1}H NMR (DMSO-d_6) δ 1.77(3H, s), 2.25-2.34(4H, m), 3.30-3.50(6H, m), 4.40 (2H, s), 6.97(2H, d, J = 8.8 Hz), 7.22-7.35 (6H, m), 7.36(2H, d, J = 8.8 Hz), 7.53-7.59 (1H, m), 7.84(1H, d, J = 8.3 Hz), 7.89-7.95 (2H, m), 8.20(1H, d, J = 2.2 Hz), 10.61(1H, s).
327	none	1		free	mp 178-179
328	none	1	morpholino	free	mp 196-198
329	none	1		free	mp 197-198
330	none	3	morpholino	free	mp 144-146
331	none	3		hydro-chloride	mp 194-196
332	none	3		hydro-chloride	mp 205-206
333	-S-	1		free	^{1}H NMR ($CDCl_3$) δ 2.35-2.45(4H, m), 3.42(2H, s), 3.42-3.48(2H, m), 3.58(2H, brs), 3.65(2H, s), 5.94(2H, s), 6.72-6.75 (2H, m), 6.84(1H, d, J = 1.1 Hz), 6.89(2H, d, J = 8.8 Hz), 7.00-7.10(1H, m), 7.19-7.25(1H, m), 7.42(2H, d, J = 8.8 Hz), 7.58(1H, d, J = 8.3 Hz), 7.65-7.76(2H, m), 7.98(1H, s), 7.99(1H, s).
334	-SO-	1		free	mp 133-135
335	$-SO_2-$	1		free	mp 125-128
336	-CH=CH- (trans)	0		free	mp 169-171

Table 168



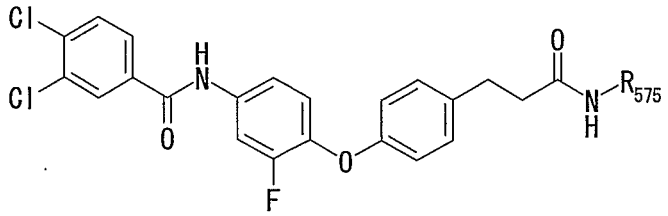
Example No.	R_{572}	R_{573}	^{1}H NMR (solvent) δppm
337	4-CF_3Ph-	benzyl	($CDCl_3$) 2.30-2.34(2H, m), 2.39-2.43(2H, m), 3.46-3.49(4H, m), 3.62-3.66(2H, m), 3.69(2H, s), 6.94(1H, d, J = 8.7 Hz), 7.03-7.08 (2H, m), 7.19-7.35(7H, m), 7.75(2H, d, J = 8.2 Hz), 8.00(2H, d, J = 8.2 Hz), 8.21(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.26(1H, s), 8.29(1H, d, J = 2.8 Hz).
338	4-CF_3Ph-	piperonyl	($CDCl_3$) 2.28-2.32(2H, m), 2.36-2.39(2H, m), 3.39(2H, s), 3.45-3.49 (2H, m), 3.60-3.64(2H, m), 3.68(2H, s), 5.94(2H, s), 6.69-6.76(2H, m), 6.83(1H, brs), 6.92(1H, d, J = 8.7 Hz), 7.01-7.06(2H, m), 7.17-7.22(2H, m), 7.72(2H, d, J = 8.4 Hz), 8.00(2H, d, J = 8.1 Hz), 8.17-8.21(1H, m), 8.29(1H, d, J = 2.6 Hz), 8.49(1H, brs).
339	3,4-Cl_2Ph-	benzyl	($CDCl_3$) 2.31-2.34(2H, m), 2.38-2.42(2H, m), 3.46-3.50(4H, m), 3.62-3.65(2H, m), 3.69(2H, s), 6.90(1H, d, J = 8.9 Hz), 7.00-7.05 (2H, m), 7.17-7.23(2H, m), 7.28-7.35(5H, m), 7.54(1H, d, J = 8.2 Hz), 7.73(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(1H, d, J = 2.1 Hz), 8.12-8.17(1H, m), 8.28(1H, d, J = 2.8 Hz), 8.44(1H, brs).
340	3,4-Cl_2Ph-	3-pyridyl	($CDCl_3$) 3.02-3.06(2H, m), 3.13-3.17(2H, m), 3.63-3.67(2H, m), 3.76-3.82(4H, m), 6.91(1H, d, J = 8.9 Hz), 7.02-7.07(2H, m), 7.17-7.24(4H, m), 7.52(1H, d, J = 8.4 Hz), 7.73-7.76(1H, m), 8.01(1H, d, J = 2.0 Hz), 8.11-8.13(1H, m), 8.18(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.23-8.25(2H, m), 8.95(1H, brs).
341	3,4-Cl_2Ph-	piperonyl	($CDCl_3$) 2.28-2.39(4H, m), 3.39(2H, s), 3.46-3.49(2H, m), 3.60-3.64 (2H, m), 3.69(2H, s), 5.94(2H, s), 6.69-6.76(2H, m), 6.82-6.83(1H, m), 6.89(1H, d, J = 8.9 Hz), 6.99-7.04(2H, m), 7.15-7.21(2H, m), 7.53(1H, d, J = 8.4 Hz), 7.71-7.75(1H, m), 7.99(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.28(1H, d, J = 2.6 Hz), 8.56(1H, s).
342	3,4-Cl_2PhNH-	piperonyl	(DMSO-d_6) 2.20-2.35(4H, m), 3.38(2H, s), 3.40-3.55(4H, m), 3.69 (2H, s), 5.98(2H, s), 6.70-6.76(1H, m), 6.76-6.86(2H, m), 6.97-7.00 (3H, m), 7.02-7.24(2H, m), 7.35(1H, dd, J = 8.8 Hz, 2.5 Hz), 7.52 (1H, d, J = 8.8 Hz), 7.86(1H, d, J = 2.5 Hz), 7.98(1H, dd, J = 8.8 Hz, 2.8 Hz), 8.19(1H, d, J = 2.6 Hz), 8.89(1H, s), 9.08(1H, s).

Table 169



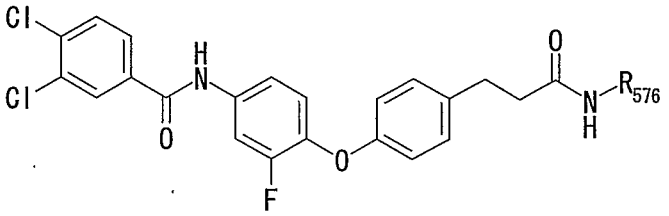
Example No.	R_{574}	^{1}H NMR (DMSO-d_6) δppm or MS
343	-H	^{1}H NMR 2.33(2H, t, J = 7.7 Hz), 2.77(2H, t, J = 7.7 Hz), 6.75(1H, brs), 6.87(2H, d, J = 8.6 Hz), 7.15-7.23(3H, m), 7.28(1H, brs), 7.54(1H, d, J = 8.7 Hz), 7.85 (1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
344	$-CH_3$	MS 460(M^+)
345	$-C_2H_5$	^{1}H NMR 0.97(3H, t, J = 7.2 Hz), 2.32(2H, t, J = 7.8 Hz), 2.77(2H, t, J = 7.8 Hz), 3.00-3.08(2H, m), 6.87(2H, d, J = 8.6 Hz), 7.14-7.21(3H, m), 7.54(1H, d, J = 9.8 Hz), 7.78(1H, brt), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.3 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
346	$-CH(CH_3)_2$	^{1}H NMR 1.00(6H, d, J = 6.6 Hz), 2.30(2H, t, J = 7.7 Hz), 2.77(2H, t, J = 7.7 Hz), 3.75-3.86(1H, m), 6.87(2H, d, J = 8.6 Hz), 7.13-7.20(3H, m), 7.54(1H, d, J = 8.9 Hz), 7.65(1H, brd), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.1 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 10.58(1H, s).
347	$-CH_2CH(CH_3)_2$	^{1}H NMR 0.78(6H, d, J = 6.7 Hz), 1.56-1.68(1H, m), 2.36(2H, t, J = 7.6 Hz), 2.78(2H, t, J = 7.6 Hz), 2.81-2.87(2H, m), 6.87(2H, d, J = 8.6 Hz), 7.10-7.22 (3H, m), 7.54(1H, d, J = 8.9 Hz), 7.77(1H, brt), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
348	$-(CH_2)_3CH_3$	^{1}H NMR 0.84(3H, t, J = 7.3 Hz), 1.15-1.27(2H, m), 1.27-1.38(2H, m), 2.33(2H, t, J = 7.7 Hz), 2.77(2H, t, J = 7.7 Hz), 2.97-3.05(2H, m), 6.87(2H, d, J = 8.6 Hz), 7.11-7.21(3H, m), 7.50-7.58(1H, m), 7.74(1H, brt), 7.85(1H, d, J = 8.4 Hz), 7.89 (1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
349	cyclopropyl	^{1}H NMR 0.26-0.37(2H, m), 0.51-0.63(2H, m), 2.29(2H, t, J = 7.7 Hz), 2.53-2.61 (1H, m), 2.76(2H, t, J = 7.7 Hz), 6.87(2H, d, J = 8.6 Hz), 7.10-7.23(3H, m), 7.54 (1H, d, J = 8.6 Hz), 7.80-8.00(4H, m), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
350	cyclopentyl	^{1}H NMR 1.21-1.34(2H, m), 1.41-1.51(2H, m), 1.51-1.63(2H, m), 1.68-1.80(2H, m), 2.31(2H, t, J = 7.7 Hz), 2.76(2H, t, J = 7.7 Hz), 3.90-3.99(1H, m), 6.87(2H, d, J = 8.6 Hz), 7.14-7.21(3H, m), 7.50-7.57(1H, m), 7.72(1H, brd), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 10.58(1H, s).
351	cyclohexyl	^{1}H NMR 1.00-1.15(3H, m), 1.15-1.28(2H, m), 1.48-1.58(1H, m), 1.58-1.70(4H, m), 2.31(2H, t, J = 7.6 Hz), 2.77(2H, t, J = 7.6 Hz), 3.44-3.53(1H, m), 6.87(2H, d, J = 8.6 Hz), 7.11-7.23(3H, m), 7.50-7.57(1H, m), 7.62(1H, brd), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).

Table 170



Example No.	R_{575}	^{1}H NMR (DMSO-d_6) δppm
352	cycloheptyl	1.28-1.40(4H, m), 1.40-1.61(6H, m), 1.63-1.77(2H, m), 2.31(2H, t, J = 7.6 Hz), 2.76(2H, t, J = 7.6 Hz), 3.64-3.74(1H, m), 6.87(2H, d, J = 8.6 Hz), 7.11-7.23(3H, m), 7.54(1H, d, J = 9.1 Hz), 7.67(1H, brd), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
353	cyclooctyl	1.30-1.65(14H, m), 2.31(2H, t, J = 7.6 Hz), 2.76(2H, t, J = 7.6 Hz), 3.69-3.80(1H, m), 6.87(2H, d, J = 8.6 Hz), 7.10-7.22(3H, m), 7.54(1H, d, J = 8.9 Hz), 7.65(1H, brd), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.3 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
354	cyclododecanyl	1.10-1.41(20H, m), 1.41-1.54(2H, m), 2.32(2H, t, J = 7.5 Hz), 2.77(2H, t, J = 7.5 Hz), 3.79-3.88(1H, m), 6.86(2H, d, J = 8.6 Hz), 7.10-7.21(3H, m), 7.48-7.57(2H, m), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.1 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.58(1H, s).
355	cyclopropylmethyl	0.06-0.16(2H, m), 0.28-0.42(2H, m), 0.78-0.90(1H, m), 2.35(2H, t, J = 7.7 Hz), 2.78(2H, t, J = 7.7 Hz), 2.84-2.97(2H, m), 6.87(2H, d, J = 8.5 Hz), 7.12-7.27(3H, m), 7.54(1H, d, J = 8.8 Hz), 7.85(1H, d, J = 8.4 Hz), 7.87(1H, brt), 7.89(1H, dd, J = 13.2 Hz, 2.3 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
356	cyclohexylmethyl	0.71-0.86(2H, m), 1.03-1.20(3H, m), 1.22-1.34(1H, m), 1.50-1.69(5H, m), 2.35(2H, t, J = 7.6 Hz), 2.78(2H, t, J = 7.6 Hz), 2.80-2.90(2H, m), 6.86(2H, d, J = 8.6 Hz), 7.12-7.23(3H, m), 7.54(1H, d, J = 8.9 Hz), 7.73(1H, brt), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
357	piperonyl	2.41(2H, t, J = 7.6 Hz), 2.81(2H, t, J = 7.6 Hz), 4.15(2H, d, J = 5.9 Hz), 5.96(2H, s), 6.63(1H, d, J = 8.0 Hz), 6.74(1H, d, J = 1.4 Hz), 6.80(1H, d, J = 8.0 Hz), 6.87(2H, d, J = 8.8 Hz), 7.14-7.23(3H, m), 7.54(1H, d, J = 9.8 Hz), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 8.25(1H, brt), 8.40-8.46(2H, m), 10.58(1H, s).
358	-CH(CH_3)Ph	1.30(3H, d, J = 7.0 Hz), 2.40(2H, t, J = 7.5 Hz), 2.78(2H, t, J = 7.5 Hz), 3.86-3.96(1H, m), 6.82-6.99(2H, m), 7.12-7.24(6H, m), 7.24-7.31(2H, m), 7.55(1H, dd, J = 8.9 Hz, 1.2 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 8.24(1H, brd), 10.59(1H, s).

Table 171



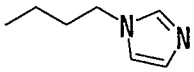
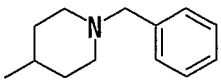
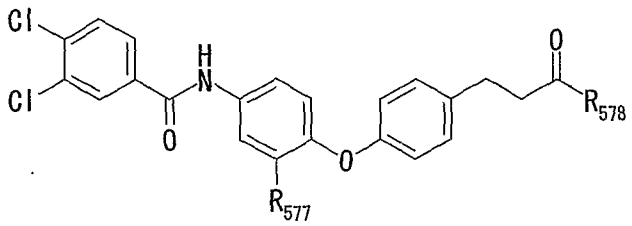
Example No.	R_{576}	^{1}H NMR (DMSO-d_6) δppm or MS
359	2-pyridylmethyl	MS 537(M^+)
360	3-pyridylmethyl	^{1}H NMR 2.44(2H, t, J = 7.6 Hz), 2.82(2H, t, J = 7.6 Hz), 4.27(2H, d, J = 5.9 Hz), 6.86(2H, dd, J = 6.7 Hz, 1.9 Hz), 7.14-7.22(3H, m), 7.25-7.32(1H, m), 7.46-7.58(2H, m), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 8.38(1H, brt), 8.40-8.46(2H, m), 10.58(1H, s).
361	4-pyridylmethyl	MS 537(M^+)
362	$-(CH_2)_2NHAc$	^{1}H NMR 1.78(3H, s), 2.34(2H, t, J = 7.8 Hz), 2.78(2H, t, J = 7.8 Hz), 2.96-3.10(4H, m), 6.83-6.91(2H, m), 7.14-7.23(3H, m), 7.54(1H, dd, J = 8.9 Hz, 1.3 Hz), 7.80-7.98(5H, m), 8.21(1H, d, J = 2.1 Hz), 10.58(1H, s).
363	$-CH(CH_3)(CH_2)_4CH_3$	^{1}H NMR 0.84(3H, t, J = 7.0 Hz), 0.96(3H, d, J = 6.6 Hz), 1.08-1.34(8H, m), 2.32(2H, t, J = 7.2 Hz), 2.77(2H, t, J = 7.2 Hz), 3.65-3.76(1H, m), 6.82-6.89(2H, m), 7.12-7.21(3H, m), 7.50-7.60(2H, m), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.3 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.58(1H, s).
364	$-(CH_2)_2OCH_3$	^{1}H NMR 2.35(2H, t, J = 7.7 Hz), 2.77(2H, t, J = 7.7 Hz), 3.13-3.22(2H, m), 3.22(3H, s), 3.29(2H, t, J = 5.8 Hz), 6.82-6.92(2H, m), 7.13-7.23(3H, m), 7.54(1H, d, J = 8.9 Hz)7.85(1H, d, J = 8.4 Hz), 7.85-7.92(2H, m), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
365		MS 554(M^+)
366		MS 619(M^+)

Table 172



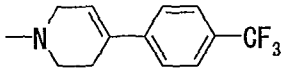
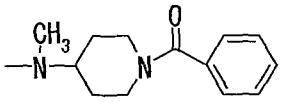
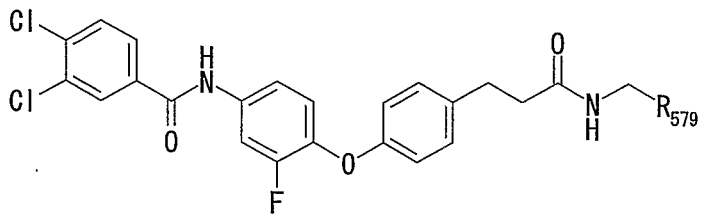
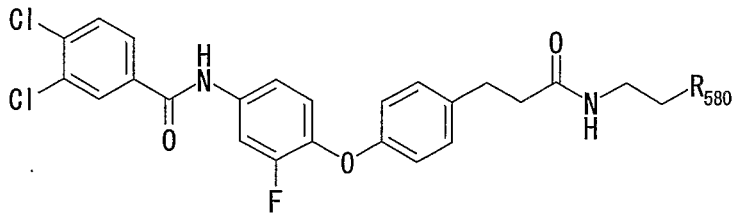
Example No.	R_{577}	R_{578}	mp (°C) or MS
367	-H	morpholino	mp 160-162
368	-F	morpholino	mp 150-151
369	-F		MS 657(M^++H)
370	-F		MS 646(M^+-1)
371	-F	4-$CH_3OPh(CH_2)_2N(C_2H_5)$-	MS 608(M^+)
372	-F	4-$CH_3OPhCH_2N(C_2H_5)$-	MS 594(M^+)
373	-F	3,4-$(CH_3O)_2PhCH_2N(CH_2CH_2CH_3)$-	MS 638(M^+)

Table 173



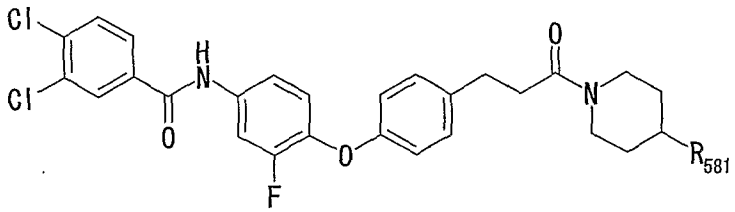
Example No.	R_{579}	^{1}H NMR (DMSO-d_6) δppm
374	Ph-	2.39-2.49(2H, m), 2.78-2.88(2H, m), 4.18-4.30(2H, m), 6.87(2H, d, J = 8.6 Hz), 7.02-7.33(8H, m), 7.55(1H, d, J = 8.9 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90 (1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.22(1H, d, J = 2.0 Hz), 8.32(1H, brt), 10.58(1H, s).
375	4-FPh-	2.43(2H, t, J = 7.6 Hz), 2.82(2H, t, J = 7.6 Hz), 4.22(2H, d, J = 5.9 Hz), 6.87 (2H, d, J = 8.6 Hz), 7.04-7.12(2H, m), 7.12-7.24(5H, m), 7.55(1H, d, J = 9.0 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 8.32(1H, brt), 10.58(1H, s).
376	3,4-$(CH_3O)_2$Ph-	2.42(2H, t, J = 7.6 Hz), 2.82(2H, t, J = 7.6 Hz), 3.70(3H, s), 3.71(3H, s), 4.18 (2H, d, J = 5.8 Hz), 6.67(1H, d, J = 8.4 Hz), 6.77-6.90(4H, m), 7.15-7.23(3H, m), 7.55(1H, d, J = 9.0 Hz), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.0 Hz), 8.25(1H, brt), 10.58(1H, s).
377	2-ClPh-	2.48(2H, t, J = 7.5 Hz), 2.83(2H, t, J = 7.5 Hz), 4.30(2H, d, J = 5.9 Hz), 6.88 (2H, d, J = 8.6 Hz), 7.08-7.15(1H, m), 7.15-7.32(5H, m), 7.38-7.46(1H, m), 7.51-7.59(1H, m), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.0 Hz), 8.34(1H, brt), 10.58 (1H, s).
378	3-ClPh-	2.45(2H, t, J = 7.5 Hz), 2.83(2H, t, J = 7.5 Hz), 4.25(2H, d, J = 6.0 Hz), 6.87 (2H, d, J = 8.6 Hz), 7.07-7.12(1H, m), 7.12-7.21(3H, m), 7.21-7.25(1H, m), 7.25-7.33(2H, m), 7.55(1H, d, J = 9.0 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 8.37(1H, brt), 10.58(1H, s).
379	4-ClPh-	2.44(2H, t, J = 7.5 Hz), 2.82(2H, t, J = 7.5 Hz), 4.22(2H, d, J = 6.0 Hz), 6.87 (2H, d, J = 8.6 Hz), 7.14(2H, d, J = 8.4 Hz), 7.16-7.22(3H, m), 7.29-7.34(2H, m), 7.55(1H, d, J = 8.1 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.5 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 8.34(1H, brt), 10.58(1H, s).
380	2-CH_3Ph-	2.21(3H, s), 2.44(2H, t, J = 7.5 Hz), 2.82(2H, t, J = 7.5 Hz), 4.21(2H, d, J = 5.7 Hz), 6.87(2H, d, J = 8.6 Hz), 7.00-7.07(1H, m), 7.07-7.23(6H, m), 7.55(1H, d, J = 9.0 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94 (1H, dd, J = 8.4 Hz, 2.1 Hz), 8.16(1H, brt), 8.22(1H, d, J = 2.1 Hz), 10.58(1H, s).
381	4-CH_3OPh-	2.41(2H, t, J = 7.6 Hz), 2.81(2H, t, J = 7.6 Hz), 3.71(3H, s), 4.17(2H, d, J = 5.8 Hz), 6.80-6.91(4H, m), 7.07(2H, d, J = 8.5 Hz), 7.13-7.25(3H, m), 7.55(1H, d, J = 8.5 Hz), 7.85(1H, d, J = 8.4 Hz), 7.90(1H, dd, J = 13.2 Hz, 2.4 Hz), 7.94 (1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 8.24(1H, brt), 10.58(1H, s).

Table 174



Example No.	R_{580}	^{1}H NMR (DMSO-d_6) δppm
382	Ph-	2.33(2H, t, J = 7.7 Hz), 2.66(2H, t, J = 7.3 Hz), 2.77(2H, t, J = 7.7 Hz), 3.20-3.29(2H, m), 6.87(2H, d, J = 8.6 Hz), 7.12-7.22(6H, m), 7.23-7.30(2H, m), 7.54(1H, dd, J = 8.9 Hz, 1.1 Hz), 7.85(1H, d, J = 8.4 Hz), 7.85-7.91(2H, m), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).
383	4-FPh-	2.33(2H, t, J = 7.7 Hz), 2.65(2H, t, J = 7.2 Hz), 2.76(2H, t, J = 7.7 Hz), 3.30-3.37(2H, m), 6.87(2H, d, J = 8.5 Hz), 7.04-7.11(2H, m), 7.13-7.22(5H, m), 7.54(1H, d, J = 9.1 Hz), 7.85(1H, d, J = 8.4 Hz), 7.80-7.92(2H, m), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.58(1H, s).
384	4-ClPh-	2.32(2H, t, J = 7.6 Hz), 2.66(2H, t, J = 7.1 Hz), 2.76(2H, t, J = 7.6 Hz), 3.18-3.27(2H, m), 6.87(2H, d, J = 8.5 Hz), 7.10-7.22(5H, m), 7.31(2H, d, J = 8.3 Hz), 7.54(1H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.4 Hz), 7.85-7.92(2H, m), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
385	3-CH_3OPh-	2.33(2H, t, J = 7.7 Hz), 2.64(2H, t, J = 7.3 Hz), 2.78(2H, t, J = 7.7 Hz), 3.18-3.27(2H, m), 3.72(3H, s), 6.70-6.78(3H, m), 6.87(2H, d, J = 8.6 Hz), 7.12-7.23(4H, m), 7.54(1H, dd, J = 8.9 Hz, 1.2 Hz), 7.85(1H, d, J = 8.4 Hz), 7.85-7.92(2H, m), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.21(1H, d, J = 2.0 Hz), 10.57(1H, s).
386	4-CH_3OPh-	2.33(2H, t, J = 7.6 Hz), 2.59(2H, t, J = 7.2 Hz), 2.77(2H, t, J = 7.6 Hz), 3.16-3.24(2H, m), 3.71(3H, s), 6.83(2H, d, J = 8.5 Hz), 6.87(2H, d, J = 8.5 Hz), 7.07(2H, d, J = 8.4 Hz), 7.13-7.23(3H, m), 7.54(1H, d, J = 8.5 Hz), 7.80-7.98(4H, m), 8.21(1H, d, J = 1.8 Hz), 10.57(1H, s).
387	PhO-	2.38(2H, t, J = 7.7 Hz), 2.79(2H, t, J = 7.7 Hz), 3.38-3.43(2H, m), 3.94(2H, t, J = 5.7 Hz), 6.79-6.85(2H, m), 6.89-6.96(3H, m), 7.12-7.20(3H, m), 7.23-7.31(2H, m), 7.50-7.57(1H, m), 7.85(1H, d, J = 8.4 Hz), 7.89(1H, dd, J = 13.2 Hz, 2.4 Hz), 8.10(1h, brt), 8.22(1H, d, J = 2.1 Hz), 10.58(1H, s).
388	$PhCH_2$-	1.60-1.70(2H, m), 2.36(2H, t, J = 7.4 Hz), 2.49-2.55(2H, m), 2.79(2H, t, J = 7.4 Hz), 3.00-3.08(2H, m), 6.83-6.90(2H, m), 7.10-7.21(6H, m), 7.21-7.29 (2H, m), 7.53(1H, d, J = 8.9 Hz), 7.89-7.92(3H, m), 8.21(1H, d, J = 2.1 Hz), 10.57(1H, s).

Table 175



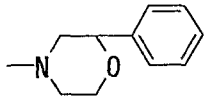
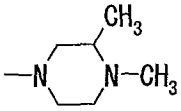
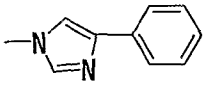
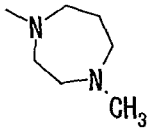
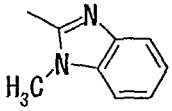
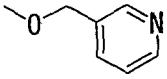
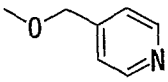
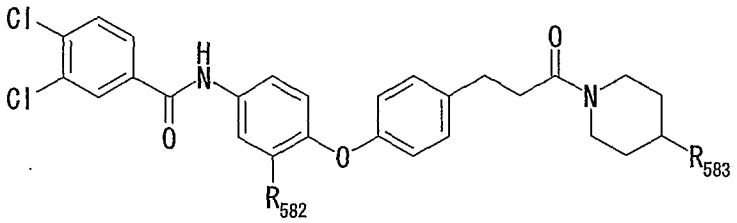
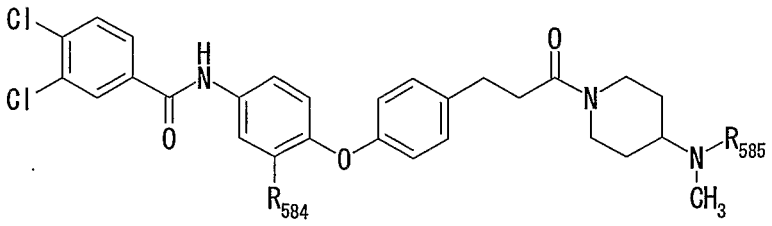
Example No.	R_{581}	MS
389	-$CHPh_2$	681(M^{+}+1)
390	-NHCOPh	633(M^{+})
391	-$O(CH_2)_2Ph$	634(M^{+})
392	-$(CH_2)_2N(CH_3)Ph$	647(M^{+})
393		675(M^{+})
394	morpholino	599(M^{+})
395		626(M^{+})
396	cyclohexyl	596(M^{+})
397		656(M^{+})
398		626(M^{+})
399	4-$CH_3OPhCONH$-	664(M^{+}+1)
400		644(M^{+})
401		620(M^{+}-1)
402		623(M^{+}+2)

Table 176



Example No.	R_{582}	R_{583}	Property
403	-H	4-CF_3OPhNH-	mp 91-95°C
404	-F	4-CF_3OPhNH-	mp 145-147°C
405	-H	4-CF_3PhO-	mp 118-121°C
406	-H	4-CF_3OPhO-	mp 126-127°C
407	-F	4-CF_3PhO-	mp 129-134°C
408	-H	4-CNPhO-	mp 148-149°C
409	-F	4-CNPhO-	mp 147-150°C
410	-F	4-CF_3OPhO-	^{1}H NMR ($CDCl_3$) δ 1.69-1.85(4H, m), 2.62(2H, t, J = 7.5 Hz), 2.90(2H, t, J = 7.5 Hz), 3.36(1H, m), 3.57-3.67(3H, m), 4.47(1H, m), 6.85-6.90(4H, m), 7.00(1H, t, J = 8.5 Hz), 7.10(2H, d, J = 8.5 Hz), 7.13(2H, d, J = 8.5 Hz), 7.30(1H, brd, J = 8.5 Hz), 7.52(1H, d, J = 8.5 Hz), 7.69-7.75(2H, m), 7.98(1H, d, J = 2.0 Hz), 8.80(1H, s).
411	-F	PhO-	MS 606(M^+)
412	-F	4-$ClPhCH_2$-	MS 638(M^+)
413	-F	4-CH_3PhCH_2-	MS 618(M^+)
414	-F	4-ClPh-	MS 626(M^+)
415	-F	Ph-	MS 590(M^+)
416	-F	2-NH_2PhCO-	MS 633(M^+)

Table 177



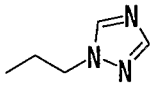
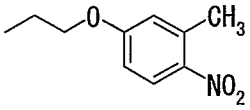
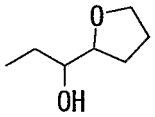
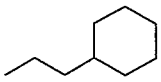
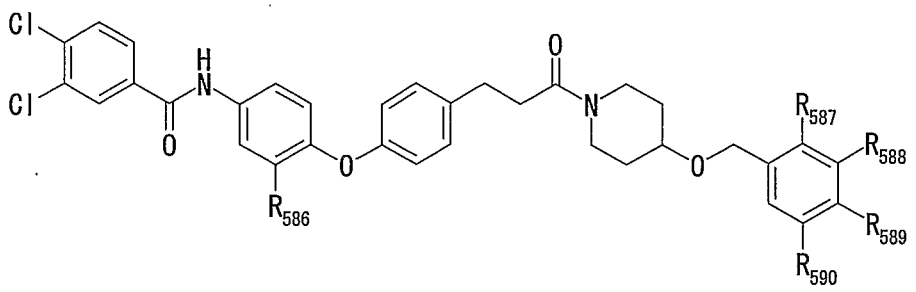
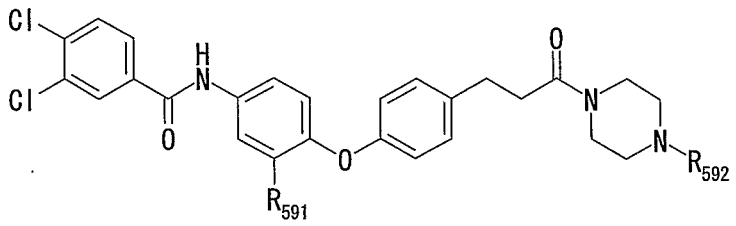
Example No.	R_{584}	R_{585}	Form	mp (°C) or MS
417	-F	-H	free	MS 543(M^+)
418	-F	$-(CH_2)_2OPh$	free	MS 664(M^++H)
419	-F	$-(CH_2)_2Ph$	free	MS 648(M^++H)
420	-F	$-(CH_2)_2N(C_2H_5)_2$	free	MS 643(M^++H)
421	-H	$-(CH_2)_2Ph$	fumarate	mp 148-151
422	-F	$-(CH_2)_3Ph$	free	MS 661(M^+)
423	-F	$-(CH_2)_2CHPh_2$	free	MS 737(M^+)
424	-F		free	MS 638(M^+)
425	-F	$4\text{-}CH_3SPh(CH_2)_2\text{-}$	free	MS 692(M^+-1)
426	-F	$4\text{-}CH_3PhO(CH_2)_2\text{-}$	free	MS 678(M^++H)
427	-F		free	MS 723(M^++H)
428	-F	$4\text{-}CH_3OPh(CH_2)_4\text{-}$	free	MS 705(M^+)
429	-F		free	MS 658(M^++H)
430	-F	$4\text{-}CH_3Ph(CH_2)_2\text{-}$	free	MS 661(M^+)
431	-F	$-(CH_2)_2N(CH_3)Ph$	free	MS 676(M^+)
432	-F		free	MS 653(M^+)

Table 178



Example No.	R_{586}	R_{587}	R_{588}	R_{589}	R_{590}	mp (°C) or MS
433	-H	-H	-H	$-CF_3$	-H	mp 124-126
434	-F	-H	-H	$-CF_3$	-H	mp 132-134
435	-F	-H	-H	-Cl	-H	MS 654(M^+)
436	-F	-F	-H	-H	-H	MS 638(M^+)
437	-F	-H	-H	-H	-H	MS 620(M^+)
438	-F	-H	-H	$-OCH_3$	-H	MS 651(M^++H)
439	-F	-H	-Cl	-H	-H	MS 656(M^+)
440	-F	-Cl	-H	-H	-H	MS 654(M)
441	-F	-H	-Cl	-Cl	-H	MS 690(M^+)
442	-F	-H	$-OCH_3$	-H	-H	MS 650(M^+)
443	-F	-H	$-OCH_3$	-H	$-OCH_3$	MS 680(M^+)
444	-F	-H	-H	$-CH_3$	-H	MS 635(M^++H)
445	-F	-H	$-CH_3$	-H	-H	MS 636(M^++2)
446	-F	$-CH_3$	-H	-H	-H	MS 635(M^++H)
447	-F	-H	$-CH_3$	$-CH_3$	-H	MS 648(M^+)
448	-F	-H	-H	-F	-H	MS 638(M^+)
449	-F	-H	-F	-H	-H	MS 638(M^+)
450	-F	-H	-F	-H	-F	MS 656(M^+)
451	-F	$-CF_3$	-H	-H	-H	MS 688(M^+)
452	-F	-H	-H	$-OCF_3$	-H	MS 705(M^++H)
453	-F	-H	$-OCF_3$	-H	-H	MS 704(M^+)
454	-F	$-OCF_3$	-H	-H	-H	MS 704(M^+)
455	-F	-H	-Cl	$-OCH_3$	-H	MS 685(M^++H)

Table 179



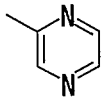
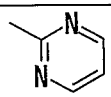
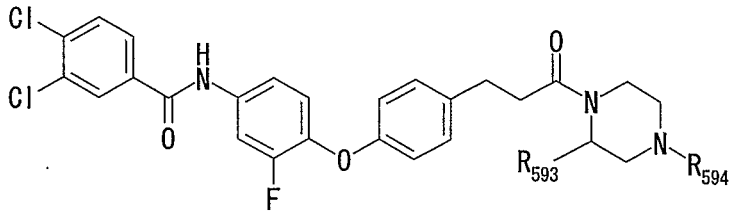
Example No.	R_{591}	R_{592}	Property
456	-H	$-CH_2CONHPh$	^{1}H NMR ($CDCl_3$) δ 2.45(2H, brt, J = 5.0 Hz), 2.55(2H, brt, J = 5.0 Hz), 2.63(2H, t, J = 7.5 Hz), 2.96(2H, t, J = 7.5 Hz), 3.11(2H, s), 3.47(2H, brs), 3.70(2H, brs), 6.93(2H, d, J = 8.5 Hz), 6.98(2H, d, J = 8.5 Hz), 7.13(1H, t, J = 8.5 Hz), 7.15(2H, d, J = 8.5 Hz), 7.34(2H, t, J = 8.5 Hz), 7.52-7.59(5H, m), 7.73(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.28(1H, s), 8.92(1H, s).
457	-F	$-CH_2CONHPh$	^{1}H NMR ($CDCl_3$) δ 2.39(2H, brs), 2.51(2H, brs), 2.61(2H, t, J = 7.5 Hz), 2.93(2H, t, J = 7.5 Hz), 3.08(2H, s), 3.43(2H, brs), 3.67 (2H, brs), 6.88(2H, d, J = 8.5 Hz), 7.03(1H, t, J = 8.5 Hz), 7.11-7.15(3H, m), 7.30-7.35(3H, m), 7.51-7.54(3H, m), 7.70(1H, dd, J = 9.0 Hz, 2.0 Hz), 7.74(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.00(1H, d, J = 2.0 Hz), 8.74(1H, s), 8.93(1H, s).
458	-F	$-(CH_2)_3Ph$	MS 633(M^+)
459	-F	$-(CH_2)_4Ph$	MS 647(M^+)
460	-F	$-CH(C_2H_5)_2$	MS 586(M^++1)
461	-F	$-CH(CH_3)_2$	MS 556(M^+-1)
462	-F	$-(CH_2)_3CH_3$	MS 571(M^+)
463	-F	$-(CH_2)_2N(CH_3)_2$	MS 585(M^+-1)
464	-F	$-COOC(CH_3)_3$	mp 155-157°C
465	-F	$-CH_2COPh$	MS 633(M^+)
466	-H	3-pyridyl	mp 153-155°C
467	-F	3-pyridyl	mp 183-185°C
468	-F	2-pyridyl	MS 591(M^+-1)
469	-F	4-pyridyl	MS 592(M^+)
470	-F		MS 593(M^+)
471	-F		MS 593(M^+)

Table 180



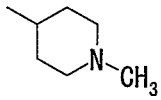
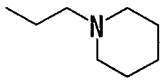
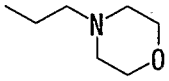
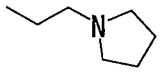
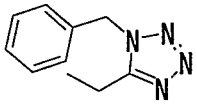
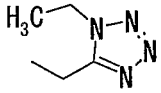
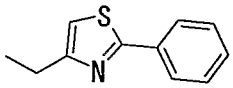
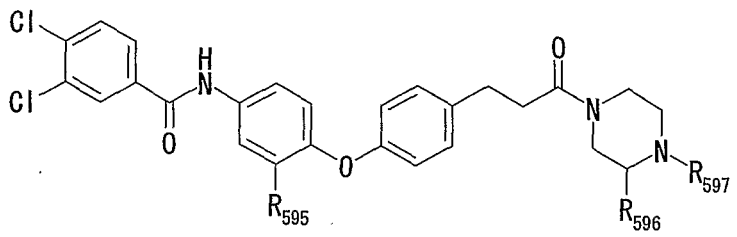
Example No.	R_{593}	R_{594}	MS
472	$-CH_3$	benzyl	619(M^+)
473	2-pyridylmethyl	-H	606(M^+)
474	3-pyridylmethyl	-H	606(M^+)
475	4-pyridylmethyl	-H	605(M^+-1)
476	cyclopentyl	-H	583(M^+)
477	cycloheptyl	-H	611(M^+)
478		-H	612(M^+)
479		-H	627(M^++H)
480		-H	628(M^+)
481		-H	612(M^+)
482	2-quinolylmethyl	-H	657(M^++H)
483		-H	686(M^+-1)
484		-H	625(M^+)
485		-H	688(M^+)

Table 181



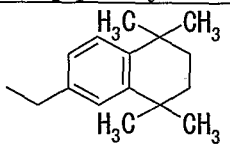
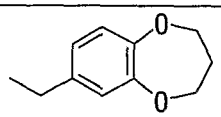
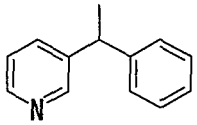
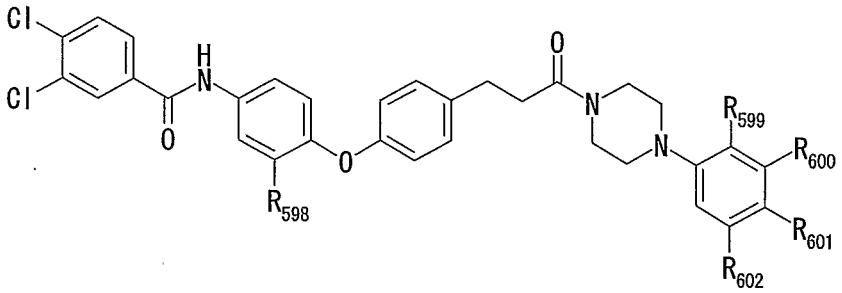
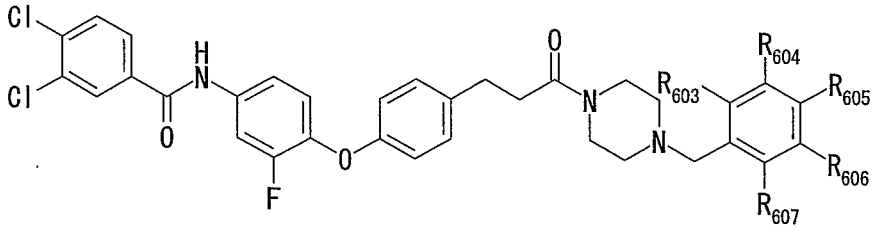
Example No.	R_{595}	R_{596}	R_{597}	Form	mp (°C)or MS
486	-H	-H	$-COOC(CH_3)_3$	free	mp 188-189
487	-H	-H	$-CH_3$	free	mp 189-191
488	-H	-H	benzyl	fumarate	mp 190-192
489	-F	-H	$-(CH_2)_2Ph$	hydrochloride	mp 191-200
490	-F	-H	piperonyl	hydrochloride	mp 226-228
491	-F	-H		free	MS 714(M^+-1)
492	-F	-H	1-naphthylmethyl	free	MS 655(M^+)
493	-F	CH_3	$3,4-(CH_3O)_2PhCH_2-$	free	MS 679(M^+)
494	-F	-H		free	MS 678(M^++1)
495	-F	-H	$-CH(CH_3)Ph$	free	MS 619(M^+)
496	-F	-H		free	MS 682(M^+)
497	-F	-H	$(4-FPh)_2CH-$	free	MS 717(M^+)
498	-F	-H	$4-CH_3OPhCH(Ph)-$	free	MS 711(M^+)

Table 182



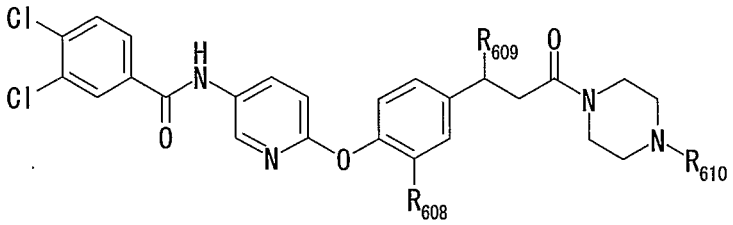
Example No.	R_{598}	R_{599}	R_{600}	R_{601}	R_{602}	Form	mp (°C) or MS
499	-F	-H	-H	$-OCF_3$	-H	hydrochloride	mp 118-121
500	-F	-H	-H	-CN	-H	free	mp 190-192
501	-H	-H	-H	$-OCF_3$	-H	hydrochloride	mp 148-149
502	-H	-H	-H	-CN	-H	free	mp 186-188
503	-F	$-CF_3$	-H	-H	-H	free	MS 659(M^+)
504	-F	-H	$-CF_3$	-H	-H	free	MS 659(M^+)
505	-F	-H	-H	$-COOC(CH_3)_3$	-H	free	MS 691(M^+)
506	-F	-H	-H	-F	-H	free	MS 609(M^+)
507	-F	$-OCH_3$	-H	-H	-H	free	MS 621(M^+)
508	-F	-Cl	-H	-H	-H	free	MS 625(M^+)
509	-F	-H	-H	-Cl	-H	free	MS 627(M^+)
510	-F	-H	-Cl	-H	-H	free	MS 625(M^+)
511	-F	-Cl	-Cl	-H	-H	free	MS 661(M^+)
512	-F	-H	-H	$-OCH_3$	-H	free	MS 621(M^+)
513	-F	-H	$-OCH_3$	-H	-H	free	MS 621(M^+)
514	-F	-H	-H	$-CH_3$	-H	free	MS 605(M^+)
515	-F	-H	$-CH_3$	-H	-H	free	MS 605(M^+)
516	-F	$-CH_3$	-H	-H	-H	free	MS 605(M^+)
517	-F	$-CH_3$	$-CH_3$	-H	-H	free	MS 619(M^+)
518	-F	-H	$-CH_3$	$-CH_3$	-H	free	MS 619(M^+)
519	-F	-H	-H	$-CF_3$	-H	free	MS 659(M^+)
520	-F	-H	-H	-Ph	-H	free	MS 667(M^+)
521	-F	-F	-H	-H	-H	free	MS 609(M^+)
522	-F	-F	-H	-F	-H	free	MS 627(M^+)
523	-F	$-OCH_3$	-H	-H	-Cl	free	MS 657(M^+)

Table 183



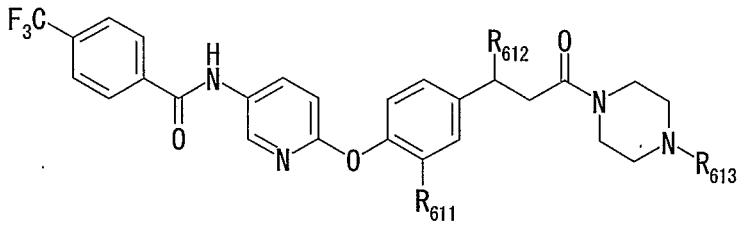
Example No.	R_{603}	R_{604}	R_{605}	R_{606}	R_{607}	Form	mp (°C) or MS
524	-H	-H	-H	-H	-H	fumarate	mp 168-170
525	-H	-H	-Cl	-H	-H	free	MS 638(M^+-1)
526	-H	-Cl	-H	-H	-H	free	MS 639(M^+)
527	-Cl	-H	-H	-H	-H	free	MS 641(M^++2)
528	-Cl	-Cl	-H	-H	-H	free	MS 675(M^++2)
529	-Cl	-H	-Cl	-H	-H	free	MS 673(M^+)
530	-Cl	-H	-H	-Cl	-H	free	MS 673(M^+)
531	-H	-Cl	-Cl	-H	-H	free	MS 676(M^++3)
532	-H	$-OCH_3$	-H	-H	-H	free	MS 635(M^+)
533	$-OCH_3$	-H	-H	-H	-H	free	MS 635(M^+)
534	-H	$-OCH_3$	-H	$-OCH_3$	-H	free	MS 665(M^+)
535	-H	$-CH_3$	-H	-H	-H	free	MS 619(M^+)
536	$-CH_3$	-H	-H	-H	-H	free	MS 619(M^+)
537	-H	$-CH_3$	$-CH_3$	-H	-H	free	MS 633(M^+)
538	-H	-H	-F	-H	-H	free	MS 623(M^+)
539	-H	-F	-H	-H	-H	free	MS 623(M^+)
540	-F	-H	-H	-H	-H	free	MS 623(M^+)
541	-F	-H	-F	-H	-H	free	MS 641(M^+)
542	-F	-H	-H	-H	-F	free	MS 641(M^+)
543	-H	-H	$-NO_2$	-H	-H	free	MS 650(M^+)
544	-H	$-NO_2$	-H	-H	-H	free	MS 650(M^+)
545	$-NO_2$	-H	-H	-H	-H	free	MS 650(M^+)
546	-H	$-CF_3$	-H	-H	-H	free	MS 673(M^+)
547	-H	-H	-CN	-H	-H	free	MS 630(M^+)
548	-H	$-OCF_3$	-H	-H	-H	free	MS 689(M^+)
549	-H	-H	$-COOCH_3$	-H	-H	free	MS 664(M^++1)
550	-H	-H	$-C(CH_3)_3$	-H	-H	free	MS 661(M^+)
551	-H	-H	$-OCH_2Ph$	-H	-H	free	MS 710(M^+-1)
552	-H	-H	-Ph	-H	-H	free	MS 681(M^+)
553	-Cl	-H	-H	-H	-Cl	free	MS 675(M^++2)
554	-F	-H	-H	-F	-H	free	MS 641(M^+)
555	-H	-F	-H	-F	-H	free	MS 641(M^+)
556	-H	-H	$-CF_3$	-H	-H	free	MS 674(M^++1)
557	-H	-H	$-OCF_3$	-H	-H	free	MS 689(M^+)
558	$-OCF_3$	-H	-H	-H	-H	free	MS 689(M^+)
559	-H	$-COOCH_3$	-H	-H	-H	free	MS 663(M^+)
560	-H	-H	$-C_2H_5$	-H	-H	free	MS 633(M^+)
561	-H	-H	$-CH(CH_3)_2$	-H	-H	free	MS 647(M^+)
562	-H	-Cl	$-OCH_3$	-H	-H	free	MS 669(M^+)

Table 184



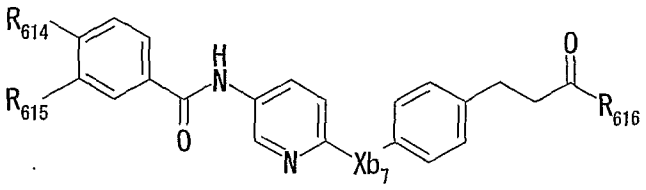
Example No.	R_{608}	R_{609}	R_{610}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
563	-H	-CH_3	piperonyl	free	mp 147-149
564	-H	-H	piperonyl	free	mp 138-140
565	-H	-CH_3	benzyl	free	mp 150-152
566	-H	-H	benzyl	free	^{1}H NMR ($CDCl_3$) 2.34-2.42(4H, m), 2.58-2.64 (2H, m), 2.91-2.96(2H, m), 3.40-3.43(2H, m), 3.51(2H, s), 3.60-3.64(2H, m), 6.93(1H, d, J = 8.9 Hz), 7.01-7.04(2H, m), 7.20(2H, d, J = 8.6 Hz), 7.27-7.33(5H, m), 7.56(1H, d, J = 8.3Hz), 7.71-7.75(1H, m), 8.00(1H, d, J = 2.0 Hz), 8.16-8.27(3H, m).
567	-OCH_3	-H	piperonyl	free	mp 142.0-144.5
568	-F	-H	piperonyl	free	mp 156.5-157.5
569	-H	-H	-$COOC(CH_3)_3$	free	^{1}H NMR ($CDCl_3$) 1.46(9H, s), 2.62-2.67(2H, m), 2.96-3.01(2H, m), 3.33-3.39(6H, m), 3.57-3.60(2H, m), 6.94-6.97(1H, m), 7.05(2H, d, J = 8.4 Hz), 7.23(2H, d, J = 8.4 Hz), 7.57 (1H, d, J = 8.1 Hz), 7.71-7.75(1H, m), 8.00 (1H, d, J = 2.2 Hz), 8.13(1H, brs), 8.21-8.24 (2H, m).
570	-OC_2H_5	-H	piperonyl	oxalate	^{1}H NMR (DMSO-d_6) 1.06(3H, t, J = 6.9 Hz), 2.39-2.86(8H, m), 3.40-3.60(4H, m), 3.65(2H, s), 3.70-5.20(4H, m), 6.00(2H, s), 6.76-6.84 (2H, m), 6.85-7.02(5H, m), 7.82(1H, d, J = 8.4 Hz), 7.92(1H, m), 8.03(1H, m), 8.20(1H, d, J = 2.0 Hz), 8.35(1H, d, J = 2.5 Hz), 10.47(1H, s).

Table 185



Example No.	R_{611}	R_{612}	R_{613}	Form	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
571	-H	-CH_3	piperonyl	hydro-chloride	mp 218-220
572	-H	-CH_3	benzyl	free	mp 142-144
573	-OCH_3	-H	benzyl	free	^{1}H NMR 2.34-2.40(4H, m), 2.58-2.63(2H, m), 2.89-2.94(2H, m), 3.39-3.42(2H, m), 3.50(2H, s), 3.58-3.61(2H, m), 3.70(3H, s), 6.75-6.80(2H, m), 6.91(1H, d, J = 8.7 Hz), 7.00(1H, d, J = 7.9 Hz), 7.24-7.35(5H, m), 7.69(2H, d, J = 8.1 Hz), 7.98(2H, d, J = 8.1 Hz), 8.14-8.18(1H, m), 8.23(1H, d, J = 2.3 Hz), 8.59(1H, s).
574	-OCH_3	-H	piperonyl	free	^{1}H NMR 2.31-2.37(4H, m), 2.57-2.63(2H, m), 2.88-2.94(2H, m), 3.37-3.41(4H, m), 3.57-3.60(2H, m), 3.70(3H, s), 5.93(2H, s), 6.69-6.80(4H, m), 6.84(1H, brs), 6.90(1H, d, J = 8.9 Hz), 7.00(1H, d, J = 7.9 Hz), 7.69(2H, d, J = 8.1 Hz), 7.98(2H, d, J = 8.1 Hz), 8.14-8.19(1H, m), 8.24(1H, d, J = 2.5 Hz), 8.67(1H, s).
575	-F	-H	piperonyl	free	mp 170.5-171.0
576	-H	-H	-$COOC(CH_3)_3$	free	^{1}H NMR 1.46(9H, s), 2.66(2H, t, J = 6.5 Hz), 2.97(2H, t, J = 6.5 Hz), 3.25-3.48(6H, m), 3.51-3.65 (2H, m), 6.95(1H, d, J = 9.7 Hz), 7.04(2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.75(2H, d, J = 8.2 Hz), 8.01(2H, d, J = 8.2 Hz), 8.18-8.33(3H, m).
577	-OC_2H_5	-H	piperonyl	hydro-chloride	mp 147.5-149.0

Table 186



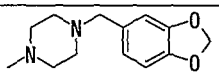
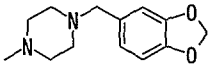
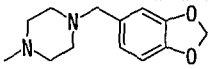
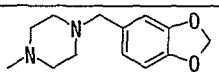
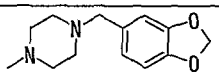
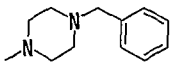
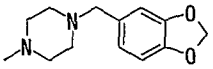
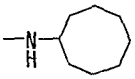
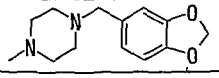
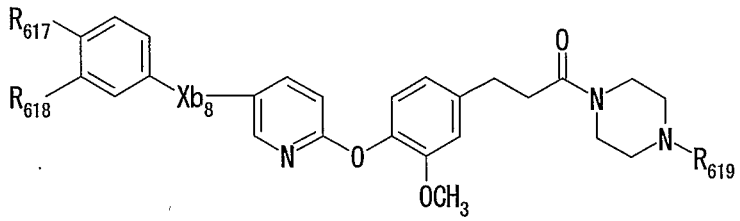
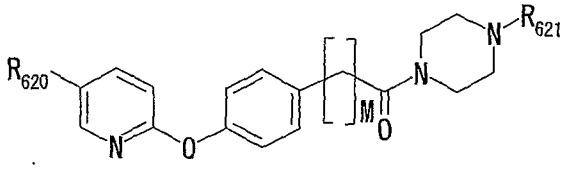
Example No.	R_{614}	R_{615}	R_{616}	Xb_7	Form	mp (°C) or ^{1}H NMR
578	-Cl	-Cl	morpholino	-O-	free	^{1}H NMR ($CDCl_3$) δ 2.60-2.66(2H, m), 2.96-3.02 (2H, m), 3.37-3.41(2H, m), 3.55-3.64(6H, m), 6.96(1H, d, J = 8.4 Hz), 7.06(2H, d, J = 8.6 Hz), 7.23-7.26(2H, m), 7.58(1H, d, J = 8.4 Hz), 7.70-7.74(1H, m), 7.86(1H, brs), 7.99(1H, d, J = 1.9 Hz), 8.19-8.25(2H, m).
579	-Cl	-Cl		-NH-	free	mp 141-142
580	-Cl	-Cl		-S-	free	mp 169-170
581	-Cl	-Cl		$-SO_2-$	free	mp 154-156
582	$-CF_3$	-H		$-N(CH_3)-$	free	mp 175-176
583	-Cl	-Cl		$-N(CH_2Ph)-$	free	mp 171-173
584	-Cl	-Cl		$-N(CH_2Ph)-$	free	mp 144-146
585	-Cl	-Cl		-CO-	free	mp 129-132
586	-Cl	-Cl		-O-	free	mp 208-210
587	-Cl	-Cl	$-NH(CH_2)_2OPh$	-O-	free	mp 129-132
588	-Cl	-Cl		-SO-	oxalate	mp 128-130

Table 187



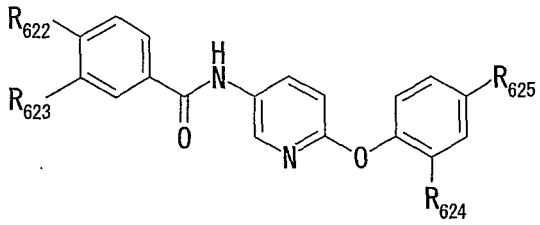
Example No.	R_{617}	R_{618}	Xb_8	R_{619}	^{1}H NMR ($CDCl_3$) δppm
589	-Cl	-Cl	-CH=CH- (trans)	piperonyl	2.33-2.42(4H, m), 2.62-2.68(2H, m), 2.96-3.01(2H, m), 3.40-3.44(4H, m), 3.62-3.66(2H, m), 3.76(3H, s), 5.95(2H, s), 6.71-6.77(2H, m), 6.82-7.07(7H, m), 7.28-7.32(1H, m), 7.38-7.46(1H, m), 7.57(1H, d, J = 2.0 Hz), 7.83-7.87(1H, m), 8.19(1H, d, J = 2.3 Hz).
590	$-CF_3$	-H	-CH=CH- (trans)	piperonyl	2.33-2.42(4H, m), 2.62-2.68(2H, m), 2.96-3.02(2H, m), 3.40-3.43(4H, m), 3.63-3.66(2H, m), 3.76(3H, s), 5.94(2H, s), 6.71-6.79(2H, m), 6.82-6.89(3H, m), 6.95(1H, d, J = 8.7 Hz), 7.00(1H, d, J = 16.5 Hz), 7.05-7.14(2H, m), 7.55-7.62 (4H, m), 7.86-7.90(1H, m), 8.22(1H, d, J = 2.3 Hz).
591	$-CF_3$	-H	-CO-	benzyl	2.38-2.43(4H, m), 2.63-2.68(2H, m), 2.97-3.02(2H, m), 3.43 (2H, brs), 3.51(2H, s), 3.65(2H, brs), 3.76(3H, s), 6.84-6.89 (2H, m), 7.04-7.09(2H, m), 7.27-7.31(5H, m), 7.73-7.88(4H, m), 8.19-8.22(1H, m), 8.55(1H, brs).
592	$-CF_3$	-H	-CO-	piperonyl	2.35-2.39(4H, m), 2.62-2.68(2H, m), 2.96-3.02(2H, m), 3.41-3.44(4H, m), 3.62-3.65(2H, m), 3.76(3H, s), 5.95(2H, s), 6.74-6.89(5H, m), 7.04-7.09(2H, m), 7.73-7.88(4H, m), 8.19-8.22(1H, m), 8.55(1H, brs).
593	$-CF_3$	-H	-CO-	3-pyridyl	2.69-2.75(2H, m), 3.01-3.06(2H, m), 3.14-3.20(4H, m), 3.59-3.62(2H, m), 3.77(3H, s), 3.80-3.84(2H, m), 6.86-6.92 (2H, m), 7.04-7.11(2H, m), 7.18-7.20(2H, m), 7.75(2H, d, J = 8.4 Hz), 7.87(2H, d, J = 8.1 Hz), 8.15(1H, t, J = 3.0 Hz), 8.20 (1H, dd, J = 8.7 Hz, 2.3 Hz), 8.30(1H, t, J = 1.8 Hz), 8.53(1H, d, J = 2.3 Hz).

Table 188



Example No.	R_{620}	R_{621}	M	^{1}H NMR (solvent) δppm
594	3,4-Cl_2PhNHCON(C_2H_5)-	4-pyridyl-methyl	2	($CDCl_3$) 1.16(3H, t, J = 7.1 Hz), 2.35-2.45(4H, m), 2.62-2.67(2H, m), 2.97-3.03(2H, m), 3.42-3.46(2H, m), 3.51(2H, s), 3.64-3.68(2H, m), 3.73(2H, q, J = 7.1 Hz), 6.07(1H, d, J = 5.0 Hz), 7.04(1H, d, J = 8.7 Hz), 7.09-7.14(3H, m), 7.25-7.30(5H, m), 7.52(1H, d, J = 2.6 Hz), 7.61(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.11(1H, d, J = 2.6 Hz), 8.54(2H, d, J = 5.9 Hz).
595	4-CF_3PhNHCON(C_2H_5)-	piperonyl	2	($CDCl_3$) 1.18(3H, t, J = 7.1 Hz), 2.32-2.41(4H, m), 2.61-2.67(2H, m), 2.97-3.03(2H, m), 3.39-3.43(4H, m), 3.61-3.65(2H, m), 3.75(2H, q, J = 7.1 Hz), 5.94(2H, s), 6.15(1H, brs), 6.72-6.76(2H, m), 6.83(1H, d, J = 0.7 Hz), 7.05(1H, dd, J = 8.7 Hz, 0.5 Hz), 7.11(2H, d, J = 8.6 Hz), 7.29(2H, d, J = 8.6 Hz), 7.40(2H, d, J = 8.6 Hz), 7.49(2H, d, J = 8.7 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.8 Hz), 8. 14(1H, dd, J = 2.8 Hz, 0.5 Hz).
596	4-CF_3PhNHCON(C_2H_5)-	4-pyridyl-methyl	2	($CDCl_3$) 1.18(3H, t, J = 7.1 Hz), 2.35-2.45(4H, m), 2.62-2.68(2H, m), 2.98-3.03(2H, m), 3.42-3.46(2H, m), 3.51(2H, s), 3.66(2H, t, J = 5.0 Hz), 3.75(2H, q, J = 7.1 Hz), 6.18(1H, brs), 7.05(1H, dd, J = 8.7 Hz, 0.5 Hz), 7.11(2H, d, J = 8.4 Hz), 7.25-7.31(4H, m), 7.40(2H, d, J = 8.7 Hz), 7.49(2H, d, J = 8.7 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.13(1H, dd, J = 2.6 Hz, 0.5 Hz), 8.53-8.55(2H, m).
597	4-CF_3PhNHCON(C_2H_5)-	2-pyridyl	2	($CDCl_3$) 1.17(3H, t, J = 7.1 Hz), 2.68-2.74(2H, m), 3.02-3.07(2H, m), 3.46-3.53(6H, m), 3.70-3.78(4H, m), 6.12(1H, brs), 6.62-6.67(2H, m), 7.04(1H, d, J = 8.7 Hz), 7.12(2H, d, J = 8.6 Hz), 7. 31(2H, d, J = 8.6 Hz), 7.40(2H, d, J = 8.7 Hz), 7.45-7.52(3H, m), 7.60(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.07(1H, d, J = 2.5 Hz), 8.16-8.19(1H, m).

Table 189



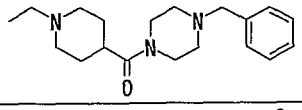
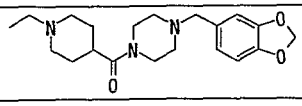
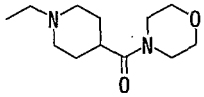
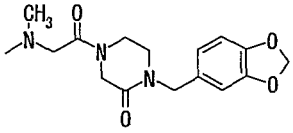
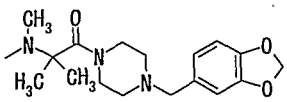
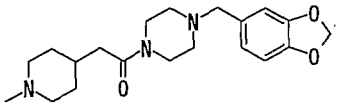
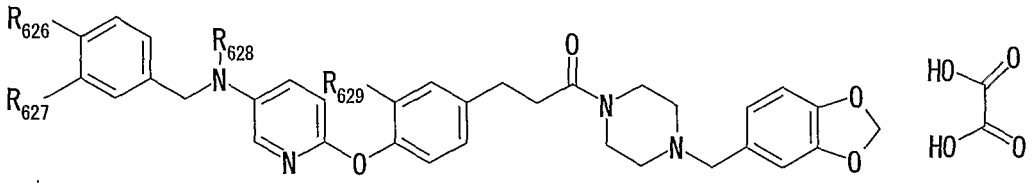
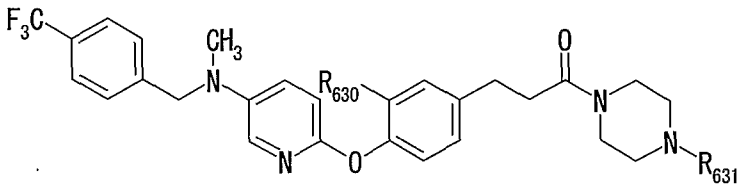
Example No.	R_{622}	R_{623}	R_{624}	R_{625}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
598	-Cl	-Cl	-H		mp 169-171
599	-Cl	-Cl	-H		mp 158-160
600	-Cl	-Cl	-H		mp 183-186
601	$-CF_3$	-H	-F		^{1}H NMR 3.00(3H, s), 3.20-3.36(2H, m), 3.57-3.80(2H, m), 4.07(2H, s), 4.14-4.34 (2H, m), 4.51(2H, s), 5.94(2H, s), 6.32-6.50 (2H, m), 6.65-6.80(3H, m), 6.92(1H, d, J = 9.4 Hz), 7.02(1H, t, J = 8.8 Hz), 7.71(2H, d, J = 8.1 Hz), 7.98(2H, d, J = 8.1 Hz), 8.10-8.20(1H, m), 8.18(1H, s), 8.30(1H, s).
602	$-CF_3$	-H	-H		^{1}H NMR 1.45(6H, s), 2.14(2H, brs), 2.33 (2H, brs), 2.87(3H, s), 3.32(2H, s), 3.63(2H, brs), 3.92(2H, brs), 5.93(2H, s), 6.68-6.75 (2H, m), 6.82(1H, d, J = 1.0 Hz), 6.92(2H, d, J = 9.2 Hz), 6.93(1H, d, J = 9.1 Hz), 7.00 (2H, d, J = 9.2 Hz), 7.77(2H, d, J = 8.1 Hz), 7.81(1H, s), 8.00(2H, d, J = 8.1 Hz), 8.19 (1H, dd, J = 8.7 Hz, 2.8 Hz), 8.26(1H, d, J = 2.1 Hz).
603	$-CF_3$	-H	$-OCH_3$		^{1}H NMR 1.33-1.45(2H, m), 1.82-1.96(3H, m), 2.28(2H, d, J = 6.8 Hz), 2.39-2.41 (4H, m), 2.72(2H, t, J = 10.1 Hz), 3.43 (2H, s), 3.48(2H, brs), 3.57-3.62(4H, m), 3.72(3H, s), 5.95(2H, s), 6.48(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.56(1H, d, J = 2.5 Hz), 6.71-6.77(2H, m), 6.86(2H, d, J = 8.6 Hz), 6.97(1H, d, J = 8.6 Hz), 7.70(2H, d, J = 8.4 Hz), 8.00(2H, d, J = 8.1 Hz), 8.13(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.22(1H, d, J = 2.5 Hz), 8.40(1H, s).

Table 190



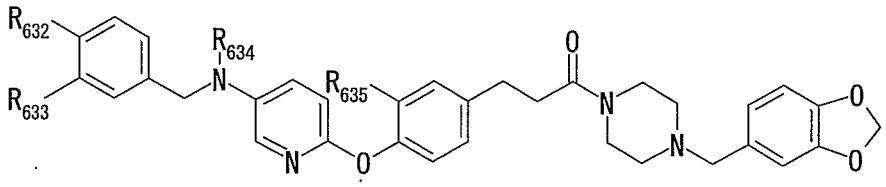
Example No.	R_{626}	R_{627}	R_{628}	R_{629}	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
604	-CF_3	-H	-CH_3	-OC_2H_5	^{1}H NMR 1.03(3H, t, J = 6.9Hz), 2.52-2.68(6H, m), 2.69-2.82(2H, m), 3.39-3.61(4H, m), 3.72(2H, s), 3.89(2H, q, J = 6.9 Hz), 4.00-5.90(4H, m), 6.01(2H, s), 6.74(1H, dd, J = 8.0Hz, 1.8Hz), 6.76 (1H, d, J = 8.9Hz), 6.82(1H, dd, J = 8.0Hz, 1.3Hz), 6.84-6.97(4H, m), 7.26(1H, dd, J = 9.0Hz, 3.1Hz), 7.41(2H, d, J = 8.0Hz), 7.50(1H, d, J =3.1Hz), 7.65(2H, d, J = 8.0Hz).
605	-CF_3	-H	-C_2H_5	-OC_2H_5	^{1}H NMR 1.02(3H, t, J = 6.9Hz), 1.08(3H, t, J = 6.9Hz), 2.53-2.84 (8H, m), 3.43(2H, q, J = 6.9Hz), 3.46-3.62(4H, m), 3.72(2H, s), 3.88 (2H, q, J = 6.9Hz), 4.30-5.90(4H, m), 6.01(2H, s), 6.69-6.78(2H, m), 6.82(1H, dd, J = 8.0Hz, 1.4Hz), 6.83-6.97(4H, m), 7.19(1H, dd, J = 9.0Hz, 3.1Hz), 7.37-7.48(3H, m), 7.65(2H, d, J = 8.1Hz).
606	-Cl	-Cl	-CH_3	-H	^{1}H NMR 2.48-2.67(6H, m), 2.68-2.82(2H, m), 2.98(3H, s), 3.37-3.62(4H, m), 3.70(2H, s), 4.50-5.90(4H, m), 6.01(2H, s), 6.78-6.95(6H, m), 7.13-7.23(3H, m), 7.28(1H, dd, J = 9.0Hz, 3.3 Hz), 7.48(1H, d, J = 2.0Hz), 7.57(1H, d, J = 8.3Hz), 7.61(1H, d, J = 3.1Hz).
607	-Cl	-Cl	-C_2H_5	-H	^{1}H NMR 1.09(3H, t, J = 6.9Hz), 2.48-2.66(6H, m), 2.69-2.82(2H, m), 3.35-3.59(6H, m), 3.67(2H, s), 4.00-5.90(4H, m), 6.00(2H, s), 6.76-6.94(6H, m), 7.13-7.25(4H, m), 7.47(1H, d, J = 1.9Hz), 7.52-7.61(2H, m).
608	-CF_3	-H	-CH_3	-F	^{1}H NMR 2.50-2.72(6H, m), 2.72-2.88(2H, m), 2.98(3H, s), 3.32-3.61(4H, m), 3.70(2H, brs), 4.67(2H, s), 6.00(2H, s), 6.80(1H, dd, J = 7.9Hz, 1.4Hz), 6.85-6.95(3H, m), 6.98-7.11(2H, m), 7.11-7.22(1H, m), 7.29(1H, dd, J = 9.0Hz, 3.1Hz), 7.41(2H, d, J = 8.0Hz), 7.50(1H, d, J = 3.1Hz), 7.66(2H, d, J = 8.0Hz).
609	-Cl	-Cl	-C_2H_5	-F	^{1}H NMR 1.00-1.20(3H, m), 2.46-2.72(6H, m), 2.72-2.89(2H, m), 3.29-3.61(6H, m), 3.71(2H, brs), 4.46(2H, s), 6.01(2H, s), 6.81(1H, dd, J = 8.0Hz, 1.4Hz), 6.85-6.95(3H, m), 6.98-7.11(2H, m), 7.13-7.28(3H, m), 7.45(1H, d, J = 3.1Hz), 7.46(1H, d, J = 1.9Hz), 7.56(1H, d, J = 8.3Hz).
610	-Cl	-Cl	-CH_3	-OC_2H_5	^{1}H NMR 1.02(3H, t, J = 6.9Hz), 2.42-2.81(8H, m), 2.94(3H, s), 3.00-4.30(10H, m), 4.49(2H, s), 6.00(2H, s), 6.71-6.83(3H, m), 6.84-6.95(4H, m), 7.18(1H, dd, J = 8.3Hz, 2.0Hz), 7.26(1H, dd, J = 9.0Hz, 3.2Hz), 7.44(1H, d, J = 2.0Hz), 7.50(1H, d, J = 3.0Hz), 7.55 (1H, d, J = 8.3Hz).
611	-Cl	-Cl	-C_2H_5	-OC_2H_5	^{1}H NMR 1.01(3H, t, J = 7.0Hz), 1.06(3H, t, J = 7.0Hz), 2.40-2.83 (8H, m), 2.90-4.50(14H, m), 6.00(2H, s), 6.70-6.82(3H, m), 6.84-6.95(4H, m), 7.15-7.24(2H, m), 7.39-7.48(2H, m), 7.55(1H, d, J = 8.3Hz).
612	-Cl	-Cl	-C_2H_5	-OCH_3	mp 91.0-96.5 dec
613	-CF_3	-H	-C_2H_5	-F	mp 104-107

Table 191



Example No.	R_{630}	R_{631}	Form	^{1}H NMR (solvent) δppm
614	-H	piperonyl	free	($CDCl_3$) 2.30-2.34(2H, m), 2.36-2.40(2H, m), 2.56-2.62(2H, m), 2.91-2.96(2H, m), 3.01(3H, s), 3.37-3.40(4H, m), 3.60-3.64(2H, m), 4.50(2H, s), 5.94(2H, s), 6.72-6.73(2H, m), 6.80(1H, d, J = 8.9 Hz), 6.84(1H, brs), 6.98(2H, d, J = 8.6 Hz), 7.11(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.18(2H, d, J = 8.4 Hz), 7.34(2H, d, J = 7.9 Hz), 7.58(2H, d, J = 8.3 Hz), 7.70(1H, d, J = 3.3 Hz).
615	-H	3-pyridyl	free	($CDCl_3$) 2.63-2.69(2H, m), 2.95-3.01(5H, m), 3.08-3.18(4H, m), 3.54-3.58(2H, m), 3.78-3.81(2H, m), 4.50(2H, s), 6.79 (1H, d, J = 8.9 Hz), 6.99(2H, d, J = 8.6 Hz), 7.10(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.17-7.22(4H, m), 7.34(2H, d, J = 8.1 Hz), 7.58(2H, d, J = 7.9 Hz), 7.67(1H, d, J = 2.8 Hz), 8.12-8.14 (1H, m), 8.29-8.30(1H, m).
616	-H	4-pyridylmethyl	free	($CDCl_3$) 2.33(2H, t, J = 5.0 Hz), 2.41(2H, t, J = 5.1 Hz), 2.57-2.63(2H, m), 2.92-2.97(2H, m), 3.02(3H, s), 3.41(2H, t, J = 5.0 Hz), 3.50(2H, s), 3.65(2H, t, J = 5.1 Hz), 4.51(2H, s), 6.80(1H, d, J = 8.9 Hz), 6.98(2H, d, J = 8.4 Hz), 7.11(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.18(2H, d, J = 8.4 Hz), 7.27(2H, d, J = 5.6 Hz), 7.34(2H, d, J = 8.3 Hz), 7.58(2H, d, J = 8.3 Hz), 7.69(1H, d, J = 3.1 Hz), 8.55(2H, d, J = 5.8 Hz).
617	-H	benzyl	hydrochloride	(DMSO-d_6) 2.64-2.69(2H, m), 2.75-2.81(2H, m), 2.92-3.02 (5H, m), 3.23-3.32(2H, m), 3.41-3.51(2H, m), 4.02-4.08(1H, m), 4.31(2H, brs), 4.43-4.48(1H, m), 4.64(2H, brs), 6.86(1H, d, J = 9.1 Hz), 6.90(2H, d, J = 8.6 Hz), 7.20(2H, d, J = 8.4 Hz), 7.29(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.42-7.47(5H, m), 7.56-7.57(2H, m), 7.62(1H, d, J = 3.1 Hz), 7.69(2H, d, J = 8.1 Hz), 11.08(1H, brs).
618	-OCH_3	piperonyl	hydrochloride	(DMSO-d_6) 2.59-3.09(6H, m), 2.97(3H, s), 3.16-3.61(4H, m), 3.65(3H, s), 3.97-4.13(1H, m), 4.14-4.28(2H, m), 4.38-4.51(1H, m), 4.58(2H, s), 6.06(2H, s), 6.72-6.80(2H, m), 6.89(1H, d, J = 8.0 Hz), 6.93-7.03(3H, m), 7.18(1H, s), 7.26(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.42(2H, d, J = 8.0 Hz), 7.49(1H, d, J = 3.1 Hz), 7.67(2H, d, J = 8.0 Hz), 10.81(1H, brs).

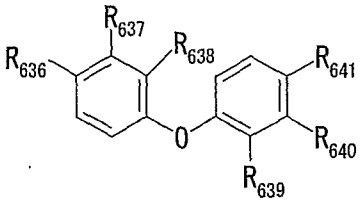
Table 192



Example No.	R_{632}	R_{633}	R_{634}	R_{635}	Form	^{1}H NMR (DMSO-d_6) δppm
619	-CF_3	-H	-C_2H_5	-H	TsOH salt	1.11(3H, t, J = 6.9 Hz), 2.28(3H, s), 2.54-3.02(7H, m), 3.17-3.48(3H, m), 3.47(2H, q, J = 6.9 Hz), 3.97-4.12(1H, m), 4.15-4.31(2H, m), 4.38-4.52 (1H, m), 4.58(2H, s), 6.07(2H, s), 6.78-7.26(11H, m), 7.39-7.49(4H, m), 7.53(1H, d, J = 3.1 Hz), 7.68(2H, d, J = 8.2 Hz), 9.45-9.69(1H, m).
620	-CF_3	-H	-$(CH_2)_2OCH_3$	-H	TsOH salt	2.27(3H, s), 2.52-3.03(7H, m), 3.24(3H, s), 3.17-3.70(10H, m), 3.95-4.13(1H, m), 4.15-4.32 (2H, m), 4.36-4.54(1H, m), 4.66(2H, s), 6.07(2H, s), 6.80(1H, d, J = 8.9 Hz), 6.83-7.07(5H, m), 7.10 (2H, d, J = 7.8 Hz), 7.13-7.26(3H, m), 7.37-7.49 (4H, m), 7.52(1H, d, J = 3.1 Hz), 7.67(2H, d, J = 8.1 Hz), 9.46-9.69(1H, m).
621	-Cl	-Cl	-CH_3	-OCH_3	hydro-chloride	2.60-3.15(7H, m), 2.94(3H, s), 3.15-3.38(2H, m), 3.38-3.60(1H, m), 3.65(3H, s), 4.07(1H, d, J = 15.7 Hz), 4.20(2H, brs), 4.38-4.60(1H, m), 4.48 (2H, s), 6.06(2H, s), 6.73-6.81(2H, m), 6.90(1H, d, J = 8.0 Hz), 6.93-7.05(3H, m), 7.16-7.24(2H, m), 7.29(1H, dd, J = 8.9 Hz, 3.2 Hz), 7.47(1H, d, J = 1.9 Hz), 7.50(1H, d, J = 3.1 Hz), 7.56(1H, d, J = 8.2 Hz), 11.10(1H, brs).
622	-Cl	-Cl	-CH_3	-F	hydro-chloride	2.58-3.17(7H, m), 2.96(3H, s), 3.18-3.38(2H, m), 3.38-3.70(1H, m), 4.00-4.18(1H, m), 4.20(2H, brs), 4.33-4.60(1H, m), 4.50(2H, s), 6.06(2H, s), 6.92(1H, d, J = 9.0 Hz), 6.95-7.14(4H, m), 7.16-7.25(3H, m), 7.31(1H, dd, J = 9.0 Hz, 3.1 Hz), 7.47(1H, d, J = 1.9 Hz), 7.51(1H, d, J = 3.1 Hz), 7.56(1H, d, J = 8.2 Hz), 11.10(1H, brs).
623	-CF_3	-H	-C_2H_5	-OCH_3	hydro-chloride	1.09(3H, t, J = 6.9 Hz), 2.58-3.11(8H, m), 3.15-3.58(4H, m), 3.64(3H, s), 3.94-4.12(1H, m), 4.14-4.28(2H, m), 4.36-4.50(1H, m), 4.54(2H, s), 6.69-6.79(2H, m), 6.88(1H, d, J = 8.0 Hz), 6.92-7.02(3H, m), 7.12-7.24(2H, m), 7.37-7.49 (3H, m), 7.67(2H, d, J = 8.1 Hz), 10.77(1H, brs).

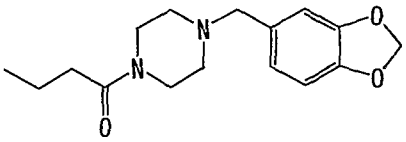
(TsOH means a p-toluenesulfonic acid. Hereinafter TsOH indicates the same meaning.)

Table 193



Example No.	R_{636}	R_{637}	R_{638}	R_{639}	R_{640}	R_{641}	Form	mp (°C) or ^{1}H NMR
624	Ya_2	-H	-H	Ya_1	-H	-H	hydrochloride	^{1}H NMR (DMSO-d_6) δ 2.56-2.72(2H, m), 2.73-2.94(3H, m), 2.96-3.10(1H, m), 3.12-3.52(4H, m), 3.91-4.07(1H, m), 4.10-4.26(2H, m), 4.33-4.48(1H, m), 6.05(2H, s), 6.82(1H, d, J = 8.2 Hz), 6.89-7.02(4H, m), 7.09(1H, t, J = 7.6 Hz), 7.14-7.25(2H, m), 7.35(1H, d, J = 7.6 Hz), 7.74(2H, d, J = 9.0 Hz), 7.81(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, d, J = 2.1 Hz), 10.45 (1H, s), 11.15(1H, brs).
625	Ya_2	-H	-H	-H	Ya_1	-H	oxalate	mp 134-143
626	-H	-H	Ya_2	-H	-H	Ya_1	fumarate	mp 123-126
627	-H	Ya_2	-H	-H	-H	Ya_1	hydrochloride	mp 141-153

In the above-mentioned Table, Y_{a1} means a group of



, and Y_{a2} means a group of

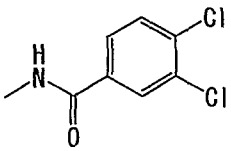


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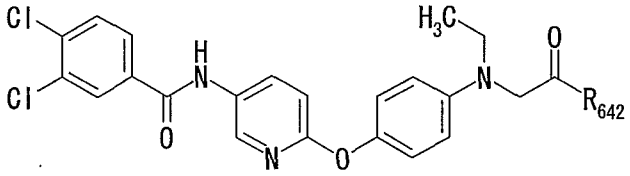
Table 194



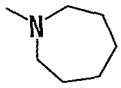
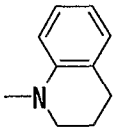
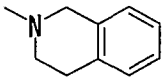
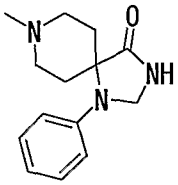
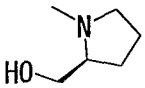
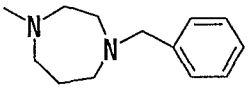
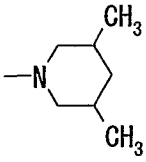
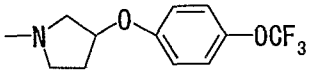
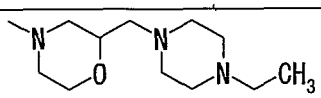
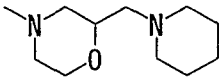
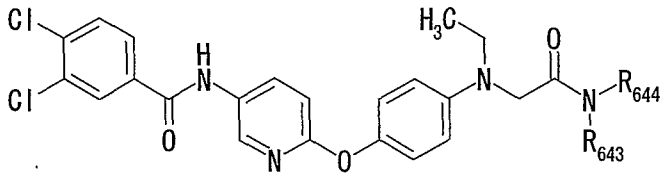
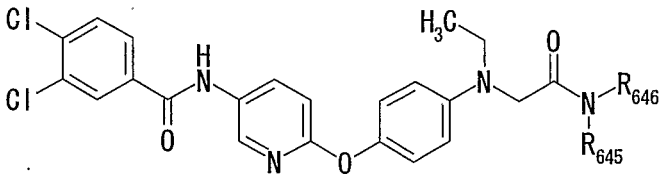
Example No.	R_{642}	MS (M^{+}+H)
628		540
629		574
630	morpholino	528
631		574
632		673
633		513
634		543
635		632
636		555
637		689
638		655
639		626

Table 195



Example No.	R_{643}	R_{644}	MS (M^++H)
640	$-CH_3$	cyclohexyl	554
641	-H	cyclohexyl	540
642	$-C_2H_5$	-Ph	562
643	$-CH_3$	4-CH_3Ph-	562
644	-H	cycloheptyl	554
645	-H	cyclooctyl	569
646	-H	benzyl	548
647	-H	2-ClPhCH_2-	584
648	-H	3-ClPhCH_2-	584
649	-H	4-ClPhCH_2-	584
650	$-CH_3$	Ph$(CH_2)_2$-	577
651	$-CH_3$	3,4-$(CH_3O)_2$PhCH_2-	623
652	$-CH_3$	benzyl	562
653	$-C_2H_5$	benzyl	576
654	-H	Ph$OCH_2CH(CH_3)$-	593
655	$-C_2H_5$	cyclohexyl	569
656	-H	$-C_2H_5$	486
657	-H	$-(CH_2)_2CH_3$	500
658	-H	$-(CH_2)_2OCH_3$	516
659	$-C_2H_5$	cyclohexylmethyl	583
660	-H	4-CH_3OPhCH_2-	578
661	-H	4-CH_3OPh$(CH_2)_2$-	593
662	-H	4-CF_3OPhCH_2-	632
663	-H	4-CF_3OPh-	618
664	-H	4-ClPh$(CH_2)_2$-	598
665	-H	piperonyl	592
666	-H	$-(CH_2)_2$OPh	579
667	-H	cyclopentyl	527
668	-H	cyclohexylmethyl	554
669	-H	4-hydroxycyclohexan-1-yl	556
670	-H	4-FPhCH_2-	566
671	-H	$-CH(CH_3)$Ph	562
672	-H	$-(CH_2)_3$Ph	576
673	-H	-Ph	534
674	-H	4-CH_3OPh-	564
675	-H	$-(CH_2)_2$Ph	562
676	-H	3-PhOPh-	627
677	-H	4-PhOPh-	627
678	-H	2-CH_3OPh$(CH_2)_2$-	593
679	-H	2-FPh$(CH_2)_2$-	580

Table 196



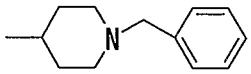
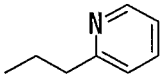
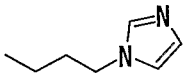
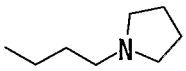
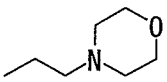
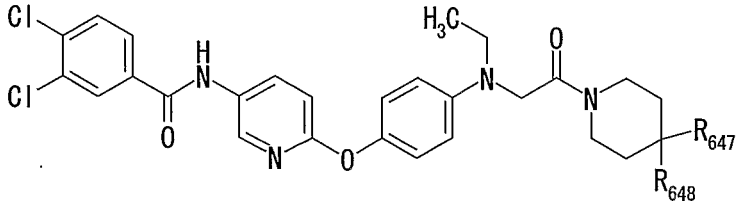
Example No.	R_{645}	R_{646}	MS (M^{+}+H)
680	-H		632
681	-H	$-CH(CH_3)_2$	501
682	$-CH_3$		578
683	$-(CH_2)_2OH$	$-(CH_2)_2OH$	547
684	$-CH_3$	$-(CH_2)_2N(CH_3)_2$	544
685	-H	$-(CH_2)_3CH_3$	515
686	-H	cyclopropyl	499
687	-H	2-pyridylmethyl	550
688	-H	3-pyridylmethyl	550
689	-H	$-CH_2CH(CH_3)_2$	515
690	-H	cyclopropylmethyl	513
691	-H		567
692	-H		570
693	-H		572

Table 197



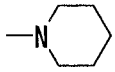
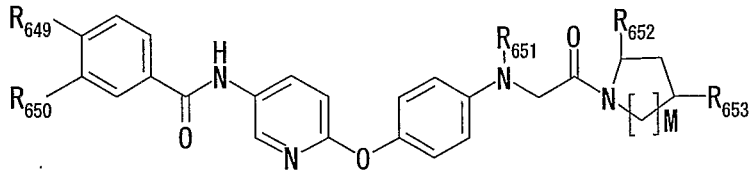
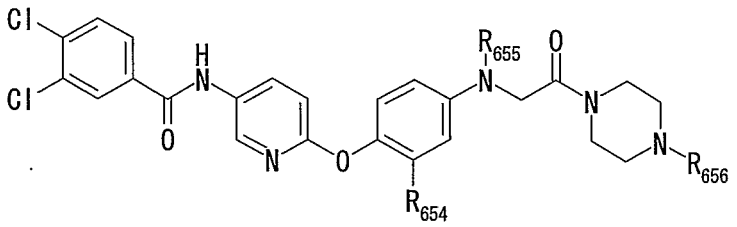
Example No.	R_{647}	R_{648}	^{1}H NMR or MS
694	-H	4-CF_3OPhO-	MS 702(M^++H)
695	-H	benzyl	MS 617(M^++H)
696	-OH	4-ClPh-	MS 654(M^++H)
697	-H	-H	MS 526(M^++H)
698	-H	-Ph	MS 602(M^++H)
699	-H	piperonyl	^{1}H NMR ($CDCl_3$) δ 1.11-1.16(5H, m), 1.65-1.71(3H, m), 2.48(2H, d, J = 6.4 Hz), 2.54-2.58(1H, m), 2.95-3.04(1H, m), 3.35(2H, q, J = 7.1 Hz), 3.84-3.89(1H, m), 4.01(2H, s), 4.52-4.57(1H, m), 5.93(2H, s), 6.56-6.63(4H, m), 6.73(1H, d, J = 7.8 Hz), 6.79(1H, d, J = 8.7 Hz), 6.92(2H, d, J = 9.1 Hz), 7.52(1H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.04(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.26(1H, d, J = 2.5 Hz), 8.56(1H, brs).
700	-H		MS 610(M^++H)
701	-H	4-$CH_3OPhCONH$-	MS 676(M^++H)
702	-H	-N(CH_3)CH_2Ph	MS 646(M^++H)
703	-H	4-$CH_3PhO(CH_2)_2N(CH_3)$-	MS 690(M^++H)
704	-OH	-Ph	MS 619(M^++H)
705	-H	4-CNPhO-	MS 644(M^++H)
706	-H	2-$ClPhCH_2$-	MS 653(M^++H)
707	-$CH_2(CH_2)_3CH_2$-		MS 595(M^++H)

Table 198



Example No.	R_{649}	R_{650}	R_{651}	R_{652}	R_{653}	M	^{1}H NMR (solvent) δppm
708	-Cl	-Cl	$-CH_3$	$-CONH_2$	-H	1	(DMSO-d_6) 1.79-2.02(4H, m), 2.96(3H, s), 3.37-3.67(3H, m), 4.19(2H, s), 6.61-6.70(2H, m), 6.89-6.95(3H, m), 7.83(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.13(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.43(1H, d, J = 2.6 Hz), 10.51(1H, s).
709	-Cl	-Cl	$-CH_3$	-H	benzyl	2	($CDCl_3$) 1.18-1.26(2H, m), 1.57(3H, brs), 1.58-1.74(2H, m), 2.49-2.58(2H, m), 3.83(1H, d, J = 13.5 Hz), 4.08 (2H, s), 4.56(1H, d, J = 13.5 Hz), 6.40(1H, d, J = 8.9 Hz), 6.67(2H, d, J = 9.1 Hz), 6.98(2H, d, J = 9.1 Hz), 7.12-7.32 (5H, m), 7.56(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.03-8.10(2H, m), 8.24(1H, d, J = 2.6 Hz).
710	$-CF_3$	-H	$-C_2H_5$	-H	piperonyl	2	($CDCl_3$) 1.12-1.17(5H, m), 1.64-1.71(3H, m), 2.48(2H, d, J = 6.6 Hz), 2.53-2.58(1H, m), 2.94-3.03(1H, m), 3.37(2H, q, J = 7.1 Hz), 3.84-3.89(1H, m), 4.01(2H, s), 4.53-4.58(1H, m), 5.93(2H, s), 6.56-6.63(4H, m), 6.73 (1H, d, J = 7.8 Hz), 6.82(1H, d, J = 8.9 Hz), 6.95(2H, d, J = 9.1 Hz), 7.72 (2H, d, J = 8.3 Hz), 7.99 (2H, d, J = 8.1 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.27(1H, d, J = 2.6 Hz), 8.37(1H, brs).
711	-Cl	-Cl	$-CH_3$	-H	piperonyl	2	($CDCl_3$) 1.03-1.17(2H, m), 1.64-1.74 (3H, m), 2.46-2.57(3H, m), 2.97-3.04 (4H, m), 3.80-3.85(1H, m), 4.07(2H, s), 4.51-4.55(1H, m), 5.92(2H, s), 6.56-6.63(4H, m), 6.73(1H, d, J = 7.8 Hz), 6.79(1H, d, J = 8.9 Hz), 6.94(2H, d, J = 8.9 Hz), 7.52(1H, d, J = 8.4 Hz), 7.71 (1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.04(1H, d, J = 8.9 Hz), 8.25(1H, d, J = 2.3 Hz), 8.49(1H, brs).
712	$-CF_3$	-H	$-CH_3$	-H	piperonyl	2	($CDCl_3$) 1.09-1.17(2H, m), 1.67-1.70(3H, m), 2.47-2.52(3H, m), 2.94-3.03(4H, m), 3.80-3.85(1H, m), 4.06(2H, s), 4.50-4.55(1H, m), 5.92(2H, s), 6.55-6.65(4H, m), 6.73(1H, d, J = 7.9 Hz), 6.81(1H, d, J = 8.9 Hz), 6.95(2H, d, J = 8.9 Hz), 7.70(2H, d, J = 8.1 Hz), 7.99 (2H, d, J = 8.1 Hz), 8.09(1H, dd, J = 8.9 Hz, 2.1 Hz), 8.26(1H, d, J = 2.6 Hz), 8.48(1H, brs).

Table 199



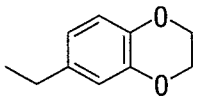
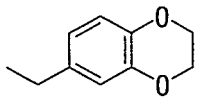
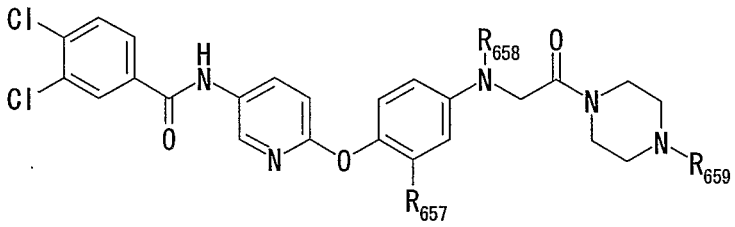
Example No.	R_{654}	R_{655}	R_{656}	^{1}H NMR (solvent) δppm
713	-OCH_3	-CH_3		($CDCl_3$) 2.38-2.43(4H, m), 2.95(3H, s), 3.40(2H, s), 3.47-3.58(4H, m), 3.63(3H, s), 4.05(2H, s), 4.24(4H, s), 6.12(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.21(1H, d, J = 2.6 Hz), 6.74-6.87(5H, m), 7.44(1H, d, J = 8.4 Hz), 7.69(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.96(1H, d, J = 2.0 Hz), 8.02 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.19(1H, d, J = 2.6 Hz), 9.00(1H, s).
714	-F	-CH_3	3-furylmethyl	(DMSO-d_6) 2.32(2H, brs), 2.41(2H, brs), 2.93(3H, s), 3.37(2H, s), 3.44(4H, brs), 4.29(2H, s), 6.40-6.44(2H, m), 6.56(1H, dd, J = 14.5 Hz, 2.8 Hz), 7.01-7.08(2H, m), 7.58(1H, s), 7.62(1H, s), 7.84(1H, d, J = 8.4 Hz), 7.94 (1H, dd, J = 8.4 Hz, 2.0 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.0 Hz), 8.39(1H, d, J = 2.6 Hz), 10.53(1H, s).
715	-F	-CH_3		(DMSO-d_6) 2.30(2H, brs), 2.39(2H, brs), 2.93(3H, s), 3.38(2H, s), 3.44(4H, brs), 4.22(4H, s), 4.28(2H, s), 6.41(1H, dd, J = 8.6 Hz, 2.2 Hz), 6.56(1H, dd, J = 14.4 Hz, 2.8 Hz), 6.76-6.81(3H, m), 7.01-7.08(2H, m), 7.84 (1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.0 Hz), 8.39(1H, d, J = 2.5 Hz), 10.53(1H, s).
716	-H	-CH_3	3-furylmethyl	($CDCl_3$) 2.42(4H, brs), 2.97(3H, s), 3.40(2H, s), 3.50(2H, brs), 3.61(2H, brs), 4.07(2H, s), 6.38(1H, d, J = 1.5 Hz), 6.63(2H, d, J = 9.1 Hz), 6.80(1H, d, J = 8.9 Hz), 6.95 (2H, d, J = 9.1 Hz), 7.34(1H, s), 7.40(1H, t, J = 1.5 Hz), 7.52(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.97(1H, d, J = 2.0 Hz), 8.04(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz), 8.42(1H, s).
717	-OCH_3	-CH_3	3-furylmethyl	($CDCl_3$) 2.40-2.44(4H, m), 2.96(3H, s), 3.39(2H, s), 3.49-3.63(4H, m), 3.63(3H, s), 4.06(2H, s), 6.12(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.22(1H, d, J = 2.5 Hz), 6.38(1H, s), 6.76(1H, d, J = 8.7 Hz), 6.86(1H, d, J = 8.7 Hz), 7.33-7.47(3H, m), 7.69(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.96-8.04(2H, m), 8.20(1H, d, J = 2.3 Hz), 8.92(1H, s).

Table 200



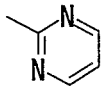
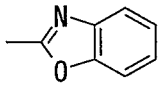
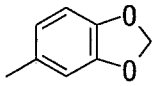
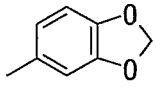
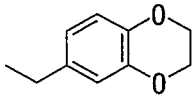
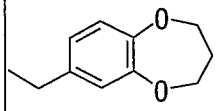
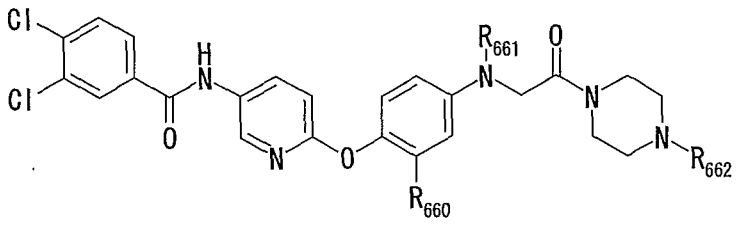
Example No.	R_{657}	R_{658}	R_{659}	Property
718	$-CH_3$	$-CH_3$	3-furylmethyl	mp 116.5-118.0°C
719	-H	$-C_2H_5$		MS 606(M^++H)
720	-H	$-C_2H_5$		MS 645(M^++H)
721	-H	$-C_2H_5$		^{1}H NMR ($CDCl_3$) δ 1.16(3H, t, J = 7.1 Hz), 3.04(4H, brs), 3.40(2H, q, J = 7.1 Hz), 3.66-3.76(4H, m), 4.07(2H, s), 5.91 (2H, s), 6.36(1H, dd, J = 8.4 Hz, 2.5 Hz), 6.55(1H, d, J = 2.3 Hz), 6.66(2H, d, J = 9.1 Hz), 6.73(1H, d, J = 8.4 Hz), 6.83(1H, d, J = 8.9 Hz), 6.96(2H, d, J = 8.9 Hz), 7.54(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.07(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, brs), 8.24(1H, d, J = 2.5 Hz).
722	-H	$-CH_3$		^{1}H NMR ($CDCl_3$) δ 3.00-3.03(7H, m), 3.64(2H, brs), 3.75 (2H, brs), 4.12(2H, s), 5.91(2H, s), 6.36(1H, dd, J = 8.4 Hz, 2.5 Hz), 6.55(1H, d, J = 2.3 Hz), 6.68(2H, d, J = 9.1 Hz), 6.73 (1H, d, J = 8.4 Hz), 6.83(1H, d, J = 8.9 Hz), 6.98(2H, d, J = 9.1 Hz), 7.54(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.07(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, brs), 8.23(1H, d, J = 3.0 Hz).
723	-H	$-C_2H_5$		^{1}H NMR (DMSO-d_6) δ 1.11(3H, t, J = 7.1 Hz), 2.31(2H, brs), 2.38(2H, brs), 3.22-3.58(8H, m), 4.16(2H, s), 4.21(4H, s), 6.56(2H, d, J = 9.0 Hz), 6.71-6.85(3H, m), 6.90(2H, d, J = 9.0 Hz), 6.93(1H, d, J = 8.9 Hz), 7.83(1H, d, J = 8.4 Hz), 7.95 (1H, dd, J = 8.4 Hz, 2.0 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.43(1H, d, J = 2.6 Hz), 10.51(1H, s).
724	-H	$-C_2H_5$		^{1}H NMR ($CDCl_3$) δ 1.13(3H, t, J = 7.0 Hz), 2.10-2.25(2H, m), 2.42(4H, brs), 3.34(2H, q, J = 7.0 Hz), 3.42(2H, s), 3.50 (2H, brs), 3.61(2H, brs), 4.01(2H, s), 4.11-4.31(4H, m), 6.59 (2H, d, J = 9.2 Hz), 6.79(1H, d, J = 8.9 Hz), 6.82-6.98(5H, m), 7.51(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.98 (1H, d, J = 2.8 Hz), 8.03(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.24(1H, d, J = 2.8 Hz), 8.54(1H, s).

Table 201



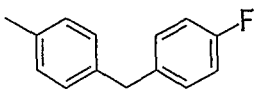
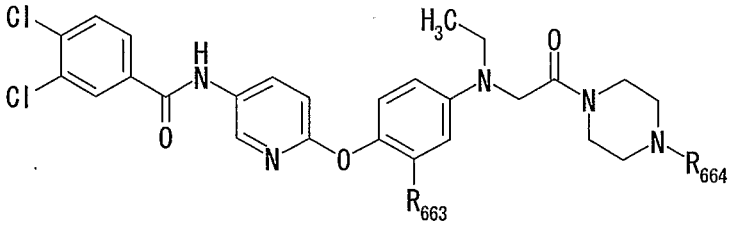
Example No.	R_{660}	R_{661}	R_{662}	mp (°C) or ^{1}H NMR (solvent) δppm
725	-CH_3	-Ac	piperonyl	mp 216-217
726	-CH_3	-Ac	benzyl	^{1}H NMR (DMSO-d_6) 1.82(3H, s), 2.09(3H, s), 2.28-2.36 (4H, m), 3.35-3.50(6H, m), 4.44(2H, s), 7.05-7.10(2H, m), 7.20-7.32(7H, m), 7.82(1H, d, J = 8.5 Hz), 7.92(1H, dd, J = 1.9 Hz, 8.5 Hz), 8.15-8.20(2H, m), 8.42(1H, d, J = 2.5 Hz), 10.53(1H, s).
727	-H	-C_2H_5	3-pyridyl	^{1}H NMR (DMSO-d_6) 1.13(3H, t, J = 7.1 Hz), 3.21(2H, brs), 3.29(2H, brs), 3.37(2H, q, J = 7.1 Hz), 3.51-3.78 (4H, m), 4.26(2H, s), 6.60(2H, d, J = 9.0 Hz), 6.92(2H, d, J = 9.0 Hz), 6.94(1H, d, J = 8.9 Hz), 7.23(1H, dd, J = 8.5 Hz, 4.6 Hz), 7.36(1H, dd, J = 8.5 Hz, 1.6 Hz), 7.83(1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.03(1H, d, J = 4.6 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.0 Hz), 8.34(1H, d, J = 2.8 Hz), 8.43(1H, d, J = 2.8 Hz), 10.51(1H, s).
728	-F	-C_2H_5	piperonyl	mp 149-151
729	-F	-CH_3	piperonyl	mp 199-201
730	-F	-Ac	piperonyl	mp 233-235
731	-OCH_3	-CH_3	piperonyl	^{1}H NMR ($CDCl_3$) 2.41-2.43(4H, m), 3.02(3H, s), 3.42(2H, s), 3.49-3.62(4H, m), 3.72(3H, s), 4.08(2H, s), 5.95(2H, s), 6.21(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.32(1H, d, J = 2.8 Hz), 6.73-6.77(2H, m), 6.84(2H, t, J = 4.5 Hz), 6.95(1H, d, J = 8.7 Hz), 7.54(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.97(2H, d, J = 2.0 Hz), 8.05-8.09(1H, m), 8.19(1H, d, J = 2.5 Hz).
732	-H	-CH_3	3-pyridylmetyl	^{1}H NMR ($CDCl_3$) 2.40-2.42(4H, m), 2.93(3H, s), 3.44(2H, s), 3.48-3.58(4H, m), 4.06(2H, s), 6.58(2H, d, J = 9.1 Hz), 6.74(1H, d, J = 8.9 Hz), 6.90(2H, d, J = 9.1 Hz), 7.25-7.30(1H, m), 7.43(1H, d, J = 8.4 Hz), 7.66-7.73(2H, m), 7.97(1H, d, J = 2.0 Hz), 8.03(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.5 Hz), 8.47-8.51(2H, m), 9.59(1H, s).
733	-H	-CH_3		^{1}H NMR (DMSO-d_6) 2.96(3H, s), 3.07-3.15(4H, m), 3.59 (4H, brs), 3.83(2H, s), 4.31(2H, s), 6.66(2H, d, J = 9.1 Hz), 6.88-6.95(5H, m), 7.05-7.13(4H, m), 7.20-7.24(2H, m), 7.83(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.0 Hz), 8.43(1H, d, J = 2.5 Hz), 10.50(1H, s).

Table 202



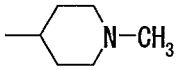
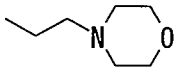
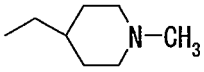
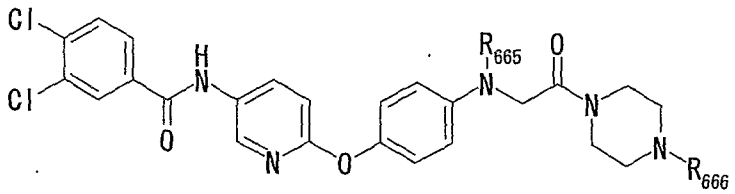
Example No.	R_{663}	R_{664}	MS or ^{1}H NMR
734	-H	-$CHPh_2$	MS 694(M^++H)
735	-H	3-CH_3OPh-	MS 634(M^++H)
736	-H	4-CH_3OPh-	MS 634(M^++H)
737	-H	3,4-$(CH_3)_2Ph$-	MS 632(M^++H)
738	-H	2,3-Cl_2Ph-	MS 673(M^++H)
739	-H	2,4-F_2Ph-	MS 640(M^++H)
740	-H	2-CH_3OPh-	MS 634(M^++H)
741	-H	3-CF_3Ph-	MS 671(M^++H)
742	-H	2-ClPh-	MS 639(M^++H)
743	-H	4-CF_3Ph-	MS 671(M^++H)
744	-H	-Ph	MS 604(M^++H)
745	-H	2-pyridylmethyl	MS 619(M^++H)
746	-H	2-pyridyl	MS 605(M^++H)
747	-H	-$(CH_2)_3Ph$	MS 646(M^++H)
748	-H	-$(CH_2)_4Ph$	MS 660(M^++H)
749	-H	-$(CH_2)_2N(CH_3)_2$	MS 599(M^++H)
750	-H	cyclopentyl	MS 596(M^++H)
751	-H		MS 625(M^++H)
752	-H		MS 641(M^++H)
753	-H	-$CH(CH_3)Ph$	MS 634(M^++H)
754	-H	-$(CH_2)_2Ph$	MS 632(M^++H)
755	-H	-$CH_2CONHPh$	MS 661(M^++H)
756	-H	-$(CH_2)_3N(CH_3)_2$	MS 613(M^++H)
757	-H		MS 639(M^++H)
758	-H	-CH_3	MS 542(M^++H)
759	-OCH_3	-H	^{1}H NMR ($CDCl_3$) δ1.26(3H, t, J = 6.9 Hz), 2.70(1H, brs), 2.82-2.87(4H, m), 3.33(2H, q, J = 6.9 Hz), 3.49-3.57(4H, m), 3.62(3H, s), 4.00(2H, s), 6.09(1H, d, J = 8.7 Hz), 6.20(1H, s), 6.73(1H, d, J = 8.7 Hz), 6.83(1H, d, J = 8.6 Hz), 7.42(1H, d, J = 8.3 Hz), 7.70(1H, d, J = 7.4 Hz), 7.97-8.03(2H, m), 8.23(1H, s), 9.26(1H, brs).

Table 203



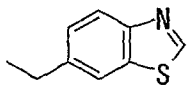
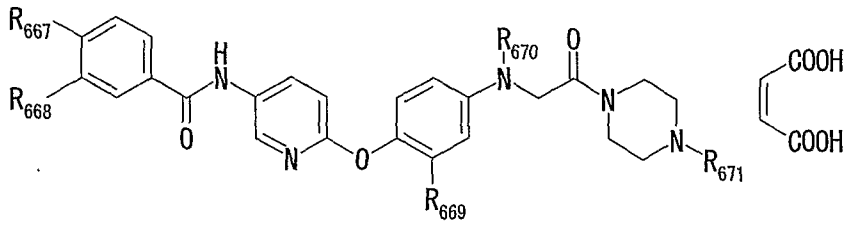
Example No.	R_{665}	R_{666}	Form	^{1}H NMR (DMSO-d_6) δppm
760	-Ac	piperonyl	hydro-chloride	1.84(3H, s), 2.83-3.14(2H, m), 3.23-3.32(2H, m), 4.02(1H, d, J = 13.6 Hz), 4.18-4.27(2H, m), 4.40(1H, d, J = 13.6 Hz), 4.50-4.60 (2H, m), 6.07(2H, s), 6.96-7.03(2H, m), 7.10-7.25(4H, m), 7.43 (2H, d, J = 8.8 Hz), 7.85(1H, d, J = 8.4 Hz), 7.98(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.24(1H, dd, J = 2.6 Hz, 8.9 Hz), 8.26(1H, d, J = 2.0 Hz), 8.54(1H, d, J = 2.6 Hz), 10.69(1H, s), 11.07(1H, brs).
761	-Ac	benzyl	hydro-chloride	1.84(3H, s), 2.90-3.17(2H, m), 3.23-3.35(2H, m), 4.03(1H, d, J = 14.4 Hz), 4.28-4.43(3H, m), 4.50-4.62(2H, m), 7.13(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.8 Hz), 7.40-7.50(5H, m), 7.58-7.62 (2H, m), 7.85(1H, d, J = 8.4 Hz), 8.00(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.20-8.29(2H, m), 8.54(1H, d, J = 2.6 Hz), 10.70(1H, s), 11.21 (1H, brs).
762	-C_2H_5	3-furylmethyl	trihydro-chloride	1.11(3H, t, J = 7.1 Hz), 2.75-3.30(3H, m), 3.30-3.50(2H, m), 3.40(2H, q, J = 7.1 Hz), 3.51-3.72(1H, m), 3.95-4.15(1H, m), 4.22(2H, s), 4.30-4.62(3H, m), 6.80-6.85(1H, m), 6.89(2H, d, J = 8.9 Hz), 7.00(1H, d, J = 8.9 Hz), 7.01(2H, d, J = 8.9 Hz), 7.70-7.80(1H, m), 7.84(1H, d, J = 8.5 Hz), 7.88(1H, s), 7.99(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.27 (1H, d, J = 2.0 Hz), 8.50(1H, d, J = 2.7 Hz), 10.69(1H, s).
763	-C_2H_5	4-pyridylmethyl	tetrahydro-chloride	1.11(3H, t, J = 7.0 Hz), 3.00-3.60(6H, m), 3.41(2H, q, J = 7.0 Hz), 3.90(2H, brs), 4.42(2H, brs), 4.63(2H, brs), 6.82(2H, d, J = 8.8 Hz), 6.98(3H, d, J = 8.8 Hz), 7.84(1H, d, J = 8.4 Hz), 7.98(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22-8.39(3H, m), 8.49(1H, d, J = 2.5 Hz), 8.99(2H, d, J = 6.2 Hz), 10.67(1H, s).
764	-CH_3		dihydro-chloride	2.94(3H, s), 2.80-3.22(3H, m), 3.22-3.70(3H, m), 3.95-4.60(6H, m), 6.68(2H, d, J = 9.1 Hz), 6.92(2H, d, J = 9.1 Hz), 6.95(1H, d, J = 8.9 Hz), 7.79(1H, dd, J = 8.4 Hz, 1.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.20(1H, d, J = 8.4 Hz), 8.24(1H, d, J = 2.0 Hz), 8.40(1H, d, J = 1.6 Hz), 8.44(1H, d, J = 2.3 Hz), 9.51(1H, s), 10.57(1H, s).

Table 204



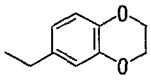
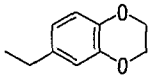
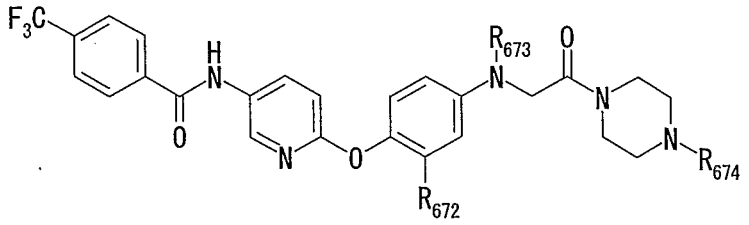
Example No.	R_{667}	R_{668}	R_{669}	R_{670}	R_{671}	mp (°C) or ^{1}H NMR (solvent) δppm
765	-Cl	-Cl	-H	$-CH_3$	piperonyl	mp 198-200
766	-Cl	-Cl	-H	$-C_2H_5$	benzyl	^{1}H NMR (DMSO-d_6) 1.12(3H, t, J = 7.1 Hz), 2.98(4H, brs), 3.34(2H, q, J = 7.1 Hz), 3.20-3.50(2H, m), 3.67(2H, brs), 4.10(2H, brs), 4.23(2H, s), 6.11(2H, s), 6.59(2H, d, J = 9.2 Hz), 6.91(2H, d, J = 9.2 Hz), 6.94(1H, d, J = 8.9 Hz), 7.45(5H, s), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.6 Hz), 8.12 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.43(1H, d, J = 2.6 Hz), 10.51(1H, s).
767	-Cl	-Cl	-H	$-CH_3$		^{1}H NMR (DMSO-d_6) 2.94(3H, s), 3.05(4H, brs), 3.40(2H, brs), 3.63(2H, brs), 4.04(2H, brs), 4.26(4H, s), 4.31(2H, brs), 6.09(2H, s), 6.65(2H, d, J = 9.1 Hz), 6.82-7.06(6H, m), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.12(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.22(1H, d, J = 2.0 Hz), 8.43(1H, d, J = 2.5 Hz), 10.51(1H, s).
768	-Cl	-Cl	$-OCH_3$	$-C_2H_5$	piperonyl	mp 172-177
769	$-CF_3$	-H	-H	$-C_2H_5$	benzyl	^{1}H NMR ($CDCl_3$+CD_3OD) 1.13(3H, t, J = 6.9 Hz), 3.08(4H, brs), 3.36(2H, q, J = 6.9 Hz), 3.85(4H, brs), 4.09(2H, s), 4.18(2H, s), 6.31 (2H, s), 6.73(2H, d, J = 8.9 Hz), 6.87(1H, d, J = 9.2 Hz), 6.98(2H, d, J = 8.9 Hz), 7.40-7.44 (5H, m), 7.73(2H, d, J = 8.4 Hz), 8.07(2H, d, J = 8.3 Hz), 8.27(2H, d, J = 7.4 Hz), 9.63(1H, s).
770	$-CF_3$	-H	-H	$-CH_3$		^{1}H NMR (DMSO-d_6) 2.94(3H, s), 2.95(4H, brs), 3.33(4H, brs), 4.03(2H, brs), 4.26(4H, s), 4.31(2H, brs), 6.09(2H, s), 6.65(2H, d, J = 9.2 Hz), 6.85-7.03(6H, m), 7.93(2H, d, J = 8.2 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.16(2H, d, J = 8.2 Hz), 8.45(1H, d, J = 2.5 Hz), 10.59(1H, s).

Table 205



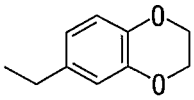
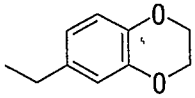
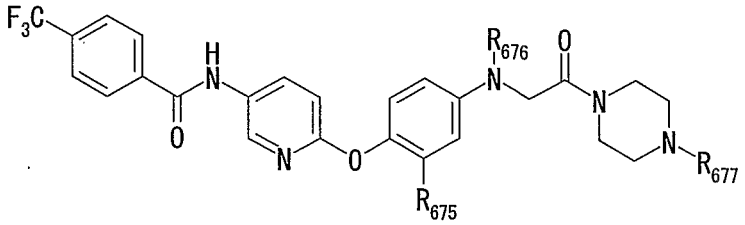
Example No.	R_{672}	R_{673}	R_{674}	mp (°C) or ^{1}H NMR (solvent) δppm
771	-H	-Ac	benzyl	mp 161-162
772	$-CH_3$	-Ac	piperonyl	^{1}H NMR (DMSO-d_6) 1.82(3H, s), 2.10(3H, s), 2.23-2.36(4H, m), 3.33-3.45(6H, m), 4.44(2H, s), 5.96(2H, s), 6.72(1H, d, J = 8.0 Hz), 6.82(1H, d, J = 8.0 Hz), 6.84(1H, s), 7.02-7.10(2H, m), 7.23(1H, d, J = 8.6 Hz), 7.33(1H, s), 7.91(2H, d, J = 8.4 Hz), 8.14(2H, d, J = 8.4 Hz), 8.20(1H, d, J = 8.6 Hz), 8.45 (1H, s), 10.60(1H, s).
773	$-CH_3$	-Ac	benzyl	^{1}H NMR (DMSO-d_6) 1.82(3H, s), 2.10(3H, s), 2.30-2.37(4H, m), 3.35-3.45(4H, m), 3.47(2H, s), 4.44(2H, s), 7.03-7.10 (2H, m), 7.20-7.35(7H, m), 7.91(2H, d, J = 8.4 Hz), 8.14(2H, d, J = 8.4 Hz), 8.21(1H, dd, J = 2.5 Hz, 8.9 Hz), 8.45(1H, d, J = 2.5 Hz), 10.60(1H, s).
774	-H	$-C_2H_5$	piperonyl	mp 178-180
775	-F	$-C_2H_5$	piperonyl	mp 170-172
776	-F	$-CH_3$	piperonyl	mp 220-221
777	$-OCH_3$	$-CH_3$	piperonyl	^{1}H NMR ($CDCl_3$) 2.38-2.42(4H, m), 2.96(3H, s), 3.41(2H, s), 3.47-3.58(4H, m), 3.64(3H, s), 4.05(2H, s), 5.94(2H, s), 6.13 (1H, dd, J = 8.9 Hz, 2.8 Hz), 6.24(1H, d, J = 2.8 Hz), 6.70-6.89(5H, m), 7.64(2H, d, J = 8.3 Hz), 7.96(2H, d, J = 8.1 Hz), 8.06(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.20(1H, d, J = 2.6 Hz), 8.93(1H, s).
778	$-OCH_3$	$-CH_3$		^{1}H NMR ($CDCl_3$) 2.38-2.42(4H, m), 2.96(3H, s), 3.40(2H, s), 3.47-3.57(4H, m), 3.98(3H, s), 4.05(2H, s), 4.24(4H, s), 6.13 (1H, dd, J = 8.9 Hz, 2.8 Hz), 6.23(1H, d, J = 2.6 Hz), 6.73-6.88(5H, m), 7.63(2H, d, J = 8.3 Hz), 7.97(2H, d, J = 8.1 Hz), 8.07(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.20(1H, d, J = 2.5 Hz), 9.11(1H, s).
779	-F	$-CH_3$		^{1}H NMR (DMSO-d_6) 2.30(2H, brs), 2.39(2H, brs), 2.93(3H, s), 3.38(2H, s), 3.44(4H, brs), 4.22(4H, s), 4.28(2H, s), 6.40-6.43(1H, m), 6.56(1H, dd, J = 14.2 Hz, 2.6 Hz), 6.73-6.81(3H, m), 7.02-7.08(2H, m), 7.93(2H, d, J = 8.6 Hz), 8.14-8.21(3H, m), 8.49(1H, d, J = 2.6 Hz), 10.61(1H, s).
780	-F	$-CH_3$	3-furylmethyl	^{1}H NMR (DMSO-d_6) 2.32(2H, s), 2.41(2H, s), 2.93(3H, s), 3.37(2H, s), 3.44(4H, brs), 4.29(2H, s), 6.40-6.44(2H, m), 6.55(1H, dd, J = 14.5 Hz, 2.8 Hz), 7.02-7.08(2H, m), 7.58-7.62(2H, m), 7.93(2H, d, J = 8.4 Hz), 8.14-8.21(3H, m), 8.41(1H, d, J = 2.6 Hz), 10.61(1H, s).

Table 206



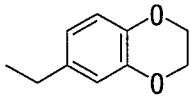
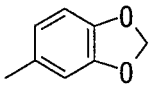
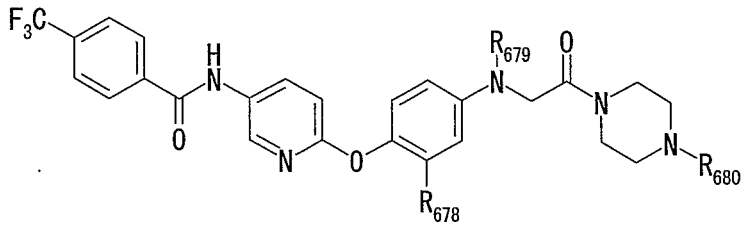
Example No.	R_{675}	R_{676}	R_{677}	mp (°C) or ^{1}H NMR (solvent) δppm
781	-OCH_3	-C_2H_5		^{1}H NMR ($CDCl_3$) 1.16(3H, t, J = 6.9 Hz), 2.38-2.43(4H, m), 3.33-3.62(8H, m), 3.66(3H, s), 4.02(2H, s), 4.26(4H, s), 6.14 (1H, dd, J = 8.7 Hz, 2.6 Hz), 6.25(1H, d, J = 2.6 Hz), 6.75-6.90(5H, m), 7.66(2H, d, J = 8.3 Hz), 8.01(2H, d, J = 8.3 Hz), 8.09(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.26(1H, d, J = 2.6 Hz), 9.19(1H, s).
782	-F	-Ac	piperonyl	^{1}H NMR (DMSO-d_6) 1.88(3H, s), 2.33(4H, brs), 3.40(2H, s), 3.40(4H, brs), 4.50(2H, s), 5.99(2H, s), 6.73-6.76(1H, m), 6.83-6.86(2H, m), 7.21(1H, d, J = 8.9 Hz), 7.32-7.49(3H, m), 7.94(2H, d, J = 8.3 Hz), 8.16(2H, d, J = 8.1 Hz), 8.25(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.46(1H, d, J = 2.6 Hz), 10.66(1H, s).
783	-H	-CH_3	3-furylmethyl	^{1}H NMR ($CDCl_3$) 2.44(4H, brs), 2.99(3H, s), 3.40(2H, s), 3.50 (2H, t, J = 4.9 Hz), 3.62(2H, t, J = 4.9 Hz), 4.07(2H, s), 6.38 (1H, d, J = 1.0 Hz), 6.67(2H, d, J = 9.1 Hz), 6.84(1H, d, J = 8.8 Hz), 6.98(2H, d, J = 9.1 Hz), 7.34(1H, s), 7.40(1H, t, J = 1.6 Hz), 7.73(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.11 (1H, dd, J = 8.8 Hz, 2.6 Hz), 8.24(1H, s), 8.25(1H, d, J = 2.6 Hz).
784	-OCH_3	-C_2H_5	3-furylmethyl	mp 174-176
785	-OCH_3	-CH_3	3-furylmethyl	mp 160-164
786	-CH_3	-CH_3	-$COOC(CH_3)_3$	^{1}H NMR ($CDCl_3$) 1.47(9H, s), 2.12(3H, s), 3.01(3H, s), 3.30-3.71(8H, m), 4.09(2H, s), 6.44-6.66(2H, m), 6.83(1H, d, J = 8.9 Hz), 6.93(1H, d, J = 8.4 Hz), 7.75(2H, d, J = 8.1 Hz), 7.94(1H, s), 7.99(2H, d, J = 8.1 Hz), 8.15(1H, d, J = 9.2 Hz), 8.22(1H, s).
787	-H	-C_2H_5		^{1}H NMR ($CDCl_3$) 1.18(3H, t, J = 7.1 Hz), 3.03(4H, brs), 3.43 (2H, q, J = 7.1 Hz), 3.67-3.77(4H, m), 4.08(2H, s), 5.91(2H, s), 6.36(1H, dd, J = 8.4 Hz, 2.3 Hz), 6.55(1H, d, J = 2.5 Hz), 6.68-6.75(3H, m), 6.87(1H, d, J = 8.7 Hz), 7.00(2H, d, J = 8.9 Hz), 7.75(2H, d, J = 8.4 Hz), 7.98(1H, brs), 7.99(2H, d, J = 8.3 Hz), 8.13(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz)

Table 207



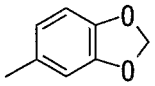
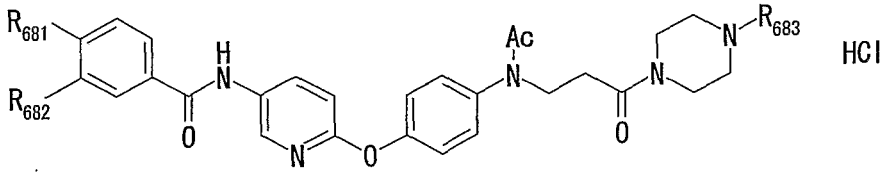
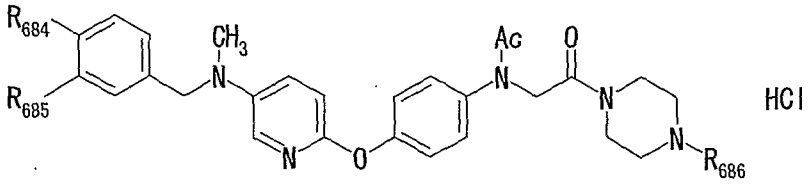
Example No.	R_{678}	R_{679}	R_{680}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
788	-F	$-(CH_2)_2CH_3$	piperonyl	free	^{1}H NMR ($CDCl_3$) 0.94(3H, t, J = 7.3 Hz), 1.58-1.69(2H, m), 2.45(4H, brs), 3.29(2H, t, J = 7.6 Hz), 3.45(2H, s), 3.49(2H, brs), 3.64(2H, brs), 4.05(2H, s), 5.95(2H, s), 6.34-6.44(2H, m), 6.75(2H, s), 6.86(1H, s), 6.96(1H, d, J = 8.9 Hz), 7.03(1H, t, J = 9.1 Hz), 7.76(2H, d, J = 8.2 Hz), 7.86(1H, brs), 8.00(2H, d, J = 8.1 Hz), 8.16-8.22(2H, m).
789	-H	$-CH_3$		free	^{1}H NMR ($CDCl_3$) 3.02(7H, brs), 3.64(2H, brs), 3.75(2H, brs), 4.12(2H, s), 5.91(2H, s), 6.36(1H, dd, J = 8.4 Hz, 2.5 Hz), 6.55(1H, d, J = 2.5 Hz), 6.70(2H, d, J = 9.1 Hz), 6.73(1H, d, J = 8.3 Hz), 6.85(1H, d, J = 8.9 Hz), 6.99(2H, d, J = 9.2 Hz), 7.73(2H, d, J = 8.3 Hz), 7.98(2H, d, J = 8.3 Hz), 8.12(1H, dd, J = 9.1 Hz, 2.8 Hz), 8.15(1H, brs), 8.24(1H, d, J = 2.5 Hz).
790	$-OCH_3$	$-CH_3$	4-(4-FPhCO)Ph-	free	^{1}H NMR ($CDCl_3$) 3.03(3H, s), 3.39(4H, brs), 3.70(3H, s), 3.71-3.79(4H, m), 4.14(2H, s), 6.23 (1H, dd, J = 8.9 Hz, 2.8 Hz), 6.36(1H, d, J = 2.6 Hz), 6.81-6.96(4H, m), 7.09-7.17(2H, m), 7.68 (2H, d, J = 8.4 Hz), 7.72-7.78(4H, m), 7.99(2H, d, J = 8.3 Hz), 8.09(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.21(1H, d, J = 2.6 Hz), 8.53(1H, s).
791	$-OCH_3$	$-C_2H_5$	4-(4-FPhCO)Ph-	free	^{1}H NMR ($CDCl_3$) 1.17(3H, t, J = 6.9 Hz), 3.37-3.42(6H, m), 3.67(3H, s), 3.71-3.76(4H, m), 4.08(2H, s), 6.19(1H, dd, J = 8.9 Hz, 2.8 Hz), 6.33(1H, d, J = 2.6 Hz), 6.77-6.92(4H, m), 7.09-7.15(2H, m), 7.64(2H, d, J = 8.3 Hz), 7.71-7.77(4H, m), 7.98(2H, d, J = 8.1 Hz), 8.07 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz), 8.83(1H, s).
792	$-CH_3$	$-CH_3$	3-furylmethyl	hydro-chloride	mp 158.5-161.0

Table 208



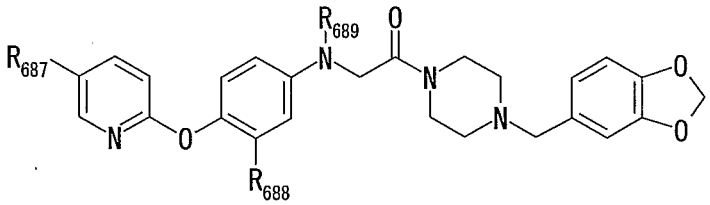
Example No.	R_{681}	R_{682}	R_{683}	^{1}H NMR (DMSO-d_6) δppm
793	-Cl	-Cl	piperonyl	1.74(3H, s), 2.19-2.34(4H, m), 2.54(2H, t, J = 7.7 Hz), 3.32-3.46(6H, m), 3.76(2H, t, J = 7.7 Hz), 5.96(2H, s), 6.72(1H, d, J = 7.9 Hz), 6.77-6.85(2H, m), 7.11(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.6 Hz), 7.31(2H, d, J = 8.6 Hz), 7.83(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.17-8.25(2H, m), 8.51(1H, d, J = 2.4 Hz), 10.57(1H, s).
794	-Cl	-Cl	benzyl	1.74(3H, s), 2.25-2.37(4H, m), 2.54(2H, t, J = 7.7 Hz), 3.36-3.42(4H, m), 3.46(2H, s), 3.76(2H, t, J = 7.7 Hz), 7.11(1H, d, J = 8.8 Hz), 7.16 (2H, d, J = 8.6 Hz), 7.20-7.31(5H, m), 7.34(2H, d, J = 8.6 Hz), 7.83(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.19-8.25(2H, m), 8.51 (1H, d, J = 2.5 Hz), 10.57(1H, s).
795	-CF_3	-H	piperonyl	1.74(3H, s), 2.20-2.35(4H, m), 2.54(2H, t, J = 7.7 Hz), 3.34-3.42(6H, m), 3.76(2H, t, J = 7.7 Hz), 5.96(2H, s), 6.72(1H, d, J = 7.8 Hz), 6.78-6.86(2H, m), 7.12(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.5 Hz), 7.35 (2H, d, J = 8.5 Hz), 7.92(2H, d, J = 8.2 Hz), 8.15(2H, d, J = 8.2 Hz), 8.24(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.54(1H, d, J = 2.5 Hz), 10.65(1H, s).
796	-CF_3	-H	benzyl	1.74(3H, s), 2.18-2.36(4H, m), 2.54(2H, t, J = 7.7 Hz), 3.35-3.45(4H, m), 3.46(2H, s), 3.76(2H, t, J = 7.7 Hz), 7.12(1H, d, J = 8.8 Hz), 7.17 (2H, d, J = 8.6 Hz), 7.20-7.33(5H, m), 7.34(2H, d, J = 8.6 Hz), 7.92(2H, d, J = 8.3 Hz), 8.15(2H, d, J = 8.3 Hz), 8.24(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.54(1H, d, J = 2.5 Hz), 10.65(1H, s).

Table 209



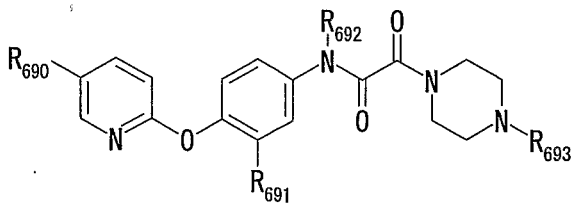
Example No.	R_{684}	R_{685}	R_{686}	^{1}H NMR (DMSO-d_6) δppm
797	-Cl	-Cl	benzyl	1.80(3H, s), 3.02(3H, s), 2.70-3.40(5H, m), 3.41-3.68(1H, m), 3.88-4.10 (1H, m), 4.32(2H, brs), 4.25-4.50(1H, m), 4.50(2H, d, J = 3.8 Hz), 4.57 (2H, s), 6.94(1H, d, J = 8.9 Hz), 7.02(2H, d, J = 8.7 Hz), 7.22(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.34(1H, dd, J = 8.9 Hz, 3.2 Hz), 7.36(2H, d, J = 8.7 Hz), 7.42-7.49(3H, m), 7.50(1H, d, J = 2.0 Hz), 7.55-7.64(1H, m), 7.62 (2H, d, J = 8.2 Hz), 7.66(1H, d, J = 6.1 Hz).
798	-Cl	-Cl	piperonyl	1.81(3H, s), 2.75-3.40(5H, m), 3.02(3H, s), 3.43-3.67(1H, m), 3.90-4.10 (1H, m), 4.22(2H, brs), 4.30-4.50(1H, m), 4.50(2H, d, J = 4.6 Hz), 4.57 (2H, s), 6.07(2H, s), 6.94(2H, d, J = 8.8 Hz), 6.97-7.07(1H, m), 7.02(2H, d, J = 8.9 Hz), 7.22(1H, dd, J = 8.3 Hz, 1.8 Hz), 7.24(1H, s), 7.34(1H, dd, J = 8.8 Hz, 3.0 Hz), 7.36(2H, d, J = 8.9 Hz), 7.50(1H, d, J = 1.8 Hz), 7.60(1H, d, J = 8.3 Hz), 7.67(1H, d, J = 3.0 Hz).
799	-CF_3	-H	benzyl	1.80(3H, s), 3.05(3H, s), 2.70-3.40(5H, m), 3.41-3.68(1H, m), 3.90-4.08 (1H, m), 4.22-4.45(1H, m), 4.32(2H, brs), 4.50(2H, d, J = 3.5 Hz), 4.67 (2H, s), 6.94(1H, d, J = 8.9 Hz), 7.02(2H, d, J = 8.8 Hz), 7.34(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.36(2H, d, J = 8.8 Hz), 7.39-7.50(5H, m), 7.54-7.64 (2H, m), 7.67(1H, d, J = 3.3 Hz), 7.70(2H, d, J = 8.1 Hz).
800	-CF_3	-H	piperonyl	1.80(3H, s), 2.70-3.40(5H, m), 3.05(3H, s), 3.43-3.65(1H, m), 3.90-4.09 (1H, m), 4.22(2H, s), 4.29-4.48(1H, m), 4.50(2H, d, J = 4.8 Hz), 4.67(2H, s), 6.07(2H, s), 6.94(1H, d, J = 8.9 Hz), 7.00(2H, d, J = 7.0 Hz), 7.02(2H, d, J = 8.8 Hz), 7.24(1H, d, J = 1.1 Hz), 7.35(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.36(2H, d, J = 8.8 Hz), 7.45(2H, d, J = 8.1 Hz), 7.67(1H, d, J = 3.3 Hz), 7.70(2H, d, J = 8.1 Hz).

Table 210



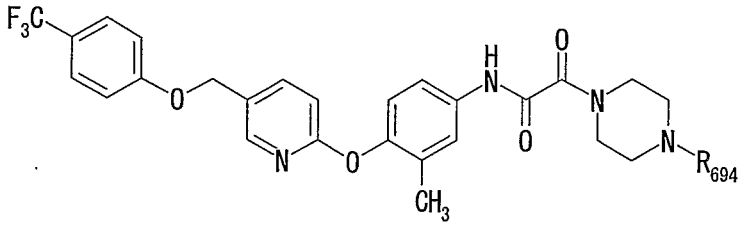
Example No.	R_{687}	R_{688}	R_{689}	^{1}H NMR ($CDCl_3$) δppm
801	4-CF_3PhCO-	-CH_3	-C_2H_5	1.19(3H, t, J = 7.1 Hz), 2.11(3H, s), 2.42-2.45(4H, m), 3.39-3.53(6H, m), 3.63-3.66(2H, m), 4.04(2H, s), 5.95(2H, s), 6.50-6.54(2H, m), 6.71-6.77(2H, m), 6.85(1H, s), 6.90-6.95(2H, m), 7.75(2H, d, J = 8.2 Hz), 7.87(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.59(1H, d, J = 2.0 Hz).
802	3,4-Cl_2PhNHCO-	-OCH_3	-C_2H_5	1.19(3H, t, J = 7.1 Hz), 2.42(4H, brs), 3.42(2H, q, J = 7.1 Hz), 3.43(2H, s), 3.51(2H, s), 3.62(2H, brs), 3.68(3H, s), 4.04(2H, s), 5.95(2H, s), 6.17(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.28(1H, d, J = 2.6 Hz), 6.73-6.74(2H, m), 6.85(1H, brs), 6.88(1H, d, J = 8.6 Hz), 6.90(1H, d, J = 8.7 Hz), 7.37(1H, d, J = 8.7 Hz), 7.47(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.86(1H, d, J = 2.5 Hz), 8.11(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.31(1H, brs), 8.58(1H, d, J = 2.3 Hz).
803	4-CF_3PhNHCO-	-OCH_3	-C_2H_5	1.19(3H, t, J = 7.1 Hz), 2.42(4H, brs), 3.38-3.47(4H, m), 3.51(2H, brs), 3.62(2H, brs), 3.68(3H, s), 4.05(2H, s), 5.94 (2H, s), 6.17(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.29(1H, d, J = 2.8 Hz), 6.73-6.74(2H, m), 6.84(1H, brs), 6.89(1H, d, J = 8.7 Hz), 6.91(1H, d, J = 8.7 Hz), 7.58(2H, d, J = 8.7 Hz), 7.76(2H, d, J = 8.7 Hz), 8.13(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.44(1H, brs), 8.64(1H, d, J = 2.5 Hz).
804	3,4-Cl_2PhNHCONH-	-$CONHCH_3$	-C_2H_5	1.07(3H, t, J = 7.0 Hz), 2.30-2.45(4H, m), 2.85(3H, d, J = 4.9 Hz), 3.33(2H, q, J = 7.0 Hz), 3.38(2H, s), 3.38-3.50(2H, m), 3.50-3.65(2H, m), 4.01(2H, s), 5.95(2H, s), 6.55-6.65 (1H, m), 6.69-6.84(5H, m), 7.14(1H, d, J = 3.1 Hz), 7.25-7.35(2H, m), 7.35-7.45(1H, m), 7.65(1H, d, J = 1.5 Hz), 7.72(1H, d, J = 2.6 Hz), 7.84(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.02(1H, s), 8.61(1H, s).
805	4-CF_3PhCH_2-	-H	-CH_3	2.42(4H, t, J = 5.1 Hz), 3.02(3H, s), 3.43(2H, s), 3.48(2H, brs), 3.63(2H, brs), 3.95(2H, s), 4.06(2H, s), 5.94(2H, s), 6.70(2H, d, J = 9.0 Hz), 6.73(2H, s), 6.74(1H, d, J = 10.0 Hz), 6.84(1H, s), 7.00(2H, d, J = 9.0 Hz), 7.27(2H, d, J = 8.1 Hz), 7.38(1H, dd, J = 8.4 Hz, 2.5 Hz), 7.54(2H, d, J = 8.1 Hz), 8.03(1H, d, J = 2.5 Hz).

Table 211



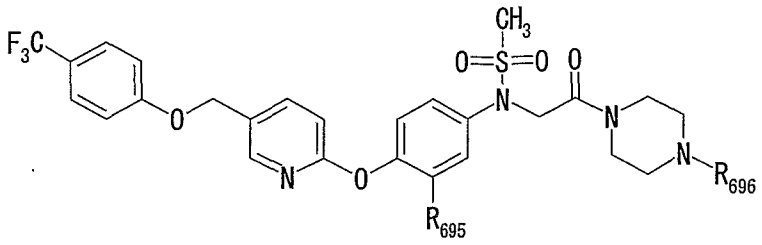
Example No.	R_{690}	R_{691}	R_{692}	R_{693}	^{1}H NMR (solvent) δppm
806	4-CF_3PhNHCO-	-CH_3	-H	piperonyl	($CDCl_3$) 2.17(3H, s), 2.49-2.54(4H, m), 3.45(2H, s), 3.71-3.75(2H, m), 4.26(2H, brs), 5.96(2H, s), 6.75(2H, brs), 6.86(1H, brs), 7.02(1H, d, J = 8.7 Hz), 7.06(1H, d, J = 8.7 Hz), 7.47(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.58(1H, d, J = 2.3 Hz), 7.63(2H, d, J = 8.4 Hz), 7.75(2H, d, J = 8.3 Hz), 7.84(1H, brs), 8.22(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.64(1H, d, J = 2.5 Hz), 9.20(1H, brs).
807	4-CF_3PhOCH_2-	-H	-H	piperonyl	($CDCl_3$) 2.51-2.54(4H, m), 3.45(2H, s), 3.71-3.75(2H, m), 4.27-4.29(2H, m), 5.05(2H, s), 5.95(2H, s), 6.85(2H, brs), 6.86(1H, brs), 6.96(1H, d, J = 8.4 Hz), 7.02(2H, d, J = 8.6 Hz), 7.14(2H, d, J = 8.9 Hz), 7.56(2H, d, J = 8.6 Hz), 7.64(2H, d, J = 8.9 Hz), 7.78(1H, dd, J = 8.4 Hz, 2.3 Hz), 8.22(1H, d, J = 2.3 Hz), 9.21(1H, brs).
808	4-CF_3PhOCH_2-	-H	-H	4-pyridylmethyl	($CDCl_3$) 2.52-2.58(4H, m), 3.55(2H, s), 3.74-3.77(2H, m), 4.29-4.32(2H, m), 5.04(2H, s), 6.96(1H, d, J = 8.4 Hz), 7.02(2H, d, J = 8.4 Hz), 7.15(2H, d, J = 8.9 Hz), 7.26-7.30(2H, m), 7.56(2H, d, J = 8.6 Hz), 7.64(2H, d, J = 9.1 Hz), 7.78(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.22(1H, d, J = 2.0 Hz), 8.56-8.58(2H, m), 9.24(1H, brs).
809	4-CF_3PhOCH_2-	-CH_3	-CH_3	piperonyl	a mixture of the rotational isomers (DMSO-d_6) 2.07-2.43 (7H, m), 3.24-3.57(11H, m), 5.17(2H, brs), 5.95-5.99(2H, m), 6.66-6.89(3H, m), 7.07-7.12(2H, m), 7.16-7.37(4H, m), 7.66(2H, d, J = 8.4 Hz), 7.85-8.00(1H, m), 8.22(1H, d, J = 2.0 Hz).
810	4-CF_3PhOCH_2-	-CH_3	-CH_3	3,4-$(CH_3O)_2$PhCH_2-	a mixture of the rotational isomers (DMSO-d_6) 2.07-2.43(7H, m), 3.26-3.75(15H, m), 5.17(2H, brs), 6.70-6.91(3H, m), 7.07-7.12(2H, m), 7.16-7.37(4H, m), 7.66(2H, d, J = 8.9 Hz), 7.95-8.00(1H, m), 8.22(1H, d, J = 2.0 Hz).

Table 212



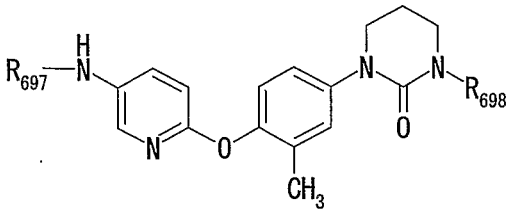
Example No.	R_{694}	^{1}H NMR ($CDCl_3$) δppm
811	piperonyl	2.18(3H, s), 2.49-2.54(4H, m), 3.45(2H, s), 3.70-3.74(2H, m), 4.23-4.27(2H, m), 5.03(2H, s), 5.95(2H, s), 6.71-6.78(2H, m), 6.86(1H, brs), 6.92(1H, d, J = 8.6 Hz), 7.00-7.06(3H, m), 7.44(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.54-7.58(3H, m), 7.77(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.20(1H, d, J = 2.3 Hz), 9.20(1H, brs).
812	3,4-$(CH_3O)_2PhCH_2$-	2.18(3H, s), 2.50-2.55(4H, m), 3.48(2H, s), 3.71-3.75(2H, m), 3.88(3H, s), 3.90(3H, s), 4.24-4.28(2H, m), 5.03(2H, s), 6.79-6.86(2H, m), 6.88(1H, brs), 6.93(1H, d, J = 8.4 Hz), 7.00-7.06(3H, m), 7.44(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.54-7.58(3H, m), 7.77(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.20(1H, d, J = 2.5 Hz), 9.19(1H, brs).
813	4-pyridylmethyl	2.18(3H, s), 2.52-2.58(4H, m), 3.55(2H, s), 3.73-3.77(2H, m), 4.27-4.31(2H, m), 5.03(2H, s), 6.93(1H, d, J = 8.4 Hz), 7.00-7.06(3H, m), 7.28(2H, d, J = 5.9 Hz), 7.44(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.54-7.57(3H, m), 7.77(1H, dd, J = 8.4 Hz, 2.3 Hz), 8.19(1H, d, J = 2.1 Hz), 8.56(2H, d, J = 5.9 Hz), 9.23(1H, brs).

Table 213



Example No.	R_{695}	R_{696}	^{1}H NMR ($CDCl_3$) δppm
814	-H	piperonyl	2.42(4H, brs), 3.21(3H, s), 3.37(2H, brs), 3.42(2H, s), 3.62(2H, brs), 4.54(2H, s), 5.06(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.83(1H, brs), 6.98-7.04(3H, m), 7.14(2H, d, J = 8.7 Hz), 7.56(2H, d, J = 8.7 Hz), 7.62(2H, d, J = 8.9 Hz), 7.81(1H, dd, J = 8.4 Hz, 2.3 Hz), 8.23(1H, d, J = 2.1 Hz).
815	-H	4-pyridylmethyl	2.48(4H, brs), 3.21(3H, s), 3.41(2H, brs), 3.53(2H, s), 3.65(2H, brs), 4.55(2H, s), 5.06(2H, s), 7.01(1H, d, J = 8.2 Hz), 7.03(2H, d, J = 8.4 Hz), 7.14(2H, d, J = 8.9 Hz), 7.26-7.28(2H, m), 7.57(2H, d, J = 8.7 Hz), 7.62(2H, d, J = 8.7 Hz), 7.81(1H, dd, J = 8.4 Hz, 2.3 Hz), 8.23(1H, d, J = 2.1 Hz), 8.56(2H, d, J = 5.6 Hz).
816	$-CH_3$	piperonyl	2.18(3H, s), 2.41-2.44(4H, m), 3.22(3H, s), 3.36-3.39(2H, m), 3.43(2H, s), 3.60-3.64(2H, m), 4.54(2H, s), 5.05(2H, s), 5.94(2H, s), 6.73-6.74(2H, m), 6.84(1H, brs), 6.97(1H, d, J = 8. 4 Hz), 7.02(1H, d, J = 8.6 Hz), 7.04(2H, d, J = 8.6 Hz), 7.45(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.49(1H, d, J = 2.5 Hz), 7.56(2H, d, J = 8.4 Hz), 7.80(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.20(1H, d, J = 2.0 Hz).
817	$-CH_3$	3,4-$(CH_3O)_2PhCH_2$-	2.18(3H, s), 2.44(4H, brs), 3.22(3H, s), 3.38-3.40(2H, m), 3.46(2H, s), 3.63-3.65(2H, m), 3.87(3H, s), 3.89(3H, s), 4.55(2H, s), 5.04(2H, s), 6.81(2H, brs), 6.87(1H, brs), 6.98(1H, d, J = 8.6 Hz), 7.02(1H, d, J = 8.4 Hz), 7.04(2H, d, J = 8.4 Hz), 7.45(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.49(1H, d, J = 2.6 Hz), 7.56(2H, d, J = 8.4 Hz), 7.80(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.20(1H, d, J = 2.3 Hz).

Table 214



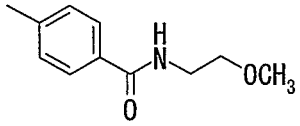
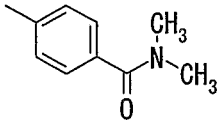
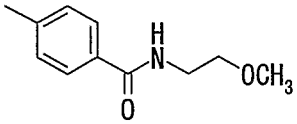
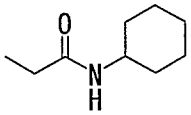
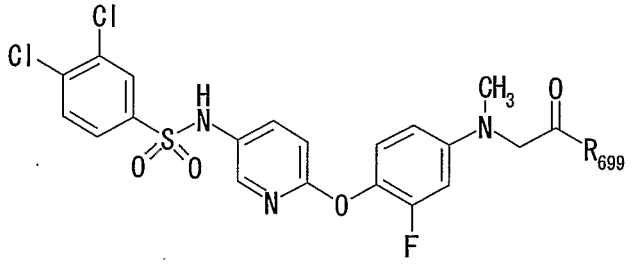
Example No.	R_{697}	R_{698}	mp (°C)
818	4-CF_3PhCO-		207.0 - 209.0
819	4-CF_3PhCO-		237.0 - 238.0
820	3,4-Cl_2PhSO_2-		115.0 - 116.0
821	3,4-Cl_2PhNHCO-	-CH_2CONHPh	147.0 - 148.0
822	3,4-Cl_2PhNHCO-		207.0 - 208.0

Table 215



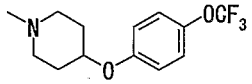
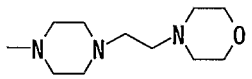
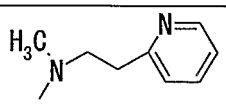
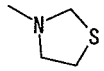
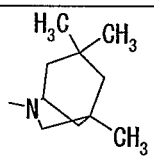
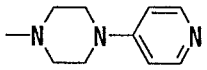
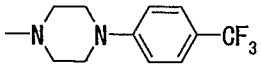
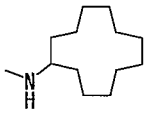
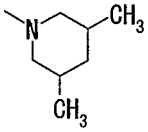
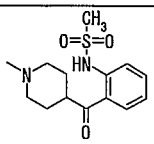
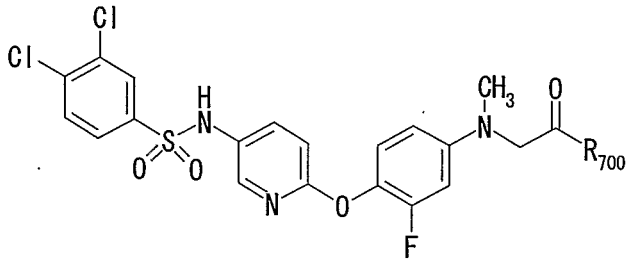
Example No.	R_{699}	^{1}H NMR or MS
823		^{1}H NMR (DMSO-d_6) δ 1.40-1.80(2H, m), 1.80-2.10 (2H, m), 2.93(3H, s), 3.15-3.50(2H, m), 3.60-3.90(2H, m), 4.31(2H, s), 4.60-4.70(1H, m), 6.35-6.45(1H, m), 6.54 (1H, dd, J = 14.4 Hz, 2.6 Hz), 6.96-7.11(4H, m), 7.27-7.31(2H, m), 7.52(1H, dd, J = 8.7 Hz, 2.7 Hz), 7.63 (1H, dd, J = 8.5 Hz, 2.1Hz), 7.76(1H, d, J = 2.7 Hz), 7.84-7.88(2H, m), 10.39(1H, brs).
824		MS 682(M^++H)
825		MS 618(M^++H)
826	-N[$CH_2CH(CH_3)_2$]$_2$	MS 611(M^++H)
827		MS 571(M^++H)
828		MS 635(M^++H)
829	-N[$(CH_2)_3N(CH_3)_2$]$_2$	MS 669(M^++H)
830		MS 645(M^++H)
831		MS 712(M^++H)
832		MS 665(M^++H)
833		MS 595(M^++H)
834		MS764(M^++H)

Table 216



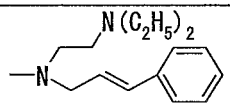
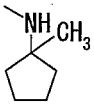
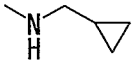
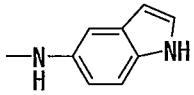
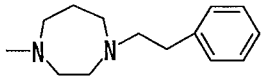
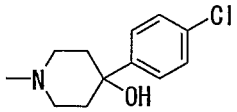
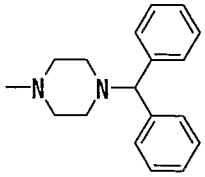
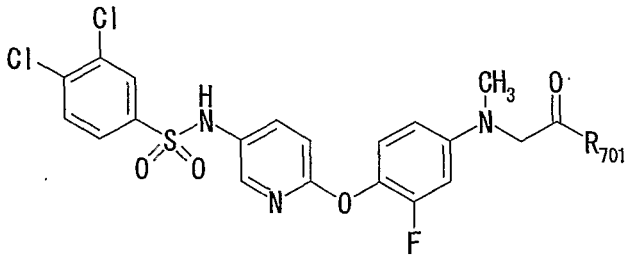
Example No.	R_{700}	MS (M^++H)
835		635
836		714
837		581
838	4-CF_3OPhCH_2NH-	673
839		553
840	-$NH(CH_2)_5OH$	585
841	-$NHCH(CH_3)COOCH_3$	585
842	3,5-$F_2PhCH_2N(C_2H_5)$-	653
843	4-$CH_3PhNHCOCH_2N(CH_3)$-	660
844	3,4-$(CH_3O)_2PhCH_2N(C_2H_5)$-	677
845	4-$CH_3PhCH_2N(C_2H_5)$-	631
846		614
847		686
848	3,4-Cl_2Ph-	714
849		695
850		734
851	-$N(CH_2Ph)CH_2CH_2CN$	642
852	-$N(C_2H_5)CH(CH_3)_2$	569
853	-$NHC(CH_3)_2CH_2Ph$	631
854	3-CNPhNH-	600
855	3,5-F_2PhNH-	611

Table 217



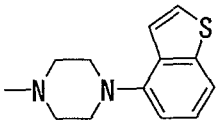
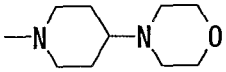
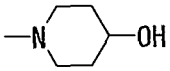
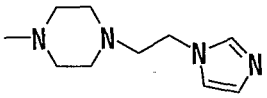
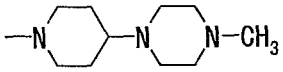
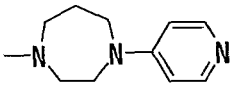
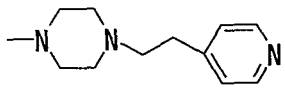
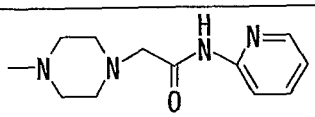
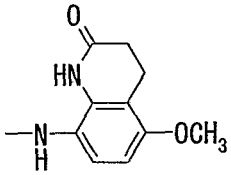
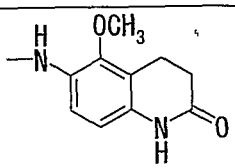
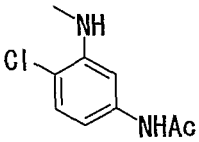
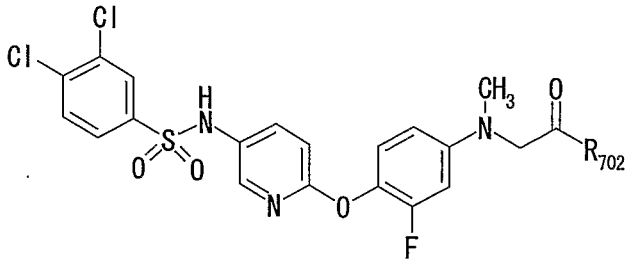
Example No.	R_{701}	MS (M^{+}+H)
856		700
857		652
858		583
859		662
860		665
861		659
862		673
863		702
864		674
865		674
866		666

Table 218



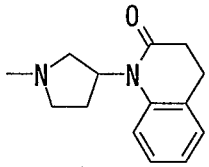
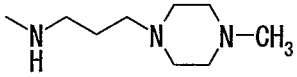
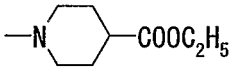
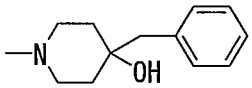
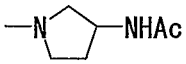
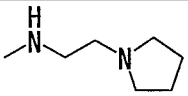
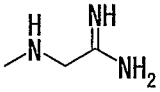
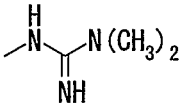
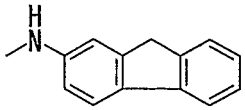
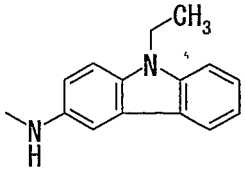
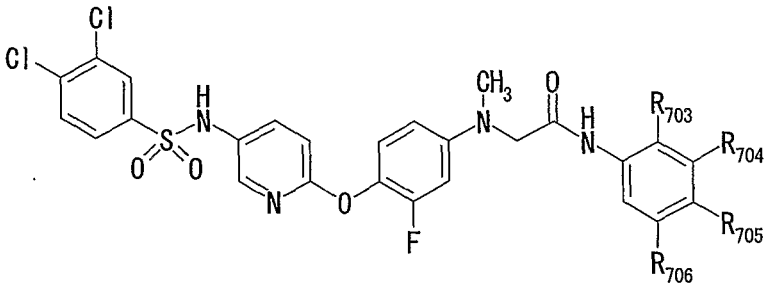
Example No.	R_{702}	MS (M^{+}+H)
867		698
868		639
869		639
870		673
871		610
872		596
873		555
874		569
875		663
876		692

Table 219



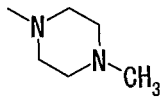
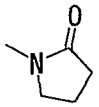
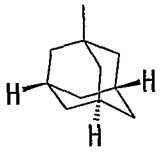
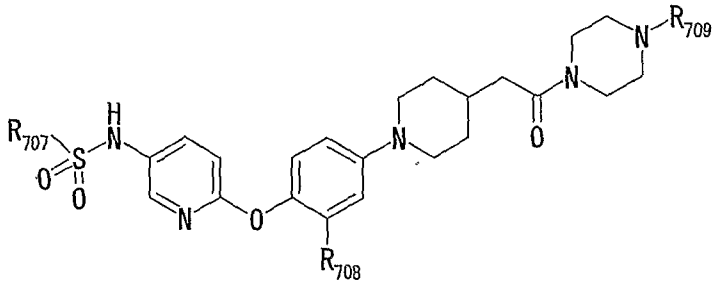
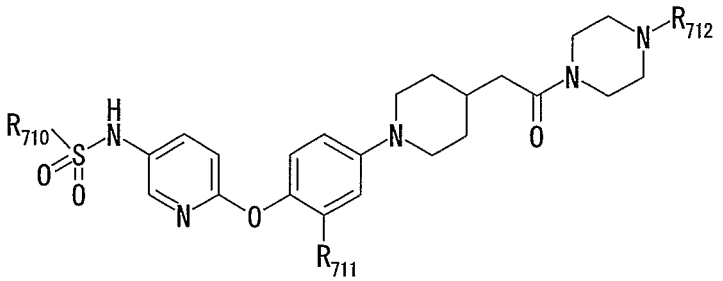
Example No.	R_{703}	R_{704}	R_{705}	R_{706}	MS (M^{+}+H)
877	-H	-H	$-OCF_3$	-H	659
878	-H	-H	$-CH_3$	-H	589
879	$-OCH_3$	$-OCH_3$	-H	-H	635
880	-H	-H	$-SCH_3$	-H	621
881	$-CH(CH_3)_2$	-H	-H	-H	617
882	-H	-H	cyclohexyl	-H	657
883	-NHPh	-H	-Cl	-H	702
884	4-ClPhNH-	-H	-H	$-COOC_2H_5$	774
885	-H	-H	$-O(CH_2)_2N(C_2H_5)_2$	-H	690
886	-H	-H		-H	673
887	-H	-H		-H	658
888	-H	-H	$-NHSO_2CH_3$	-H	668
889	-H	-H	$-(CH_2)_2OH$	-H	619
890	-H	-H	$-(CH_2)_4CH_3$	-H	645
891	-H	-H	benzyl	-H	665
892	-H	-H	-SPh	-H	683
893	-H	-H		-H	709

Table 220



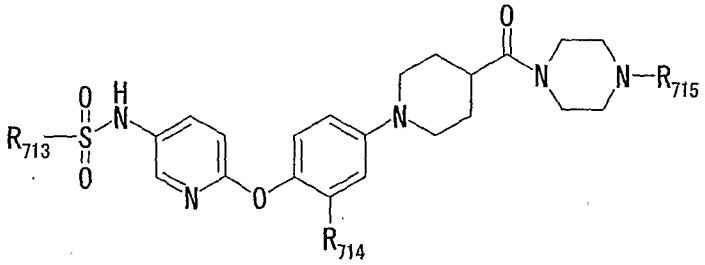
Example No.	R_{707}	R_{708}	R_{709}	^{1}H NMR ($CDCl_3$) δppm
894	4-CF_3Ph-	-CH_3	piperonyl	1.34-1.42(2H, m), 1.80-1.98(3H, m), 2.03(3H, s), 2.29(2H, d, J = 6.6 Hz), 2.41(4H, brs), 2.65(2H, t, J = 12.0 Hz), 3.43(2H, s), 3.49-3.65(6H, m), 5.94(2H, s), 6.69-6.87(8H, m), 7.56(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.68(2H, d, J = 8.6 Hz), 7.76-7.85(3H, m).
895	3,4-Cl_2Ph-	-CH_3	piperonyl	1.34-1.39(2H, m), 1.79-1.98(3H, m), 2.04(3H, s), 2.29(2H, d, J = 6.6 Hz), 2.41(4H, brs), 2.64(2H, t, J = 11.9 Hz), 3.43(2H, s), 3.49-3.65(6H, m), 5.94(2H, s), 6.70-6.88(7H, m), 7.45-7.50(3H, m), 7.55(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.78-7.82(2H, m).
896	4-CF_3Ph-	-CH_3	benzyl	1.34-1.43(2H, m), 1.80-2.01(3H, m), 2.03(3H, s), 2.29(2H, d, J = 6.6 Hz), 2.43(4H, brs), 2.65(2H, t, J = 12.0 Hz), 3.49-3.65(8H, m), 6.70-6.76(3H, m), 6.86(1H, d, J = 8.7 Hz), 7.26-7.32 (6H, m), 7.55(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.68(2H, d, J = 8.6 Hz), 7.76(1H, d, J = 2.8 Hz), 7.84(2H, d, J = 8.4 Hz).
897	3,4-Cl_2Ph-	-CH_3	benzyl	1.27-1.39(2H, m), 1.79-2.01(3H, m), 2.04(3H, s), 2.29(2H, d, J = 6.8 Hz), 2.43(4H, brs), 2.64(2H, t, J = 11.9 Hz), 3.53-3.66(8H, m), 6.69-6.76(3H, m), 6.86(1H, d, J = 8.7 Hz), 7.29-7.32 (6H, m), 7.44-7.50(2H, m), 7.55(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.79-7.82(2H, m).
898	4-CF_3Ph-	-H	3,4-Cl_2Ph-	1.34-1.46(2H, m), 1.83-2.02(3H, m), 2.34(2H, d, J = 6.8 Hz), 2.67(2H, t, J = 12.0 Hz), 3.15-3.17(4H, m), 3.55-3.65(4H, m), 3.78-3.80(2H, m), 6.72-6.97(7H, m), 7.26-7.31(2H, m), 7.56 (1H, dd, J = 8.9 Hz, 2.8 Hz), 7.70(2H, d, J = 8.24 Hz), 7.78-7.86(3H, m).
899	4-CF_3Ph-	-H	4-CF_3Ph-	1.35-1.47(2H, m), 1.83-2.02(3H, m), 2.36(2H, d, J = 6.8 Hz), 2.67(2H, t, J = 12.0 Hz), 3.28-3.30(4H, m), 3.57(2H, d, J = 12.2 Hz), 3.68(2H, brs), 3.82(2H, brs), 6.76(1H, d, J = 8.7 Hz), 6.87-6.96(7H, m), 7.50(2H, d, J = 8.6 Hz), 7.56(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.69(2H, d, J = 8.4 Hz), 7.80-7.86(3H, m).
900	3,4-Cl_2Ph-	-H	4-CF_3Ph-	1.34-1.47(2H, m), 1.83-2.02(3H, m), 2.35(2H, d, J = 6.8 Hz), 2.68(2H, t, J = 12.0 Hz), 3.29-3.31(4H, m), 3.58(2H, d, J = 12.2 Hz), 3.68(2H, brs), 3.83(2H, brs), 6.79(1H, d, J = 8.7 Hz), 6.88-6.98(7H, m), 7.50-7.59(5H, m), 7.79(1H, d, J = 2.8 Hz), 7.83-7.84(1H, m).

Table 221



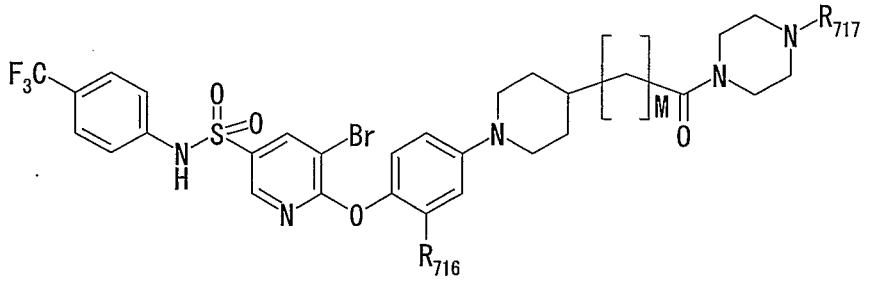
Example No.	R_{710}	R_{711}	R_{712}	^{1}H NMR ($CDCl_3$) δppm
901	3,4-Cl_2Ph-	-H	3,4-Cl_2Ph-	1.34-1.46(2H, m), 1.82-2.02(3H, m), 2.35(2H, d, J = 6.6 Hz), 2.66(2H, t, J = 12.0 Hz), 3.16-3.17(4H, m), 3.57(2H, d, J = 12.2 Hz), 3.65(2H, brs), 3.80(2H, brs), 6.72-6.78(2H, m), 6.87-6.97(6H, m), 7.29(1H, d, J = 8.9 Hz), 7.49(2H, s), 7.57(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.81-7.84(2H, m).
902	4-CF_3Ph-	-CH_3	3,4-Cl_2Ph-	1.34-1.46(2H, m), 1.82-2.01(3H, m), 2.03(3H, s), 2.35(2H, d, J = 6.8 Hz), 2.67(2H, t, J = 12.0 Hz), 3.15-3.17(4H, m), 3.58(2H, d, J = 12.2 Hz), 3.65(2H, brs), 3.79(2H, brs), 6.70-6.76 (4H, m), 6.86(1H, d, J = 8.6 Hz), 6.96(1H, d, J = 2.8 Hz), 7.29(1H, d, J = 8.7 Hz), 7.53-7.57(1H, m), 7.68(2H, d, J = 8.2 Hz), 7.77(1H, d, J = 2.5 Hz), 7.84(2H, d, J = 8.2 Hz), 8.05(1H, s).
903	4-CF_3Ph-	-H	piperonyl	1.27-1.41(2H, m), 1.83-2.05(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.40-2.44(4H, m), 2.66-2.75(2H, m), 3.44-3.56(4H, m), 3.65-3.74(4H, m), 5.95(2H, s), 6.75-6.99(8H, m), 7.57(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.71-7.74(4H, m), 7.85(2H, d, J = 8.2 Hz).
904	3,4-Cl_2Ph-	-H	benzyl	1.31-1.40(2H, m), 1.80-2.05(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.62-2.71(2H, m), 3.53-3.58(6H, m), 3.66(2H, brs), 6.79(1H, d, J = 8.7 Hz), 6.88-6.98(4H, m), 7.31(5H, brs), 7.50(2H, s), 7.56 (1H, dd, J = 8.9 Hz, 2.8 Hz), 7.77-7.84(3H, m).
905	4-CF_3Ph-	-H	benzyl	1.30-1.43(2H, m), 1.80-2.04(3H, m), 2.28(2H, d, J = 6.8 Hz), 2.42-2.46(4H, m), 2.62-2.70(2H, m), 3.47-3.58(6H, m), 3.66(2H, brs), 6.78(1H, d, J = 8.7 Hz), 6.87-6.97(4H, m), 7.26-7.32 (6H, m), 7.56(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.68-7.77(3H, m), 7.83-7.86(2H, m).
906	3,4-Cl_2Ph-	-H	piperonyl	1.33-1.39(2H, m), 1.79-2.00(3H, m), 2.30(2H, d, J = 6.8 Hz), 2.42-2.44(4H, m), 2.65(2H, t, J = 10.4 Hz), 3.43(2H, s), 3.49-3.57(4H, m), 3.65(2H, brs), 5.94(2H, s), 6.74-6.77(3H, m), 6.84-6.97(5H, m), 7.49-7.59(3H, m), 7.81-7.85(3H, m).
907	4-CF_3Ph-	-OCH_3	piperonyl	1.33-1.44(2H, m), 1.82-1.95(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.41(4H, brs), 2.70(2H, t, J = 12.2 Hz), 3.43-3.64(8H, m), 3.67(3H, s), 5.94(2H, s), 6.46(1H, dd, J = 8.7 Hz, 2.6 Hz), 6. 54(1H, d, J = 2.5 Hz), 6.70-6.78(4H, m), 6.85(1H, s), 6.92(1H, d, J = 8.6 Hz), 7.55(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.67(2H, d, J = 8.4 Hz), 7.74(1H, d, J = 2.6 Hz), 7.84(2H, d, J = 8.2 Hz).

Table 222



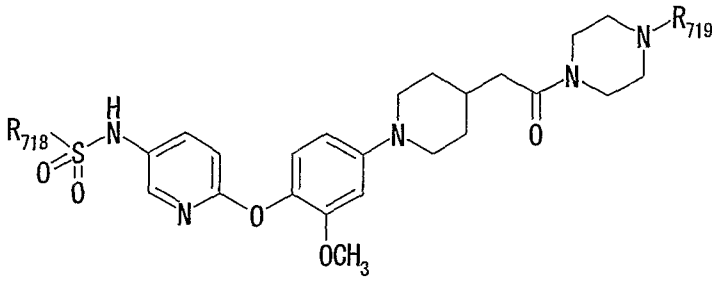
Example No.	R_{713}	R_{714}	R_{715}	^{1}H NMR ($CDCl_3$) δppm
908	3,4-Cl_2Ph-	-H	benzyl	1.76-1.99(4H, m), 2.45-2.73(7H, m), 3.53(4H, brs), 3.66(4H, brs), 6.75(1H, d, J = 8.7 Hz), 6.87-6.97(4H, m), 7.29-7.59(9H, m), 7.83(2H, d, J = 2.0 Hz).
909	4-CF_3Ph-	-H	benzyl	1.77-1.99(4H, m), 2.45(4H, brs), 2.53-2.76(3H, m), 3.54(4H, brs), 3.65-3.69(4H, m), 6.81(1H, d, J = 8.7 Hz), 6.90-6.99(4H, m), 7.28-7.34(6H, m), 7.57(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.71-7.75(3H, m), 7.85(2H, d, J = 8.2 Hz).
910	4-CF_3Ph-	-CH_3	piperonyl	1.75-1.96(4H, m), 2.04(3H, s), 2.44(4H, brs), 2.53-2.73(3H, m), 3.43(2H, s), 3.53(2H, brs), 3.63(4H, brs), 5.94(2H, s), 6.70-6.89(8H, m), 7.56(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.67(2H, d, J = 8.6 Hz), 7.78(1H, d, J = 2.6 Hz), 7.84(2H, d, J = 8.2 Hz).
911	4-CF_3Ph-	-CH_3	benzyl	1.75-2.02(4H, m), 2.03(3H, s), 2.45(4H, brs), 2.55-2.72(3H, m), 3.53(4H, brs), 3.66(4H, brs), 6.72-6.77(3H, m), 6.87(1H, d, J = 8.6 Hz), 7.25-7.31(6H, m), 7.56(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.66(2H, d, J = 8.2 Hz), 7.78-7.86(3H, m).
912	3,4-Cl_2Ph-	-CH_3	piperonyl	1.76-1.98(4H, m), 2.04(3H, s), 2.44(4H, brs), 2.54-2.72(3H, m), 3.43(2H, s), 3.54(2H, brs), 3.63-3.67(4H, m), 5.94(2H, s), 6.70-6.89(8H, m), 7.44-7.59(3H, m), 7.80(2H, d, J = 2.0 Hz).
913	3,4-Cl_2Ph-	-CH_3	benzyl	1.77-1.97(4H, m), 2.07(3H, s), 2.45(4H, brs), 2.53-2.75(3H, m), 3.54(4H, brs), 3.66(4H, brs), 6.75-6.81(3H, m), 6.90(1H, d, J = 8.6 Hz), 7.26-7.33(6H, m), 7.51-7.58(3H, m), 7.72(1H, d, J = 2.6 Hz), 7.79(1H, s).
914	3,4-Cl_2Ph-	-H	piperonyl	1.76-1.99(4H, m), 2.44(4H, brs), 2.54-2.74(3H, m), 3.43(2H, s), 3.54(2H, brs), 3.63-3.67(4H, m), 5.94(2H, s), 6.74-6.98(8H, m), 7.45-7.59(3H, m), 7.81-7.84(3H, m).
915	4-CF_3Ph-	-H	piperonyl	1.76-1.80(2H, m), 1.91-1.95(2H, m), 2.43(4H, brs), 2.59-2.73(3H, m), 3.43(2H, s), 3.54(2H, brs), 3.62(4H, brs), 5.94(2H, s), 6.72-6.75(3H, m), 6.84-6.96(5H, m), 7.57(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.66(2H, d, J = 8.4 Hz), 7.82-7.87(4H, m).

Table 223



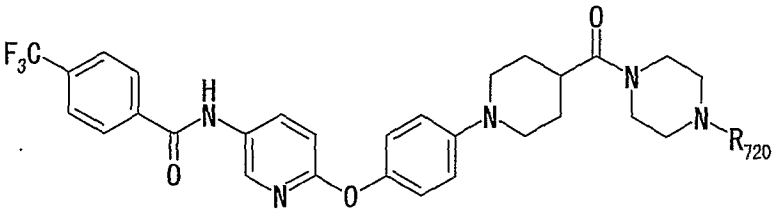
Example No.	R_{716}	R_{717}	M	^{1}H NMR ($CDCl_3$) δppm
916	-H	piperonyl	1	1.31-1.45(2H, m), 1.82-2.02(3H, m), 2.33(2H, d, J = 6.8 Hz), 2.43(4H, brs), 2.69(2H, t, J = 12.0 Hz), 3.43(2H, s), 3.51-3.67(6H, m), 5.93(2H, s), 6.73-6.99(8H, m), 7.28(2H, d, J = 8.6 Hz), 7.50(2H, d, J = 8.6 Hz), 8.28(1H, d, J = 2.1 Hz), 8.43(1H, d, J = 2.1 Hz).
917	-H	benzyl	1	1.34-1.44(2H, m), 1.82-2.00(3H, m), 2.32(2H, d, J = 6.8 Hz), 2.43-2.47(4H, m), 2.69(2H, t, J = 12.0 Hz), 3.51-3.67(8H, m), 6.88(2H, d, J = 9.2 Hz), 6.98(2H, d, J = 9.2 Hz), 7.25-7.32(8H, m), 7.50(2H, d, J = 8.6 Hz), 8.28(1H, d, J = 2.3 Hz), 8.43(1H, d, J = 2.1 Hz).
918	-CH_3	piperonyl	1	1.31-1.45(2H, m), 1.82-2.00(3H, m), 2.02(3H, s), 2.33(2H, d, J = 6.8 Hz), 2.43(4H, brs), 2.68(2H, t, J = 11.9 Hz), 3.41-3.67(8H, m), 5.92(2H, s), 6.73-6.92(7H, m), 7.25-7.30(2H, m), 7.50(2H, d, J = 8.6 Hz), 8.30(1H, d, J = 2.3 Hz), 8.41(1H, d, J = 2.3 Hz).
919	-CH_3	benzyl	1	1.37-1.40(2H, m), 1.83-2.01(3H, m), 2.03(3H, s), 2.31(2H, d, J = 6.9 Hz), 2.43-2.47(4H, m), 2.70(2H, t, J = 12.0 Hz), 3.51-3.67(8H, m), 6.74-6.80(2H, m), 6.91(1H, d, J = 8.6 Hz), 7.24-7.33(8H, m), 7.52(2H, d, J = 8.4 Hz), 8.29(1H, d, J = 2.1 Hz), 8.42(1H, d, J = 2.3 Hz).
920	-H	piperonyl	0	1.79-2.03(4H, m), 2.45(4H, brs), 2.57-2.76(3H, m), 3.44(2H, s), 3.55(2H, brs), 3.66(4H, brs), 5.94(2H, s), 6.72-6.78(2H, m), 6.85-7.00(6H, m), 7.28(2H, d, J = 8.6 Hz), 7.50(2H, d, J = 8.6 Hz), 8.28(1H, d, J = 2.1 Hz), 8.42(1H, d, J = 2.1 Hz).

Table 224



Example No.	R_{718}	R_{719}	^{1}H NMR ($CDCl_3$) δppm
921	3,4-Cl_2Ph-	piperonyl	1.37-1.44(2H, m), 1.81-2.02(3H, m), 2.30(2H, d, J = 6.8 Hz), 2.42(4H, brs), 2.69(2H, t, J = 11.9 Hz), 3.43(2H, s), 3.43-3.65(6H, m), 3.68(3H, s), 5.94(2H, s), 6.46(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.54(1H, d, J = 2.3 Hz), 6.73-6.76(3H, m), 6.85(1H, s), 6.93(1H, d, J = 8.6 Hz), 7.44-7.57(3H, m), 7.79-7.83(3H, m).
922	4-CF_3Ph-	benzyl	1.37-1.44(2H, m), 1.81-2.02(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.42-2.46(4H, m), 2.69(2H, t, J = 12.0 Hz), 3.48-3.63(8H, m), 3.67(3H, s), 6.46(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.54(1H, d, J = 2.6 Hz), 6.75(1H, d, J = 8.9 Hz), 6.92(1H, d, J = 8.7 Hz), 7.26-7.36(6H, m), 7.54(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.67(2H, d, J = 8.6 Hz), 7.75(1H, d, J = 2.8 Hz), 7.83(2H, d, J = 8.1 Hz).
923	3,4-Cl_2Ph-	benzyl	1.37-1.44(2H, m), 1.81-2.02(3H, m), 2.30(2H, d, J = 6.8 Hz), 2.42-2.46(4H, m), 2.69(2H, t, J = 11.9 Hz), 3.50-3.66(8H, m), 3.67(3H, s), 6.45(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.54(1H, d, J = 2.5 Hz), 6.74(1H, d, J = 8.7 Hz), 6.93(1H, d, J = 8.6 Hz), 7.26-7.32(5H, m), 7.43-7.56(3H, m), 7.79-7.83(3H, m).

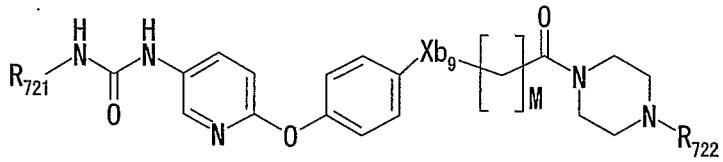
Table 225



Example No.	R_{720}	^{1}H NMR ($CDCl_3$) δppm
924	benzyl	1.63-1.77(2H, m), 1.81-1.98(2H, m), 2.44(4H, brs), 2.53-2.72(3H, m), 3.53(4H, brs), 3.65-3.69(4H, m), 6.90-7.04(5H, m), 7.26-7.33(5H, m), 7.74(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.14-8.19(2H, m), 8.27(1H, d, J = 2.6 Hz).
925	piperonyl	1.64-1.77(2H, m), 1.89-1.97(2H, m), 2.39-2.41(4H, m), 2.56-2.75(3H, m), 3.43(2H, s), 3.52-3.69(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.85-7.04(6H, m), 7.74(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.14-8.18(2H, m), 8.27(1H, d, J = 2.5 Hz).

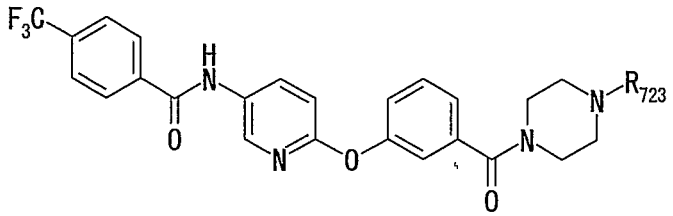
The following compounds were made in the same manner as in Reference Example 918.

Table 226



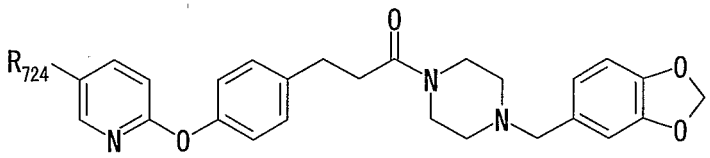
Example No.	R_{721}	Xb_9	R_{722}	M	^{1}H NMR ($CDCl_3$) δppm
926	4-CF_3Ph-	-CH_2-	benzyl	1	2.38-2.44(4H, m), 2.63-2.68(2H, m), 2.89-2.95(2H, m), 3.45-3.49(2H, m), 3.52(2H, s), 3.64-3.68(2H, m), 6.85(1H, d, J = 8.9 Hz), 6.93-6.98(2H, m), 7.08-7.13 (2H, m), 7.28-7.36(5H, m), 7.44-7.51(4H, m), 7.96 (1H, d, J = 2.5 Hz), 8.00-8.04(1H, m), 8.14(1H, s), 8.18(1H, s).
927	3,4-Cl_2Ph-	-CH(CH_3)-	piperonyl	0	1.47(3H, d, J = 6.8 Hz), 2.00-2.15(1H, m), 2.25-2.50 (3H, m), 3.36(2H, s), 3.36-3.80(4H, m), 3.98(1H, q, J = 6.8 Hz), 5.93(2H, s), 6.65-6.75(2H, m), 6.79(1H, d, J = 1.2Hz), 6.89(1H, d, J = 8.8 Hz), 7.02-7.06(2H, m), 7.16-7.33(4H, m), 7.57(1H, d, J = 2.4 Hz), 7.91 (1H, d, J = 2.7 Hz), 8.00(1H, brs), 8.05-8.10(2H, m).
928	3,4-Cl_2Ph-	-C(CH_3)$_2$-	piperonyl	0	1.55(6H, s), 1.80-2.15(2H, m), 2.20-2.55(2H, m), 2.95-3.20(2H, m), 3.31(2H, s), 3.50-3.90(2H, m), 5.91(2H, s), 6.60-6.72(2H, m), 6.76(1H, d, J = 1.3 Hz), 6.90(1H, d, J = 8.9 Hz), 7.07-7.33(6H, m), 7.58 (1H, d, J = 2.4 Hz), 7.88(1H, d, J = 2.7 Hz), 8.09-8.11(2H, m), 8.17(1H, dd, J = 8.9 Hz, 2.8 Hz).

Table 227



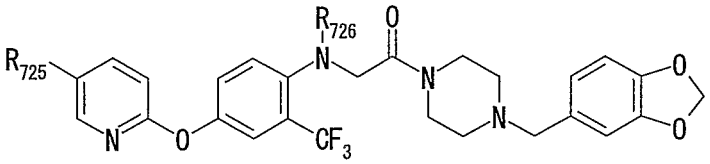
Example No.	R_{723}	^{1}H NMR ($CDCl_3$) δppm
929	benzyl	2.33-2.55(4H, m), 3.36-3.79(6H, m), 6.89(1H, d, J = 8.7 Hz), 7.07-7.15(3H, m), 7.24-7.38(6H, m), 7.67-7.70(2H, m), 8.00(2H, d, J = 7.9 Hz), 8.09-8.13(1H, m), 8.32(1H, d, J = 2.3 Hz), 9.05(1H, brs).
930	piperonyl	2.36-2.44(4H, m), 3.37-3.76(6H, m), 5.93(2H, s), 6.69-6.75(2H, m), 6.83(1H, brs), 6.86(1H, d, J = 8.7 Hz), 7.04-7.06(2H, m), 7.10-7.14(1H, m), 7.27-7.36(1H, m), 7.65(2H, d, J = 8.4 Hz), 7.99(2H, d, J = 8.1 Hz), 8.07-8.12(1H, m), 8.34(1H, d, J = 2.6 Hz), 9.41(1H, s).

Table 228



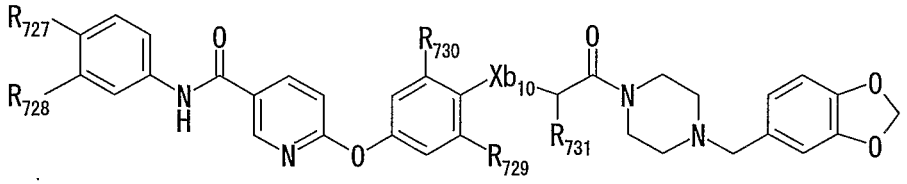
Example No.	R_{724}	^{1}H NMR ($CDCl_3$) δppm
931	4-$CF_3PhCH_2N(SO_2CH_3)$-	2.31-2.41(4H, m), 2.58-2.64(2H, m), 2.94-2.97(2H, m), 2.99(3H, s), 3.38-3.41(4H, m), 3.60-3.65(2H, m), 4.85(2H, s), 5.94(2H, s), 6.65-6.75(2H, m), 6.83-6.87(2H, m), 6.95-7.05(2H, m), 7.20-7.30(2H, m), 7.38-7.41(2H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.54-7.57(2H, m), 8.04(1H, d, J = 2.3 Hz).
932	3,4-$Cl_2PhCH_2N(SO_2CH_3)$-	2.25-2.45(4H, m), 2.59-2.65(2H, m), 2.94-3.05(5H, m), 3.30-3.45(4H, m), 3.55-3.70(2H, m), 4.74(2H, s), 5.95(2H, s), 6.65-6.80(2H, m), 6.84-6.89(2H, m), 7.02-7.15(3H, m), 7.23-7.30(3H, m), 7.30-7.40(2H, m), 8.03(1H, d, J = 2.7 Hz).
933	3,4-Cl_2PhCH_2NHCO-	2.25-2.45(4H, m), 2.59-2.65(2H, m), 2.94-3.00(2H, m), 3.37-3.41(4H, m), 3.59-3.65(2H, m), 4.58(2H, d, J = 5.9 Hz), 5.94(2H, s), 6.50-6.65(1H, m), 6.65-6.80(2H, m), 6.84(1H, s), 6.94 (1H, d, J = 8.6 Hz), 7.03-7.06(2H, m), 7.17(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.22-7.26(2H, m), 7.38-7.42(2H, m), 8.14(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.57(1H, d, J = 2.3 Hz).
934	3,4-$Cl_2PhNHCON(C_2H_5)$-	1.17(3H, t, J = 7.1 Hz), 2.32-2.42(4H, m), 2.61-2.67(2H, m), 2.97-3.03(2H, m), 3.39-3.43(4H, m), 3.61-3.65(2H, m), 3.74(2H, q, J = 7.1 Hz), 5.94(2H, s), 6.00(1H, brs), 6.70-6.85(3H, m), 7.05(1H, d, J = 8.7 Hz), 7.09-7.13(3H, m), 7.26-7.31(3H, m), 7.52(1H, d, J = 2.5 Hz), 7.61(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.12(1H, d, J = 2.4 Hz).
935	3,4-$Cl_2PhN(CH_3)$-	2.25-2.45(4H, m), 2.59-2.65(2H, m), 2.95-3.00(2H, m), 3.25(3H, s), 3.38-3.42(4H, m), 3.61-3.65(2H, m), 5.94(2H, s), 6.55-6.65(1H, m), 6.65-6.80(2H, m), 6.80-6.85(2H, m), 6.89-6.93(1H, m), 7.06-7.10(2H, m), 7.20-7.27(3H, m), 7.45-7.50(1H, m), 8.01(1H, d, J = 2.4 Hz).
936	3,4-Cl_2PhNH-	2.31-2.41(4H, m), 2.59-2.65(2H, m), 2.94-3.00(2H, m), 3.37-3.41(4H, m), 3.61-3.65(2H, m), 5.61(1H, brs), 5.94(2H, s), 6.69-6.80(3H, m), 6.84(1H, s), 6.90(1H, d, J = 8.7 Hz), 6.96(1H, d, J = 2.7 Hz), 7.04-7.07(2H, m), 7.21-7.25(3H, m), 7.49(1H, dd, J = 8.7 Hz, 2.9 Hz), 8.00(1H, d, J = 2.8 Hz).
937	4-CF_3PhCH_2NHCO-	2.31-2.40(4H, m), 2.59-2.65(2H, m), 2.95-3.01(2H, m), 3.38-3.41(4H, m), 3.60-3.64(2H, m), 4.70(2H, d, J = 5.8 Hz), 5.94(2H, s), 6.35-6.50(1H, m), 6.70-6.77(2H, m), 6.84(1H, s), 6.95 (1H, d, J = 8.6 Hz), 7.03-7.07(2H, m), 7.23-7.26(2H, m), 7.44-7.47(2H, m), 7.59-7.62(2H, m), 8.14(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.57(1H, d, J = 2.4 Hz).
938	3,4-$Cl_2PhN(C_2H_5)CONH$-	1.17(3H, t, J = 7.1 Hz), 2.30-2.40(4H, m), 2.57-2.63(2H, m), 2.92-2.98(2H, m), 3.37-3.40(4H, m), 3.60-3.64(2H, m), 3.77(2H, q, J = 7.1 Hz), 5.94(2H, s), 6.65-6.80(2H, m), 6.81-6.85(2H, m), 6.98-7.00(2H, m), 7.17-7.21(3H, m), 7.45(1H, d, J = 2.4 Hz), 7.57(1H, d, J = 8.5 Hz), 7.85-7.91(2H, m).

Table 229



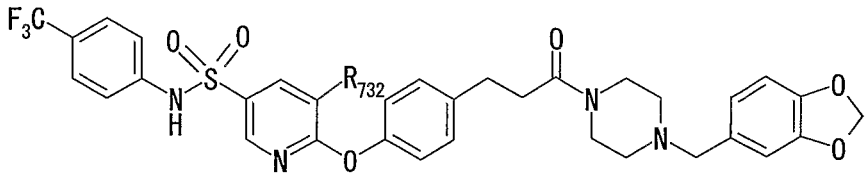
Example No.	R_{725}	R_{726}	^{1}H NMR ($CDCl_3$) δppm
939	3,4-Cl_2PhNHCO-	-CH_3	2.30-2.50(4H, m), 2.78(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.82(2H, s), 5.95(2H, s), 6.65-6.75(2H, m), 6.85(1H, s), 7.05(1H, d, J = 8.6 Hz), 7.26-7.30(1H, m), 7.39-7.43(2H, m), 7. 49-7.53(2H, m), 7.88(1H, d, J = 2.4 Hz), 8.24(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.31(1H, brs), 8.66(1H, d, J = 2.4 Hz).
940	4-CF_3PhNHCO-	-CH_3	2.30-2.45(4H, m), 2.78(3H, s), 3.41(2H, s), 3.55-3.59(4H, m), 3.82(2H, s), 5.94(2H, s), 6.65-6.80(2H, m), 6.85(1H, s), 7.05(1H, d, J = 8.6 Hz), 7.26-7.30(1H, m), 7.41(1H, d, J = 2.8 Hz), 7.51(1H, d, J = 8.8 Hz), 7.59-7.63(2H, m), 7.77-7.80(2H, m), 8.26(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.54(1H, brs), 8.66(1H, d, J = 2.2 Hz).
941	3,4-Cl_2PhCH_2NHCO-	-CH_3	2.30-2.45(4H, m), 2.80(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.81(2H, s), 4.59(2H, d, J = 5.9 Hz), 5.95(2H, s), 6.50-6.60(1H, m), 6.65-6.80(2H, m), 6.85(1H, s), 7.01(1H, d, J = 8.6 Hz), 7.18(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.30(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.39-7.43(3H, m), 7.54(1H, d, J = 8.8 Hz), 8.18(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.56(1H, d, J = 2.4 Hz).
942	4-CF_3PhCH_2NHCO-	-CH_3	2.30-2.45(4H, m), 2.80(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.81(2H, s), 4.70(2H, d, J = 5.9 Hz), 5.94(2H, s), 6.50-6.65(1H, m), 6.70-6.80(2H, m), 6.85(1H, s), 7.00(1H, d, J = 8.6 Hz), 7.29(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.39-7.62(6H, m), 8.18(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.57(1H, d, J = 2.4 Hz).
943	3,4-Cl_2PhN(CH_3)-	-C_2H_5	1.02(3H, t, J = 7.1 Hz), 2.35-2.40(4H, m), 3.22(2H, q, J = 7.1 Hz), 3.27(3H, s), 3.40(2H, s), 3.45-3.60(4H, m), 3.85(2H, s), 5.94(2H, s), 6.64(1H, dd, J = 8.9 Hz, 2.9 Hz), 6.65-6.75(2H, m), 6.84(1H, s), 6.90(1H, d, J = 2.8 Hz), 6.96(1H, d, J = 8.7 Hz), 7.22-7.26(1H, m), 7.26-7.35(1H, m), 7.42(1H, d, J = 2.8 Hz), 7.50(1H, dd, J = 8.7 Hz, 2.9 Hz), 7.66(1H, d, J = 8.8 Hz), 8.00(1H, d, J = 2.6 Hz).

Table 230



Example No.	R_{727}	R_{728}	R_{729}	R_{730}	R_{731}	Xb_{10}	^{1}H NMR ($CDCl_3$) δppm
944	-Cl	-Cl	-CH_3	-CH_3	-H	-N(CH_3)-	2.30(6H, s), 2.32-2.45(4H, m), 2.83(3H, s), 3.30-3.45(4H, m), 3.55-3.70(2H, m), 3.83(2H, s), 5.94(2H, s), 6.69-6.76(4H, m), 6.83(1H, s), 6.96(1H, d, J = 8.6 Hz), 7.40(1H, d, J = 8.7 Hz), 7.50(1H, dd, J = 8.8 Hz, 2.5 Hz), 7.87(1H, d, J = 2.4 Hz), 8.19(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.31(1H, brs), 8.68(1H, d, J = 2.2 Hz).
945	-CF_3	-H	-CH_3	-CH_3	-H	-N(CH_3)-	2.30-2.45(10H, m), 2.86(3H, s), 3.30-3.45(4H, m), 3.55-3.70(2H, m), 3.84(2H, s), 5.94(2H, s), 6.65-6.78(4H, m), 6.84(1H, s), 6.99(1H, d, J = 8.6 Hz), 7.60-7.65(2H, m), 7.70-7.78(2H, m), 8.07(1H, brs), 8.21(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.70(1H, d, J = 2.5 Hz).
946	-CF_3	-H	-H	-H	-H	-CH(CH_3)-	1.30-1.36(3H, m), 2.10-2.40(4H, m), 2.47-2.67(2H, m), 3.25-3.45(5H, m), 3.50-3.65(2H, m), 5.93(2H, s), 6.65-6.75(2H, m), 6.83(1H, d, J = 0.9 Hz), 7.01(1H, dd, J = 8.6 Hz, 0.6 Hz), 7.06-7.15(2H, m), 7.25-7.30 (2H, m), 7.60-7.64(2H, m), 7.74-7.78(2H, m), 8.14(1H, brs), 8.22(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.67-8.68(1H, m).
947	-CF_3	-H	-H	-H	-CH_3	-CH_2-	1.14-1.17(3H, m), 1.95-2.10(1H, m), 2.15-2.45(3H, m), 2.55-2.70(1H, m), 2.85-3.05(2H, m), 3.15-3.45(4H, m), 3.45-3.70(2H, m), 5.92-5.94(2H, m), 6.65-6.85(3H, m), 6.95-7.06(3H, m), 7.10-7.30(2H, m), 7.59-7.63(2H, m), 7.75-7.79(2H, m), 8.24(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.40(1H, brs), 8.71(1H, d, J = 2.4 Hz).

Table 231



Example No.	R_{732}	^{1}H NMR (DMSO-d_6) δppm
948	-Br	2.20-2.35(4H, m), 2.59-2.65(2H, m), 2.79-2.85(2H, m), 3.20-3.60(6H, m), 5.99(2H, s), 6.73-6.77(1H, m), 6.83-6.86(2H, m), 7.07-7.10(2H, m), 7.27-7.34(4H, m), 7.62-7.65(2H, m), 8.44-8.48(2H, m), 10.90(1H, brs).
949	-H	2.20-2.35(4H, m), 2.59-2.65(2H, m), 2.78-2.84(2H, m), 3.38-3.44(6H, m), 5.98(2H, s), 6.72-6.76(1H, m), 6.82-6.86(2H, m), 7.04-7.08(2H, m), 7.17(1H, d, J = 8.8 Hz), 7.26-7.33(4H, m), 7.61-7.65(2H, m), 8.17(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.55(1H, d, J = 2.6 Hz), 10.98(1H, brs).

Example 950

Production of 3,4-dichloro-N-{6-[4-(4-phenethylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}benzamide

To a solution of ethyl 4-(5-aminopyridin-2-yloxy)benzoate (690 mg, 2.7 mmol) in THF (10 mL) were added triethylamine (0.73 mL, 5.3 mmol) and 3,4-dichlorobenzoyl chloride (570 mg, 2.7 mmol) under ice cooling, and the resulting solution was stirred for 1 hour under ice cooling. This reaction solution was concentrated under reduced pressure, and to the residue was added ethyl acetate. The resulting solution was washed with water, 1 N hydrochloric acid and brine, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was washed, when hot, with *n*-hexane : dichloromethane = 1 : 2. The product was dissolved in THF (20 mL). To the residue was added 1 N aqueous sodium hydroxide (2.9 mL, 2.9

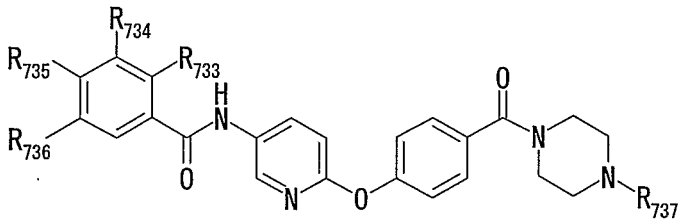
mmol), and this solution was stirred for 5 hours at 100°C. THF was evaporated, and the aqueous layer was made to have a pH of 3 with 1 N hydrochloric acid. Precipitated matter was collected by filtration, and dried. The resulting product was dissolved in DMF (10 mL), and 1-phenethylpiperazine (200 mg, 1.1 mmol), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (240 mg, 1.3 mmol) and 1-hydroxybenzotriazole monohydrate (170 mg, 1.3 mmol) were added to the solution. The resulting solution was stirred for 1 day at room temperature. This reaction solution was concentrated under reduced pressure, and to the residue was added chloroform. The resulting solution was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (methanol : chloroform = 1 : 99), to thereby yield 310 mg of the title compound.

Appearance: White Powder

^{1}H NMR ($CDCl_3$) δ 2.54(4H, brs), 2.62-2.68(2H, m), 2.79-2.85(2H, m), 3.60-3.73(4H, m), 6.95(1H, d, J = 8.9 Hz), 7.09-7.23(5H, m), 7.27-7.33(2H, m), 7.37-7.41(2H, m), 7.55(1H, d, J = 8.3 Hz), 7.74-7.78(1H, m), 8.04(1H, d, J = 2.0 Hz), 8.11-8.15(1H, m), 8.31(1H, d, J = 2.6 Hz), 8.57(1H, brs).

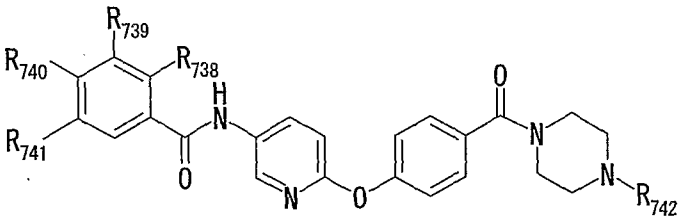
The following compounds were produced in the same manner as in Example 950.

Table 232



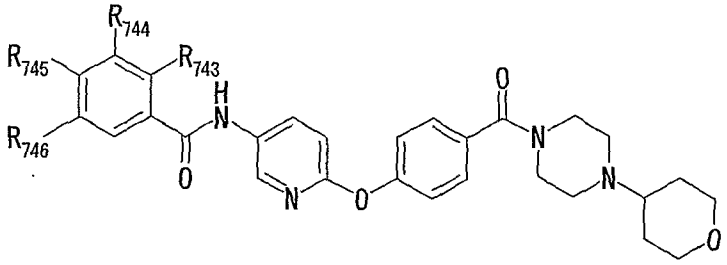
Example No.	R_{733}	R_{734}	R_{735}	R_{736}	R_{737}	MS (M^{+}+H)
951	$-CH_3$	-F	-H	-H	4-CNPhCH_2-	550
952	-H	-F	-F	-H	4-CNPhCH_2-	554
953	-H	-Cl	-H	-Cl	4-CNPhCH_2-	586
954	-H	$-OCF_3$	-H	-H	4-CNPhCH_2-	602
955	$-CH_3$	-F	-H	-H	2-pyridylmethyl	526
956	-H	$-CH_3$	$-CH_3$	-H	2-pyridylmethyl	522
957	-H	-F	-F	-H	2-pyridylmethyl	530
958	-H	-Cl	-H	-Cl	2-pyridylmethyl	530
959	-H	$-CF_3$	-H	-H	2-pyridylmethyl	562
960	-H	-H	-Cl	-H	2-pyridylmethyl	528
961	-H	$-CF_3$	-H	-F	2-pyridylmethyl	580
962	-H	$-OCF_3$	-H	-H	2-pyridylmethyl	578
963	$-CH_3$	-F	-H	-H	3-pyridylmethyl	526
964	-H	$-CH_3$	$-CH_3$	-H	3-pyridylmethyl	522
965	-H	-F	-F	-H	3-pyridylmethyl	530
966	-H	-Cl	-H	-Cl	3-pyridylmethyl	562
967	-H	$-CF_3$	-H	-H	3-pyridylmethyl	562
968	-H	-H	-Cl	-H	3-pyridylmethyl	528
969	-H	$-CF_3$	-H	-F	3-pyridylmethyl	580
970	$-CH_3$	-F	-H	-H	4-pyridylmethyl	526
971	-H	$-CH_3$	$-CH_3$	-H	4-pyridylmethyl	522
972	-H	-F	-F	-H	4-pyridylmethyl	530
973	-H	-Cl	-H	-Cl	4-pyridylmethyl	562
974	-H	$-CF_3$	-H	-H	4-pyridylmethyl	562
975	-H	-H	-Cl	-H	4-pyridylmethyl	528
976	-H	$-CF_3$	-H	-F	4-pyridylmethyl	580
977	-H	$-OCF_3$	-H	-H	4-pyridylmethyl	578
978	$-CH_3$	-F	-H	-H	piperonyl	569
979	-H	$-CH_3$	$-CH_3$	-H	piperonyl	565
980	-H	-F	-F	-H	piperonyl	573
981	-H	-Cl	-H	-Cl	piperonyl	605
982	-H	$-CF_3$	-H	-H	piperonyl	605
983	-H	$-CF_3$	-H	-F	piperonyl	623

Table 233



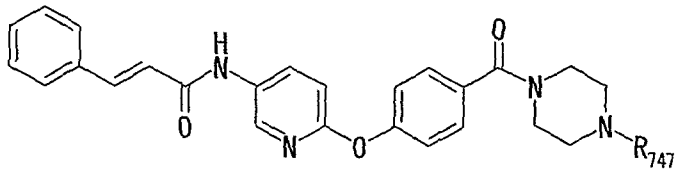
Example No.	R_{738}	R_{739}	R_{740}	R_{741}	R_{742}	MS (M^{+}+H)
984	-H	-OCF_3	-H	-H	piperonyl	621
985	-H	-CH_3	-CH_3	-H	benzyl	521
986	-H	-F	-F	-H	benzyl	529
987	-CH_3	-F	-H	-H	4-AcNHPhCH_2-	582
988	-H	-CH_3	-CH_3	-H	4-AcNHPhCH_2-	578
989	-H	-F	-F	-H	4-AcNHPhCH_2-	586
990	-H	-Cl	-H	-Cl	4-AcNHPhCH_2-	618
991	-H	-CF_3	-H	-H	4-AcNHPhCH_2-	618
992	-H	-H	-Cl	-H	4-AcNHPhCH_2-	584
993	-H	-CF_3	-H	-F	4-AcNHPhCH_2-	636
994	-H	-OCF_3	-H	-H	4-AcNHPhCH_2-	634
995	-CH_3	-F	-H	-H	2,3-$(CH_3)_2$PhCH_2-	553
996	-H	-CH_3	-CH_3	-H	2,3-$(CH_3)_2$PhCH_2-	549
997	-H	-F	-F	-H	2,3-$(CH_3)_2$PhCH_2-	557
998	-H	-Cl	-H	-Cl	2,3-$(CH_3)_2$PhCH_2-	589
999	-H	-CF_3	-H	-H	2,3-$(CH_3)_2$PhCH_2-	589
1000	-H	-H	-Cl	-H	2,3-$(CH_3)_2$PhCH_2-	555
1001	-H	-CF_3	-H	-F	2,3-$(CH_3)_2$PhCH_2-	607
1002	-H	-OCF_3	-H	-H	2,3-$(CH_3)_2$PhCH_2-	605
1003	-CH_3	-F	-H	-H	3-furylmethyl	515
1004	-H	-CH_3	-CH_3	-H	3-furylmethyl	511
1005	-H	-F	-F	-H	3-furylmethyl	519
1006	-H	-Cl	-H	-Cl	3-furylmethyl	551
1007	-H	-CF_3	-H	-H	3-furylmethyl	551
1008	-H	-H	-Cl	-H	3-furylmethyl	517
1009	-H	-Cl	-Cl	-H	3-furylmethyl	551
1010	-H	-CF_3	-H	-F	3-furylmethyl	569
1011	-H	-OCF_3	-H	-H	3-furylmethyl	567
1012	-CH_3	-F	-H	-H	3-pyridyl	512
1013	-H	-CH_3	-CH_3	-H	3-pyridyl	508
1014	-H	-F	-F	-H	3-pyridyl	516
1015	-H	-Cl	-H	-Cl	3-pyridyl	548
1016	-H	-CF_3	-H	-H	3-pyridyl	548
1017	-H	-CF_3	-H	-F	3-pyridyl	566
1018	-H	-OCF_3	-H	-H	3-pyridyl	564

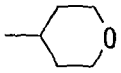
Table 234



Example No.	R_{743}	R_{744}	R_{745}	R_{746}	MS (M^{+}+H)
1019	$-CH_3$	-F	-H	-H	519
1020	-H	$-CH_3$	$-CH_3$	-H	515
1021	-H	-F	-F	-H	523
1022	-H	-Cl	-H	-Cl	555
1023	-H	$-CF_3$	-H	-H	555
1024	-H	-H	-Cl	-H	521
1025	-H	-Cl	-Cl	-H	555
1026	-H	$-CF_3$	-H	-F	573
1027	-H	$-OCF_3$	-H	-H	571

Table 235



Example No.	R_{747}	MS (M^{+}+H)
1028	4-$CNPhCH_2$-	544
1029	2-pyridylmethyl	520
1030	3-pyridylmethyl	520
1031	4-pyridylmethyl	520
1032	4-$AcNHPhCH_2$-	576
1033	2,3-$(CH_3)_2PhCH_2$-	547
1034	3-furylmethyl	509
1035		513

Example 1036

Production of 2-{3-methyl-4-[5-(4-trifluoromethylbenzoyl)pyridin-2-yloxy]phenylamino}-1-(4-piperonylpiperazin-1-yl)ethanone

To a solution of 2-chloro-5-(4-trifluoromethylbenzoyl)pyridine (1.00 g, 3.5 mmol) in DMF (30 mL) were added N-(4-hydroxy-3-methylphenyl)glycine ethyl ester (0.81 g, 3.9 mmol), cesium carbonate (1.71 g, 5.2 mmol) and copper (I) iodide (200 mg, 1.05 mmol), and the resulting solution was stirred for 3.5 hours at 60°C under an argon atmosphere. The resulting reaction solution was filtered and concentrated. To the residue was added water and extracted with ethyl acetate. The ethyl acetate layer was washed with water and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 3 : 1), to thereby yield 1.20 g of a yellow oil. The yellow oil was dissolved in THF (23 mL), and to the solution was added 1 M aqueous sodium hydroxide (3.9 mL, 3.9 mmol). The resulting solution was stirred for 3 hours at room temperature. This reaction solution was cooled with ice, and made to have a pH of 1 with 6 M hydrochloric acid. The resulting solution was extracted with ethyl acetate, and the ethyl acetate layer was washed with water and then dried over anhydrous magnesium sulfate. The solvent was

evaporated under reduced pressure, to thereby yield 1.04 g of a yellow oil. This yellow oil was dissolved in DMF (20 mL), and to the resulting solution were added 1-piperonylpiperazine (530 mg, 2.4 mmol), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (560 mg, 2.9 mmol) and 1-hydroxybenzotriazole monohydrate (390 mg, 2.6 mmol), and the resulting solution was stirred for 15 hours at room temperature. The reaction solution was concentrated under reduced pressure, and to the residue was added water, and extracted with ethyl acetate. The ethyl acetate layer was washed with water, dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 2 → ethyl acetate), to thereby yield 280 mg of a yellow oil. To this oil was added diethyl ether and left to stand. Precipitated matter was collected by filtration, to thereby yield 220 mg of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 2.11(3H, s), 2.43-2.48(4H, m), 3.45-3.48(4H, m), 3.67-3.71(2H, m), 3.86(2H, d, J = 4.1 Hz), 4.90(1H, t, J = 4.1 Hz), 5.96(2H, s), 6.49-6.53(2H, m), 6.71-6.78(2H, m), 6.86-6.97(3H, m), 7.75(2H, d, J = 8.1 Hz), 7.87(2H, d, J = 8.1 Hz), 8.18(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.58(1H, d, J = 2.1 Hz).

The following compound was produced in the same manner as in Example 1036.

Example 1037

6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2,5-difluorophenoxy)-N-(4-trifluoromethylphenyl)nicotinamide hydrobromide

Melting point: 224.5 - 226.0°C

Example 1038

Production of N-(6-{2-methyl-4-[methyl-(2-oxo-2-piperazin-1-ylethyl)amino]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide

To a solution of methyl{4-[5-(3,4-dichlorobenzoylamino)-pyridin-2-yloxy]-3-methylphenyl}aminoacetic acid (1.59 g, 3.5 mmol) in DMF (60 mL) were added 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (0.79 g, 4.1 mmol), 1-hydroxybenzotriazole monohydrate (0.63 g, 4.1 mmol), and 1-*t*-butyloxycarbonylpiperazine (0.68 g, 3.6 mmol). The resulting solution was stirred for 15 hours at room temperature under a nitrogen atmosphere. Water was added to the solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and then the ethyl acetate layer was dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (*n*-

hexane : ethyl acetate = 2 : 1 → 3 : 2), to thereby yield an amide product. This amide product was dissolved in THF (20 mL). To the solution was then added 10% hydrochloric acid (10 mL), and the resulting solution was stirred for 14 hours at room temperature. To this reaction solution was added a saturated sodium bicarbonate solution to make the solution neutral, and extracted with ethyl acetate. The ethyl acetate layer was dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 50 : 1 → 20 : 1), to thereby yield 0.38 g of the title compound.

Appearance: Colorless amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.10(3H, s), 2.75-2.94(4H, m), 2.99(3H, s), 3.40-3.70(4H, m), 4.08(2H, s), 6.46-6.59(2H, m), 6.79(1H, d, J = 8.9 Hz), 6.89(1H, d, J = 8.6 Hz), 7.55(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.03-8.14(2H, m), 8.23(1H, d, J = 2.6 Hz).

Example 1039

Production of N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide

To a solution of 3-[4-(5-aminopyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propan-1-one trihydrochloride (200 mg, 0.35 mmol) in THF (4 mL) were added triethylamine (0.243 mL, 1.8 mmol) and 4-

trifluoromethylbenzoyl chloride (0.055 mL, 0.37 mmol), and the resulting solution was stirred for 1 hour at room temperature. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with water and brine, dried over anhydrous magnesium sulfate, evaporated, and the residue was recrystallized from diethyl ether, to thereby yield 170 mg of the title compound.

Appearance: White powder

Melting point: 140-141°C

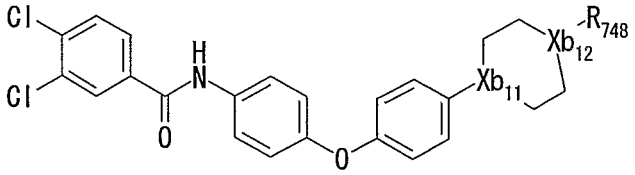
^{1}H NMR ($CDCl_3$) δ 2.32-2.40(4H, m), 2.59-2.65(2H, m), 2.93-2.99(2H, m), 3.41(4H, brs), 3.60-3.64(2H, m), 5.94(2H, s), 6.71-6.77(2H, m), 6.85(1H, s), 6.96(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.76(2H, d, J = 8.4 Hz), 8.01(2H, d, J = 8.4 Hz), 8.11-8.14(1H, m), 8.23(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.28(1H, d, J = 2.7 Hz).

A crude titled product (77.4 g) obtained using the same procedures was recrystallized from ethyl acetate (400 mL), to thereby yield 49.66 g of the title compound.

Appearance: White powder; Melting point: 142-144°C

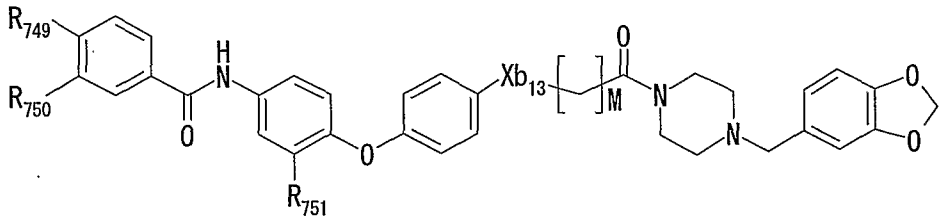
The following compounds were produced in the same manner as in Example 1039.

Table 236



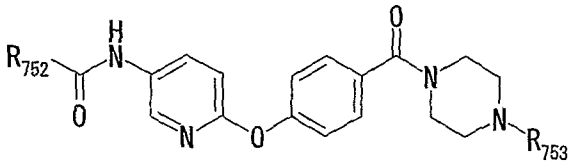
Example No.	Xb_{11}	Xb_{12}	R_{748}	mp (°C) or ^1H NMR
1040	N	N	$-COOC(CH_3)_3$	mp 197-199
1041	N	CH	$-OCH_2OCH_3$	mp 152-154
1042	N	CH	$-COOC_2H_5$	mp 189-190
1043	N	CH	$-N(CH_3)COOC(CH_3)_3$	mp 146-147
1044	CH	N	$-COOC(CH_3)_3$	mp 192-193
1045	N	CH	$-OCH_2COOC_2H_5$	^1H NMR ($CDCl_3$) δ 1.30(3H, t, J = 7.0 Hz), 1.75-1.81(2H, m), 2.03(2H, brs), 2.85-2.90(2H, m), 3.45-3.49(2H, m), 3.56(1H, m), 4.15(2H, s), 4.23(2H, q, J = 7.0 Hz), 6.90-6.95(6H, m), 7.50-7.53(3H, m), 7.69(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.95(1H, d, J = 2.0 Hz), 8.04(1H, brs).

Table 237



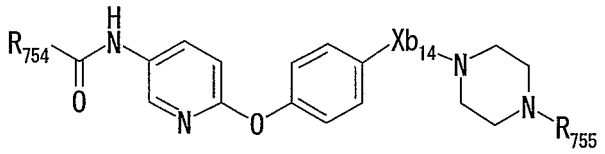
Example No.	R_{749}	R_{750}	R_{751}	Xb_{13}	M	Form	mp (°C) or ^{1}H NMR
1046	-Cl	-Cl	-F	-N(Ac)-	1	free	^{1}H NMR (DMSO-d_6) δ 1.78(3H, s), 2.22-2.38 (4H, m), 3.30-3.50(6H, m), 4.41(2H, s), 5.98(2H, s), 6.74(1H, d, J = 8.1 Hz), 6.80-6.86(2H, m), 6.98(2H, d, J = 8.8 Hz), 7.29(1H, t, J = 9.2 Hz), 7.38(2H, d, J = 8.8 Hz), 7.58(1H, d, J = 9.2 Hz), 7.84(1H, d, J = 8.4 Hz), 7.90-7.96(2H, m), 8.21 (1H, d, J = 1.8 Hz), 10.61(1H, s).
1047	-Cl	-Cl	-F	-NH-	0	free	mp 224-228
1048	-Cl	-Cl	-F	-NH-	1	dihydrochloride	mp 174-178
1049	$-CF_3$	-H	-H	$-N(CH_3)-$	1	free	^{1}H NMR ($CDCl_3$) δ 2.45(4H, brs), 3.03(3H, s), 3.46(2H, s), 3.52(2H, brs), 3.64(2H, brs), 4.08 (2H, s), 5.95(2H, s), 6.67(2H, d, J = 9.1 Hz), 6.74-6.78(2H, m), 6.87(1H, s), 6.92-6.97(4H, m), 7.52(2H, d, J = 8.9 Hz), 7.74-7.81(3H, m), 7.98(2H, d, J = 8.2 Hz).
1050	-Cl	-Cl	-H	$-N(CH_3)-$	1	free	^{1}H NMR ($CDCl_3$) δ 2.49(4H, brs), 3.02(3H, s), 3.50(2H, s), 3.55(2H, brs), 3.66(2H, brs), 4.08 (2H, s), 5.96(2H, s), 6.67(2H, d, J = 9.1 Hz), 6.74-6.78(2H, m), 6.88-6.96(5H, m), 7.50(2H, d, J = 8.9 Hz), 7.56(1H, d, J = 8.4 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.83(1H, s), 7.97(1H, d, J = 2.1 Hz).
1051	-Cl	-Cl	-F	-O-	1	hydrochloride	^{1}H NMR (DMSO-d_6) δ 2.83-2.95(1H, m), 2.97-3.12(2H, m), 3.23-3.56(3H, m), 3.95-4.06 (1H, m), 4.18-4.29(2H, m), 4.33-4.44(1H, m), 4.75-4.92(2H, m), 6.07(2H, s), 6.90-6.96(4H, m), 6.97-7.04(2H, m), 7.11(1H, t, J = 9.1 Hz), 7.15-7.22(1H, m), 7.52(1H, d, J = 9.1 Hz), 7.84 (1H, d, J = 8.4 Hz), 7.88(1H, d, J = 13.3 Hz), 7.94(1H, dd, J = 8.4 Hz, 1.9 Hz), 8.23(1H, d, J = 1.9 Hz), 10.60(1H, s), 11.10(1H, brs).

Table 238



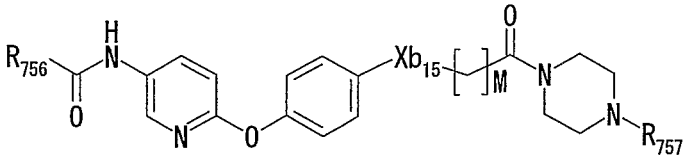
Example No.	R_{752}	R_{753}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
1052	4-ClPh-	benzyl	mp 187-190
1053	3-ClPh-	benzyl	^{1}H NMR 2.38(4H, brs), 3.34-3.71(6H, m), 6.86(1H, d, J = 8.8 Hz), 7.00-7.05(2H, m), 7.19-7.36(8H, m), 7.43-7.47(1H, m), 7.69-7.73(1H, m), 7.83(1H, t, J = 1.8 Hz), 8.08(1H, dd, J = 8.8 Hz, 2.8 Hz), 8.24(1H, d, J = 2.6 Hz), 8.51(1H, brs).
1054	4-CH_3Ph-	4-CH_3OPhCH_2-	^{1}H NMR 2.32-2.50(7H, m), 3.44-3.79(9H, m), 6.84-6.92(3H, m), 7.06-7.11(2H, m), 7.20-7.23(4H, m), 7.34-7.39(2H, m), 7.79(2H, d, J = 8.3 Hz), 8.16-8.21(1H, m), 8.35(1H, d, J = 2.8 Hz), 8.76(1H, brs).
1055	2-naphthyl	4-CH_3OPhCH_2-	^{1}H NMR 2.41(4H, brs), 3.46-3.80(6H, m), 3.81(3H, s), 6.83-6.90(2H, m), 6.95(1H, d, J = 8.7 Hz), 7.10(2H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.6 Hz), 7.38(2H, d, J = 8.7 Hz), 7.52-7.63 (2H, m), 7.88-7.97(4H, m), 8.27(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.41-8.43(2H, m), 8.80(1H, brs).
1056	4-ClPh-	4-CH_3OPhCH_2-	^{1}H NMR 2.43(4H, brs), 3.48-3.77(6H, m), 3.80(3H, s), 6.83-6.89(2H, m), 6.96(1H, d, J = 8.9 Hz), 7.10-7.15(2H, m), 7.22(2H, d, J = 8.6 Hz), 7.38-7.48(4H, m), 7.82-7.87(2H, m), 8.17-8.21(2H, m), 8.30(1H, d, J = 2.6 Hz).
1057	3-ClPh-	4-CH_3OPhCH_2-	^{1}H NMR 2.41(4H, brs), 3.46-3.76(6H, m), 3.79(3H, s), 6.83-6.89(3H, m), 7.05(2H, d, J = 8.4 Hz), 7.21(2H, d, J = 8.6 Hz), 7.31-7.48(4H, m), 7.77(1H, d, J = 7.8 Hz), 7.90(1H, s), 8.08-8.12(1H, m), 8.35(1H, d, J = 2.5 Hz), 9.26(1H, brs).
1058	4-CF_3OPh-	benzyl	mp 152-153
1059	2,4-Cl_2Ph-	benzyl	mp 196-197
1060	2,3-F_2Ph-	benzyl	mp 172-175
1061	4-ClPh-	piperonyl	^{1}H NMR 2.45(4H, brs), 3.45(2H, s), 3.45-3.75(4H, m), 5.95(2H, s), 6.74-6.77(2H, m), 6.86(1H, s), 6.99(1H, d, J = 8.9 Hz), 7.14 (2H, d, J = 8.7 Hz), 7.42-7.51(4H, m), 7.84(2H, d, J = 8.7 Hz), 7.91(1H, brs), 8.22(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.29(1H, d, J = 2.1 Hz)
1062	4-ClPh-	3-pyridyl	^{1}H NMR 3.24(4H, brs), 3.49-3.82(4H, m), 7.02(1H, d, J = 8.7 Hz), 7.16-7.24(4H, m), 7.48(2H, d, J = 8.9 Hz), 7.49(2H, d, J = 8.7 Hz), 7.85(2H, d, J = 8.7 Hz), 8.04(1H, brs), 8.15-8.17(1H, m), 8.24(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.31-8.32(2H, m).

Table 239



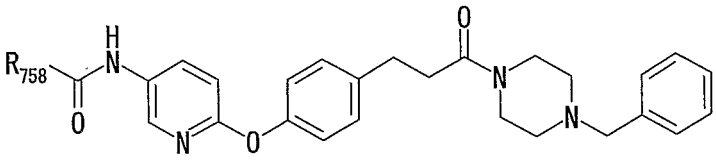
Example No.	R_{754}	R_{755}	Xb_{14}	Form	Property
1063	3-CF_3OPh-	benzyl	-CO-	maleate	mp 155-157°C
1064	3,5-Cl_2Ph-	benzyl	-CO-	dihydrochloride	^{1}H NMR (DMSO-d_6) δ 3.15-3.54(8H, m), 4.36(2H, s), 7.15-7.22(3H, m), 7.47-7.60(7H, m), 7.90-7.91(1H, m), 8.00(1H, s), 8.01(1H, s), 8.22-8.27(1H, m), 8.54(1H, d, J = 2.2 Hz), 10.69(1H, s).
1065	PhCH=CH- (trans)	benzyl	-CO-	free	MS 518(M^+)
1066	PhCH=CH- (trans)	piperonyl	-CO-	free	^{1}H NMR ($CDCl_3$) δ 2.45(4H, brs), 3.44 (2H, s), 3.52(2H, brs), 3.76(2H, brs), 5.95 (2H, s), 6.60(1H, d, J = 15.5 Hz), 6.74-6.77(2H, m), 6.85(1H, s), 6.95(1H, d, J = 8.7 Hz), 7.12(2H, d, J = 8.6 Hz), 7.38-7.45(5H, m), 7.53-7.56(2H, m), 7.74 (1H, brs), 7.77(1H, d, J = 15.5 Hz), 8.21 (1H, d, J = 8.4 Hz), 8.25(1H, d, J = 2.5Hz).
1067	PhCH=CH- (trans)	3-pyridyl	-CO-	free	^{1}H NMR ($CDCl_3$) δ 3.20(4H, brs), 3.79 (4H, brs), 6.67(1H, d, J = 15.7 Hz), 6.92 (1H, d, J = 8.7 Hz), 7.10-7.21(4H, m), 7.33-7.46(7H, m), 7.73(1H, d, J = 15.7Hz), 8.11-8.31(4H, m), 9.30(1H, s).
1068	3,4-Cl_2Ph-	benzyl	-SO_2-	hydrochloride	mp 253-256°C
1069	4-CF_3Ph-	benzyl	-SO_2-	hydrochloride	mp 249-251°C

Table 240



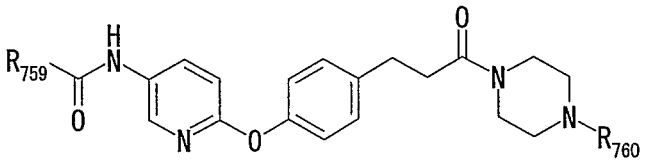
Example No.	R_{756}	R_{757}	Xb_{15}	M	^{1}H NMR (solvent) δppm
1070	3,4-Cl_2Ph-	benzyl	-CH(OH)-	0	($CDCl_3$) 1.95-2.15(1H, m), 2.15-2.40(3H, m), 3.42 (2H, s), 3.49(4H, brs), 5.42(1H, d, J = 6.6 Hz), 5.61 (1H, d, J = 6.6 Hz), 7.08(1H, d, J = 8.9 Hz), 7.09(2H, d, J = 8.6 Hz), 7.15-7.43(5H, m), 7.38(2H, d, J = 8.6 Hz), 7.85(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.23(1H, d, J = 2.3 Hz), 8.50(1H, d, J = 2.7 Hz), 10.57(1H, s).
1071	4-CF_3Ph-	benzyl	-CH(OH)-	0	($CDCl_3$) 1.90-2.05(1H, m), 2.22-2.57(3H, m), 3.10-3.40(2H, m), 3.44(2H, s), 3.58-3.85(2H, m), 4.75(1H, d, J = 6.4 Hz), 5.21(1H, d, J = 6.4 Hz), 6.96 (1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.6 Hz), 7.20-7.38 (5H, m), 7.32(2H, d, J = 8.6 Hz), 7.78(2H, d, J = 8.1 Hz), 7.92(1H, brs), 8.00(2H, d, J = 8.1 Hz), 8.22(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.29(1H, d, J = 2.5 Hz).
1072	4-CF_3Ph-	piperonyl	-O-	1	(DMSO-d_6) 2.32(2H, brs), 2.40(2H, brs), 3.41(2H, s), 3.46(4H, brs), 4.81(2H, s), 5.99(2H, s), 6.73-6.88(3H, m), 6.94(2H, d, J = 9.2 Hz), 7.02(1H, d, J = 8.7 Hz), 7.05(2H, d, J = 9.2 Hz), 7.93(2H, d, J = 8.4 Hz), 8.16 (2H, d, J = 8.4 Hz), 8.19(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.47(1H, d, J = 2.7 Hz), 10.60(1H, s).
1073	4-CF_3Ph-	benzyl	-O-	1	($CDCl_3$) 2.35-2.53(4H, m), 3.51(2H, s), 3.56(2H, t, J = 5.0 Hz), 3.62(2H, t, J = 5.0 Hz), 4.64(2H, s), 6.90 (1H, d, J = 8.8 Hz), 6.92(2H, d, J = 9.0 Hz), 7.04(2H, d, J = 9.0 Hz), 7.21-7.41(5H, m), 7.73(2H, d, J = 8.1 Hz), 8.00(2H, d, J = 8.1 Hz), 8.18(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.27(1H, d, J = 2.6 Hz), 8.32(1H, brs).
1074	3-ClPh-	piperonyl	none	2	($CDCl_3$) 2.31-2.38(4H, m), 2.58-2.64(2H, m), 2.90-2.96(2H, m), 3.37-3.40(4H, m), 3.59-3.62(2H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 6.92 (1H, d, J = 8.9 Hz), 7.03(2H, d, J = 8.4 Hz), 7.20(2H, d, J = 8.4 Hz), 7.38-7.44(1H, m), 7.50-7.54(1H, m), 7.77(1H, d, J = 7.8 Hz), 7.87-7.88(1H, m), 8.21(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.28(1H, d, J = 2.7 Hz), 8.36 (1H, s).

Table 241



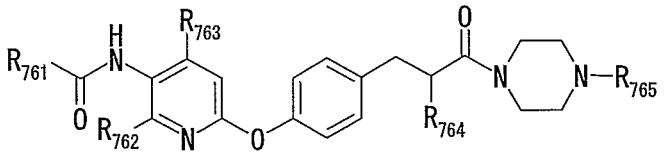
Example No.	R_{758}	mp (°C) or ^{1}H NMR
1075	3-ClPh-	^{1}H NMR ($CDCl_3$) δ 2.33-2.38(4H, m), 2.55-2.61(2H, m), 2.86-2.91(2H, m), 3.37-3.41(2H, m), 3.49(2H, s), 3.56-3.60(2H, m), 6.87(1H, d, J = 8.9 Hz), 6.97-7.01(2H, m), 7.14(2H, d, J = 8.6 Hz), 7.25-7.37(6H, m), 7.45-7.48(1H, m), 7.75-7.79(1H, m), 7.87(1H, t, J = 1.8 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.32 (1H, d, J = 2.8 Hz), 9.06(1H, brs).
1076	4-ClPh-	mp 136-139
1077	2-ClPh-	^{1}H NMR ($CDCl_3$) δ 2.32-2.41(4H, m), 2.56-2.61(2H, m), 2.90-2.96(2H, m), 3.37-3.41(2H, m), 3.50(2H, s), 3.58-3.61(2H, m), 6.92(1H, d, J = 8.7 Hz), 7.03 (2H, d, J = 8.4 Hz), 7.19-7.43(10H, m), 7.69-7.72(1H, m), 8.21-8.27(3H, m).
1078	Ph-	^{1}H NMR ($CDCl_3$) δ 2.36(4H, brs), 2.56-2.61(2H, m), 2.89-2.95(2H, m), 3.36-3.41(2H, m), 3.49(2H, s), 3.58-3.62(2H, m), 6.99(1H, d, J = 8.7 Hz), 7.01 (2H, d, J = 8.1 Hz), 7.18(2H, d, J = 8.1 Hz), 7.26-7.55(8H, m), 7.87(2H, d, J = 6.6 Hz), 8.20(1H, d, J = 8.7 Hz), 8.28(1H, brs), 8.50(1H, brs).
1079	4-CNPh-	^{1}H NMR ($CDCl_3$) δ 2.33-2.41(4H, m), 2.56-2.62(2H, m), 2.87-2.92(2H, m), 3.38-3.42(2H, m), 3.50(2H, s), 3.56-3.60(2H, m), 6.91(1H, d, J = 8.9 Hz), 6.98-7.01(2H, m), 7.14-7.19(2H, m), 7.25-7.35(5H, m), 7.71-7.75(2H, m), 7.99-8.02(2H, m), 8.17-8.29(2H, m), 8.75-8.97(1H, m).
1080	3-CH_3OPh-	^{1}H NMR ($CDCl_3$) δ 2.33-2.41(4H, m), 2.56-2.62(2H, m), 2.90-2.95(2H, m), 3.38-3.42(2H, m), 3.51(2H, s), 3.60-3.63(2H, m), 3.83(3H, s), 6.90(1H, d, J = 8.7 Hz), 7.00-7.09(3H, m), 7.18(2H, d, J = 8.6 Hz), 7.26-7.44(8H, m), 8.19-8.23(1H, m), 8.29(1H, d, J = 2.8 Hz), 8.48(1H, brs).
1081	4-CH_3Ph-	^{1}H NMR ($CDCl_3$) δ 2.33-2.40(7H, m), 2.56-2.62(2H, m), 2.90-2.95(2H, m), 3.38-3.41(2H, m), 3.49(2H, s), 3.59-3.62(2H, m), 6.89(1H, d, J = 8.7 Hz), 7.01 (2H, d, J = 8.6 Hz), 7.16-7.32(9H, m), 7.78(2H, d, J = 8.2 Hz), 8.18-8.22(1H, m), 8.27(1H, d, J = 2.6 Hz), 8.33-8.44(1H, m).
1082	2-CH_3Ph-	^{1}H NMR ($CDCl_3$) δ 2.32-2.40(4H, m), 2.48(3H, s), 2.55-2.60(2H, m), 2.89-2.95 (2H, m), 3.37-3.40(2H, m), 3.50(2H, s), 3.57-3.60(2H, m), 6.89-6.92(1H, m), 7.00-7.05(2H, m), 7.18-7.47(10H, m), 7.45(1H, d, J = 2.2 Hz), 8.04(1H, brs), 8.23-8.25(2H, m).
1083	4-CH_3OPh-	^{1}H NMR ($CDCl_3$) δ 2.31-2.38(4H, m), 2.54-2.60(2H, m), 2.87-2.93(2H, m), 3.37-3.40(2H, m), 3.48(2H, s), 3.58-3.61(2H, m), 3.82(3H, s), 6.84-6.90(3H, m), 6.99(2H, d, J = 8.4 Hz), 7.15(2H, d, J = 8.6 Hz), 7.25-7.32(5H, m), 7.85(2H, d, J = 8.9 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.28(1H, d, J = 2.7 Hz), 8.73(1H, brs).
1084	2-CH_3OPh-	^{1}H NMR ($CDCl_3$) δ 2.33-2.42(4H, m), 2.58-2.64(2H, m), 2.93-2.99(2H, m), 3.38-3.42(2H, m), 3.49(2H, s), 3.61-3.65(2H, m), 4.02(3H, s), 6.89-6.92(1H, m), 7.01-7.32(11H, m), 7.47-7.53(1H, m), 8.23-8.29(3H, m), 9.76(1H, s).
1085	2-naphthyl	mp 156-159
1086	4-CF_3Ph-	^{1}H NMR (DMSO-d_6) δ 2.30-2.32(4H, m), 2.59-2.65(2H, m), 2.79-2.84(2H, m), 3.44-3.47(6H, m), 7.02(2H, d, J = 8.6 Hz), 7.05(1H, d, J = 9.1 Hz), 7.25-7.35(7H, m), 7.93(2H, d, J = 8.3 Hz), 8.16(2H, d, J = 8.3 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.49(1H, d, J = 2.6 Hz), 10.62(1H, brs).

Table 242



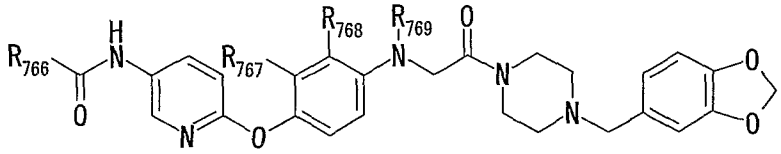
Example No.	R_{759}	R_{760}	Form	mp (°C) or ^{1}H NMR
1087	4-CF_3OPh-	benzyl	maleate	mp 144-146
1088	3-CF_3OPh-	benzyl	maleate	mp 125-128
1089	4-CF_3OPh-	piperonyl	free	mp 187-190
1090	2-CF_3OPh-	piperonyl	free	^{1}H NMR ($CDCl_3$) δ 2.31-2.39(4H, m), 2.57-2.63(2H, m), 2.91-2.97(2H, m), 3.37-3.40(4H, m), 3.58-3.62(2H, m), 5.93(2H, s), 6.70-6.76(2H, m), 6.84(1H, s), 6.93(1H, d, J = 8.9 Hz), 7.03-7.07(2H, m), 7.19-7.23(2H, m), 7.32-7.36(1H, m), 7.40-7.46(1H, m), 7.53-7.59(1H, m), 7.99-8.03(1H, m), 8.20(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.27 (1H, d, J = 2.7 Hz), 8.55(1H, brs).
1091	3-CF_3OPh-	piperonyl	free	^{1}H NMR ($CDCl_3$) δ 2.30-2.36(4H, m), 2.55-2.61(2H, m), 2.86-2.92(2H, m), 3.37-3.40(4H, m), 3.56-3.60(2H, m), 5.93(2H, s), 6.69-6.76(2H, m), 6.83(1H, s), 6.88-6.92 (1H, m), 6.98-7.02(2H, m), 7.14-7.18(2H, m), 7.36-7.40 (1H, m), 7.44-7.52(1H, m), 7.78-7.85(2H, m), 8.19(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.29-8.31(1H, m), 8.78-8.92(1H, m).
1092	3,5-Cl_2Ph-	piperonyl	dihydro-chloride	^{1}H NMR (DMSO-d_6) δ 2.69-3.33(10H, m), 3.99-4.11 (1H, m), 4.23(2H, s), 4.44-4.49(1H, m), 6.07(2H, s), 6.97-7.07(5H, m), 7.20-7.30(3H, m), 7.89-8.00(1H, m), 8.00(2H, d, J = 1.8 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.48(1H, d, J = 2.3 Hz), 10.64(1H, s).
1093	PhCH=CH-(trans)	piperonyl	free	^{1}H NMR ($CDCl_3$) δ 2.05-3.38(9H, m), 3.69-4.71(5H, m), 5.96(2H, s), 6.72-6.79(2H, m), 6.95-7.05(4H, m), 7.13-7.23(3H, m), 7.35-7.37(3H, m), 7.51-7.54(2H, m), 7.70-7.76(1H, m), 8.41(1H, d, J = 2.3 Hz), 8.50(1H, d, J = 8.7 Hz), 8.95(1H, brs).
1094	2-naphthyl	piperonyl	free	^{1}H NMR ($CDCl_3$) δ 2.28-2.34(4H, m), 2.55-2.61(2H, m), 2.89-2.95(2H, m), 3.38(4H, brs), 3.58(2H, brs), 5.92 (2H, s), 6.69-6.76(2H, m), 6.83(1H, s), 6.92(1H, d, J = 8.6 Hz), 7.02(2H, d, J = 8.4 Hz), 7.18(2H, d, J = 8.4 Hz), 7.51-7.61(2H, m), 7.86-7.94(4H, m), 8.27(1H, dd, J = 8.6 Hz, 2.7 Hz), 8.33-8.38(2H, m), 8.55(1H, brs).
1095	4-ClPh-	piperonyl	free	^{1}H NMR ($CDCl_3$) δ 2.31-2.41(4H, m), 2.59-2.65(2H, m), 2.94-3.00(2H, m), 3.38-3.41(4H, m), 3.63(2H, brs), 5.94(2H, s), 6.71-6.77(2H, m), 6.85(1H, s), 6.95(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.4 Hz), 7.23(2H, d, J = 8.4 Hz), 7.48(2H, d, J = 8.6 Hz), 7.82-7.89(3H, m), 8.19-8.25 (2H, m).

Table 243



Example No.	R_{761}	R_{762}	R_{763}	R_{764}	R_{765}	^{1}H NMR ($CDCl_3$) δppm
1096	4-CF_3Ph-	-H	-H	-OH	-COOC(CH_3)$_3$	1.44(9H, s), 2.82-3.00(2H, m), 3.00-3.80 (9H, m), 4.60(1H, t, J = 6.5 Hz), 6.97(1H, d, J = 8.8 Hz), 7.06(2H, d, J = 8.6 Hz), 7.24 (2H, d, J = 8.6 Hz), 7.75(2H, d, J = 8.1 Hz), 8.00(2H, d, J = 8.1 Hz), 8.07(1H, brs), 8.18 (1H, d, J = 2.6 Hz), 8.27(1H, dd, J = 8.8 Hz, 2.6 Hz).
1097	4-CF_3Ph-	-H	-CH_3	-H	piperonyl	2.32(3H, s), 2.32-2.40(4H, m), 2.59-2.64 (2H, m), 2.93-2.98(2H, m), 3.30-3.45(4H, m), 3.55-3.70(2H, m), 5.94(2H, s), 6.65-6.75(2H, m), 6.82-6.84(2H, m), 7.03-7.07(2H, m), 7.20-7.24(2H, m), 7.72(1H, brs), 7.75-7.79(2H, m), 8.00-8.04(2H, m), 8.30(1H, s).
1098	4-CF_3Ph-	-CH_3	-H	-H	piperonyl	2.31-2.40(4H, m), 2.47(3H, s), 2.59-2.65(2H, m), 2.94-3.00(2H, m), 3.38-3.41(4H, m), 3.60-3.65(2H, m), 5.94(2H, s), 6.68-6.77(3H, m), 6.84(1H, s), 7.04-7.08(2H, m), 7.20-7.24(2H, m), 7.63(1H, brs), 7.77-7.80(2H, m), 7.99-8.11(3H, m).
1099	3,4-Cl_2Ph-	-CH_3	-H	-H	piperonyl	2.25-2.40(4H, m), 2.45(3H, s), 2.58-2.64(2H, m), 2.92-2.98(2H, m), 3.38-3.41(4H, m), 3.60-3.64(2H, m), 5.94(2H, s), 6.66-6.76(3H, m), 6.84(1H, s), 7.03-7.07(2H, m), 7.18-7.22(2H, m), 7.59(1H, d, J = 8.3 Hz), 7.67(1H, brs), 7.72(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.98-8.02(2H, m).
1100	3,4-Cl_2Ph-	-H	-CH_3	-H	piperonyl	2.31(3H, s), 2.31-2.40(4H, m), 2.58-2.64(2H, m), 2.92-2.98(2H, m), 3.37-3.41(4H, m), 3.60-3.64(2H, m), 5.94(2H, s), 6.65-6.75(2H, m), 6.80-6.84(2H, m), 7.03-7.06(2H, m), 7.20-7.24(2H, m), 7.58(1H, d, J = 8.3 Hz), 7.64(1H, brs), 7.73(1H, dd, J = 8.3 Hz, 1.8 Hz), 8.01(1H, d, J = 1.9 Hz), 8.26(1H, s).

Table 244



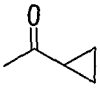
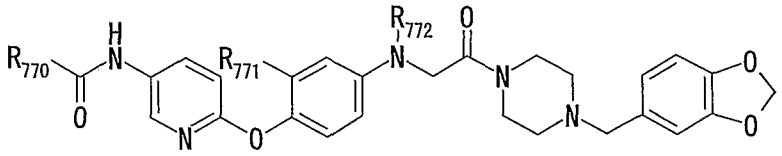
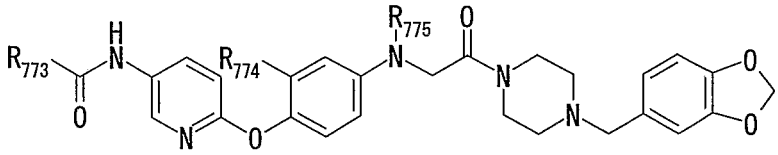
Example No.	R_{766}	R_{767}	R_{768}	R_{769}	mp (°C) or ^{1}H NMR (solvent) δppm
1101	4-CF_3Ph-	-H	-H	-Ac	mp 189-191
1102	3,4-Cl_2Ph-	-H	-H	-COC_2H_5	mp 204-206
1103	3,4-Cl_2Ph-	-H	-H	-H	mp 188-189
1104	3,4-Cl_2Ph-	-H	-H		^{1}H NMR (DMSO-d_6) 0.60-0.70(2H, m), 0.75-0.80 (2H, m), 1.42(1H, m), 2.25-2.35(4H, m), 3.35-3.45(6H, m), 4.49(2H, s), 5.98(2H, s), 6.74(1H, d, J = 7.9 Hz), 6.84(1H, d, J = 7.9 Hz), 6.86(1H, s), 7.12(1H, d, J = 8.8 Hz), 7.18(2H, d, J = 8.6 Hz), 7.47(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.20-8.23(2H, m), 8.51(1H, d, J = 2.5 Hz), 10.58(1H, s).
1105	4-CF_3Ph-	-H	-H	-CH_3	H NMR (DMSO-d_6) 2.31-2.39(4H, m), 2.94(3H, s), 3.31(2H, s), 3.42(4H, brs), 4.24(2H, s), 5.99(2H, s), 6.64 (2H, d, J = 9.1 Hz), 6.76(1H, dd, J = 7.9 Hz, 1.2 Hz), 6.84-6.96(5H, m), 7.93(2H, d, J = 8.3 Hz), 8.13(1H, s), 8.16(2H, d, J = 8.6 Hz), 8.45(1H, d, J = 2.5 Hz), 10.58(1H, s).
1106	3,4-Cl_2Ph-	-H	-H		^{1}H NMR ($CDCl_3$) 0.57-0.62(2H, m), 0.75-0.82(2H, m), 2.37-2.49(4H, m), 2.70-2.74(1H, m), 3.45(2H, s), 3.49-3.59(4H, m), 4.17(2H, s), 5.95(2H, s), 6.74-6.94 (8H, m), 7.49(1H, d, J = 8.2 Hz), 7.67-7.71(1H, m), 7.95 (1H, d, J = 2.1 Hz), 8.00(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24 (1H, d, J = 2.6 Hz), 8.59(1H, brs).
1107	4-CF_3Ph-	-H	-H		^{1}H NMR ($CDCl_3$) 0.57-0.62(2H, m), 0.74-0.81(2H, m), 2.35-2.47(4H, m), 2.66-2.74(1H, m), 3.44(2H, s), 3.47-3.57(4H, m), 4.16(2H, s), 5.94(2H, s), 6.70-6.94 (8H, m), 7.66(2H, d, J = 8.2 Hz), 7.95(2H, d, J = 8.0 Hz), 8.04(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz), 8.80(1H, s).
1108	4-CF_3Ph-	-CH_3	-CH_3	-CH_3	^{1}H NMR ($CDCl_3$) 2.09(3H, s), 2.26(3H, s), 2.39(4H, brs), 2.67(3H, s), 3.41(2H, s), 3.53-3.63(4H, m), 3.74(2H, s), 5.94(2H, s), 6.71-6.77(2H, m), 6.85-6.90(3H, m), 6.98 (1H, d, J = 8.7 Hz), 7.75(2H, d, J = 8.2 Hz), 7.98-8.01 (3H, m), 8.18(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.25(1H, d, J = 2.3 Hz).
1109	3,4-Cl_2Ph-	-CH_3	-CH_3	-CH_3	^{1}H NMR ($CDCl_3$) 2.09(3H, s), 2.25(3H, s), 2.37-2.40 (4H, m), 2.66(3H, s), 3.41(2H, s), 3.53-3.63(4H, m), 3.73 (2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84-6.89(3H, m), 6.96(1H, d, J = 8.7 Hz), 7.56(1H, d, J = 8.2 Hz), 7.70-7.74(1H, m), 7.99(1H, d, J = 2.0 Hz), 8.10-8.16(2H, m), 8.24(1H, d, J = 2.8 Hz).

Table 245



Example No.	R_{770}	R_{771}	R_{772}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1110	4-CF_3Ph-	-OCH_3	-C_2H_5	free	mp 142.6-146.5
1111	4-CF_3Ph-	-CH_3	-C_2H_5	hydro-chloride	mp 173-175 dec
1112	3,4-Cl_2Ph-	-CH_3	-C_2H_5	hydro-chloride	mp 168.5-171.0
1113	2,3-Cl_2Ph-	-CH_3	-CH_3	free	^{1}H NMR ($CDCl_3$) 2.12(3H, s), 2.41-2.45(4H, m), 3.01(3H, s), 3.43(2H, s), 3.50(2H, brs), 3.63(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.52-6.58(2H, m), 6.71-6.77 (2H, m), 6.81-6.93(3H, m), 7.32(1H, t, J = 7.8 Hz), 7.56-7.61(2H, m), 7.68(1H, brs), 8.16(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.20(1H, d, J = 2.2 Hz).
1114	3,4-Cl_2Ph-	-OCH_3	-H	free	^{1}H NMR (DMSO-d_6) 2.32-2.40(4H, m), 3.42(2H, s), 3.51(4H, brs), 3.63(3H, s), 3.91(2H, d, J = 4.8 Hz), 5.54 (1H, t, J = 4.8 Hz), 5.99(2H, s), 6.21(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.50(1H, d, J = 2.5 Hz), 6.76(1H, dd, J = 7.9 Hz, 1.5 Hz), 6.82-6.88(4H, m), 7.82(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.07(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.21(1H, d, J = 2.2 Hz), 8.37(1H, d, J = 2.5 Hz), 10.44(1H, s).
1115	4-CF_3Ph-	-OCH_3	-H	free	^{1}H NMR ($CDCl_3$) 2.32-2.40(4H, m), 3.42(2H, s), 3.50(4H, brs), 3.63(3H, s), 3.91(2H, d, J = 4.6 Hz), 5.55 (1H, brt), 5.99(2H, s), 6.20(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.49(1H, d, J = 2.3 Hz), 6.74-6.88(5H, m), 7.92(2H, d, J = 8.4 Hz), 8.07-8.17(3H, m), 8.38(1H, d, J = 2.3 Hz), 10.53(1H, s).
1116	4-CF_3Ph-	-CH_3		free	^{1}H NMR ($CDCl_3$) 0.59-0.64(2H, m), 0.76-0.82(2H, m), 2.08(3H, s), 2.37-2.47(4H, m), 2.69-2.77(1H, m), 3.44 (2H, s), 3.48-3.59(4H, m), 4.16(2H, s), 5.94(2H, s), 6.67-6.77(5H, m), 6.86(2H, d, J = 8.6 Hz), 7.70(2H, d, J = 8.2 Hz), 7.97(2H, d, J = 8.1 Hz), 8.08(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.23(1H, d, J = 2.8 Hz), 8.39(1H, brs).
1117	3,4-Cl_2Ph-	-CH_3		free	^{1}H NMR ($CDCl_3$) 0.59-0.65(2H, m), 0.76-0.83(2H, m), 2.08(3H, s), 2.38-2.48(4H, m), 2.71-2.78(1H, m), 3.44(2H, s), 3.49-3.59 (4H, m), 4.17(2H, s), 5.95(2H, s), 6.67-6.77 (5H, m), 6.85-6.88(2H, m), 7.53(1H, d, J = 8.2 Hz), 7.68-7.72(1H, m), 7.96(1H, d, J = 2.0 Hz), 8.02-8.07(1H, m), 8.22-8.26(2H, m).
1118		-CH_3	-CH_3	free	^{1}H NMR ($CDCl_3$) 0.83-0.85(2H, m), 1.07-1.08(2H, m), 1.46-1.63(1H, m), 2.10(3H, s), 2.41-2.44(4H, m), 3.00(3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.06(2H, s), 5.94(2H, s), 6.51-6.55(2H, m), 6.70-6.77(3H, m), 6.85(1H, brs), 6.89(1H, d, J = 8.4 Hz), 7.44-7.64(1H, m), 8.01-8.04(1H, m), 8.08(1H, d, J = 2.3 Hz).

Table 246



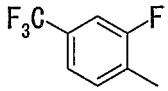
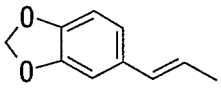
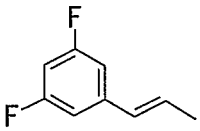
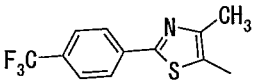
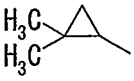
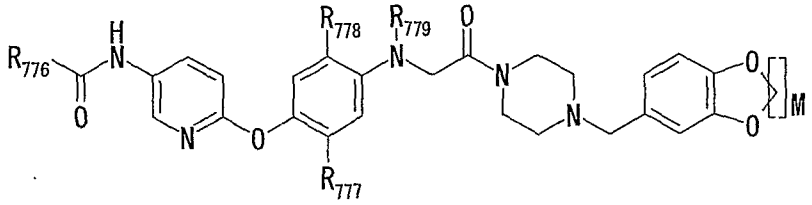
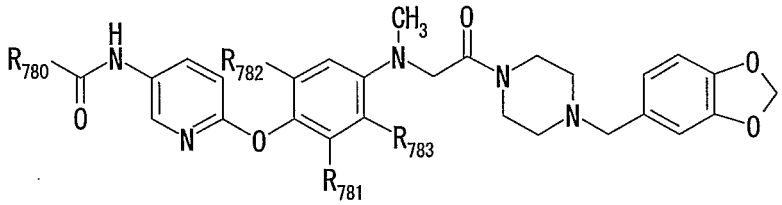
Example No.	R_{773}	R_{774}	R_{775}	Form	^{1}H NMR (solvent) δppm
1119		-CH3	-CH3	hydro-chloride	(DMSO-d6) 2.01(3H, s), 2.80-3.18(3H, m), 2.93 (3H, s), 3.35(2H, s), 3.38-3.62(1H, m), 3.95-4.50 (4H, m), 4.27(2H, s), 6.08(2H, s), 6.49(1H, dd, J = 8.7 Hz, 2.7 Hz), 6.58(1H, d, J = 2.7 Hz), 6.83(1H, d, J = 8.7 Hz), 6.92(1H, d, J = 8.9 Hz), 7.02(2H, s), 7.21(1H, s), 7.74(1H, d, J = 8.4 Hz), 7.90(1H, d, J = 8.4 Hz), 7.88-7.95(1H, m), 8.11(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.36(1H, d, J = 2.7 Hz), 10.71(1H, s).
1120		-CH3	-CH3	free	(CDCl3) 2.11(3H, s), 2.42(4H, brs), 3.00(3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.01(2H, s), 6.37(1H, d, J = 15.2 Hz), 6.52-6.56(2H, m), 6.74-6.85(5H, m), 6.91(1H, d, J = 8.6 Hz), 7.00-7.02(2H, m), 7.49(1H, brs), 7.65(1H, d, J = 15.3 Hz), 8.16-8.17(2H, m).
1121		-CH3	-CH3	free	(CDCl3) 2.09(3H, s), 2.42-2.43(4H, m), 3.00(3H, s), 3.43(2H, s), 3.47-3.50(2H, m), 3.63(2H, brs), 4.08(2H, s), 5.95(2H, s), 6.49-6.61(3H, m), 6.70-6.91(6H, m), 7.01-7.03(2H, m), 7.63(1H, d, J = 15.3 Hz), 7.98(1H, brs), 8.16-8.19(2H, m).
1122		-CH3	-CH3	free	(CDCl3) 2.17(3H, s), 2.43(4H, brs), 2.82(3H, s), 3.01(3H, s), 3.44(2H, s), 3.50(2H, brs), 3.63(2H, brs), 4.08(2H, s), 5.95(2H, s), 6.53-6.57(2H, m), 6.74(2H, brs), 6.81(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.92(1H, d, J = 8.6 Hz), 7.52(1H, brs), 7.73 (2H, d, J = 8.3 Hz), 8.04-8.09(3H, m), 8.18(1H, d, J = 2.8 Hz).
1123	4-CF3Ph-	-F	allyl	free	(CDCl3) 2.45(4H, brs), 3.45(2H, s), 3.45(2H, brs), 3.64(2H, brs), 3.99(2H, d, J = 5.1 Hz), 4.05 (2H, s), 5.18-5.28(2H, m), 5.83-5.93(1H, m), 5.95(2H, s), 6.36-6.47(2H, m), 6.75(2H, s), 6.86-6.87(1H, m), 6.96(1H, d, J = 9.1 Hz), 7.03 (1H, t, J = 8.9 Hz), 7.75-7.78(3H, m), 7.99(2H, d, J = 8.1 Hz), 8.15-8.22(2H, m).
1124		-CH3	-CH3	free	(CDCl3) 0.83-0.87(1H, m), 1.19-1.22(7H, m), 1.37-1.42(1H, m), 2.10(3H, s), 2.41-2.44(4H, m), 3.00(3H, s), 3.43(2H, s), 3.48(2H, brs), 3.63(2H, brs), 4.06(2H, s), 5.94(2H, s), 6.51-6.56(2H, m), 6.70-6.77(3H, m), 6.85-6.91(2H, m), 7.40(1H, brs), 8.05-8.06(2H, m).

Table 247



Example No.	R_{776}	R_{777}	R_{778}	R_{779}	M	mp (°C) or ^{1}H NMR
1125	4-CF_3Ph-	-F	-F	-CH_3	1	mp 160.0 -161.5
1126	3,4-Cl_2Ph-	-F	-F	-CH_3	1	mp 207-209
1127	4-CF_3Ph-	-F	-F	-C_2H_5	1	^{1}H NMR (DMSO-d_6) δ 1.07(3H, t, J = 7.0 Hz), 2.20-2.41(4H, m), 3.20-3.30(2H, m), 3.39(2H, s), 3.39-3.52(4H, m), 4.11(2H, s), 5.97(2H, s), 6.71-6.76(1H, m), 6.78-6.88(3H, m), 7.09-7.19 (2H, m), 7.92(2H, d, J = 8.4 Hz), 8.15(2H, d, J = 8.4 Hz), 8.20(1H, dd, J = 2.7 Hz, 9.0 Hz), 8.42 (1H, d, J = 2.7 Hz).
1128	3,4-Cl_2Ph-	-CH_3	-CH_3	-C_2H_5	1	^{1}H NMR (DMSO-d_6) δ 0.95(3H, t, J = 7.0 Hz), 2.01(3H, s), 2.19(3H, s), 2.20-2.40(4H, m), 3.00 (2H, q, J = 7.0 Hz), 3.30-3.55(6H, m), 3.79(2H, s), 5.98(2H, s), 6.74(1H, dd, J = 7.9 Hz, 1.4 Hz), 6.82-6.86(3H, m), 6.97(1H, d, J = 8.9 Hz), 7.05 (1H, s), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.21(1H, d, J = 2.0 Hz), 8.42(1H, d, J = 2.6 Hz), 10.51(1H, brs).
1129	4-CF_3Ph-	-CH_3	-CH_3	-C_2H_5	1	^{1}H NMR (DMSO-d_6) δ 0.95(3H, t, J = 7.0 Hz), 2.02(3H, s), 2.19(3H, s), 2.20-2.40(4H, m), 3.00 (2H, q, J = 7.0 Hz), 3.30-3.60(6H, m), 3.79(2H, s), 5.98(2H, s), 6.74(1H, d, J = 7.9 Hz), 6.82-6.85(3H, m), 6.98(1H, d, J = 8.6 Hz), 7.05(1H, s), 7.91-7.95(2H, m), 8.14-8.20(3H, m), 8.44(1H, d, J = 1.8 Hz), 10.59(1H, brs).
1130	4-CF_3Ph-	-OCH_3	-H	-H	2	^{1}H NMR ($CDCl_3$) δ2.44(4H, brs), 3.43(4H, brs), 3.49(2H, s), 3.66(3H, s), 3.83(2H, brs), 4.25(4H, s), 4.67(1H, brs), 6.10(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.23(1H, d, J = 2.5 Hz), 6.75-6.96(5H, m), 7.67(2H, d, J = 8.3 Hz), 7.96(2H, d, J = 8.1 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.20-8.24(1H, m), 8.56(1H, s).

Table 248



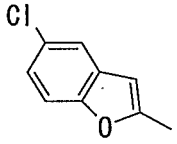
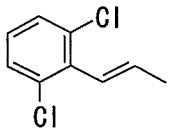
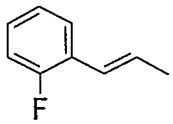
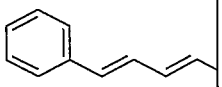
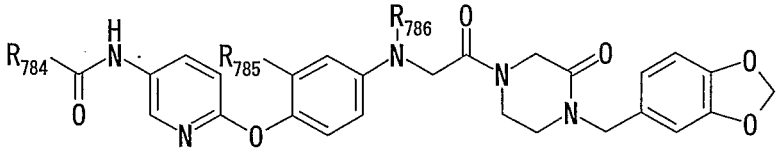
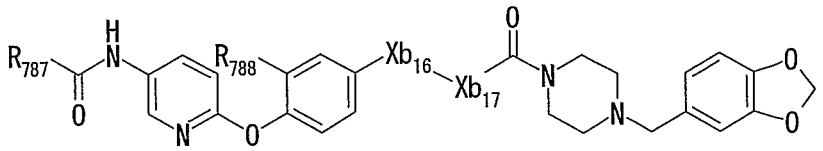
Example No.	R_{780}	R_{781}	R_{782}	R_{783}	mp (°C) or ^{1}H NMR (solvent) δppm
1131		-CH_3	-H	-H	^{1}H NMR ($CDCl_3$) 2.13(3H, s), 2.43(4H, t, J = 4.8 Hz), 3.02 (3H, s), 3.44(2H, s), 3.50(2H, brs), 3.64(2H, brs), 4.08(2H, s), 5.94(2H, s), 6.53-6.58(2H, m), 6.74(2H, brs), 6.83(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.93(1H, d, J = 8.4 Hz), 7.42(1H, dd, J = 8.9 Hz, 2.0 Hz), 7.50(1H, d, J = 8.9 Hz), 7.53(1H, s), 7.69(1H, d, J = 1.8 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.26(1H, brs), 8.31(1H, d, J = 2.6 Hz).
1132	3,4-Cl_2Ph-	-F	-F	-H	mp 203.5-204.5
1133	4-CF_3Ph-	-F	-F	-H	mp 230.0-231.5
1134	4-ClPh-	-CH_3	-H	-H	^{1}H NMR ($CDCl_3$) 2.08(3H, s), 2.42(4H, brs), 2.97(3H, s), 3.43(2H, s), 3.49(2H, brs), 3.60(2H, brs), 4.05(2H, s), 5.94 (2H, s), 6.48-6.52(2H, m), 6.74-6.89(5H, m), 7.41(2H, d, J = 8.6 Hz), 7.80(2H, d, J = 8.4 Hz), 8.08(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.21(1H, d, J = 2.6 Hz), 8.29(1H, s).
1135		-CH_3	-H	-H	^{1}H NMR ($CDCl_3$) 2.11(3H, s), 2.43-2.44(4H, m), 3.00(3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.51-6.57(2H, m), 6.69-6.93(6H, m), 7.19(1H, dd, J = 8.7 Hz, 7.5 Hz), 7.35-7.38(2H, m), 7.55(1H, brs), 7.86(1H, d, J = 15.8 Hz), 8.17-8.20(2H, m).
1136		-CH_3	-H	-H	^{1}H NMR ($CDCl_3$) 2.10(3H, s), 2.43(4H, brs), 3.00(3H, s), 3.43(2H, s), 3.50(2H, brs), 3.64(2H, brs), 4.07(2H, s), 5.95 (2H, s), 6.50-6.56(2H, m), 6.67-6.92(6H, m), 7.07-7.19(2H, m), 7.31-7.36(1H, m), 7.47-7.52(1H, m), 7.73(1H, brs), 7.80 (1H, d, J = 15.7 Hz), 8.14-8.20(2H, m).
1137		-CH_3	-H	-H	^{1}H NMR ($CDCl_3$) 2.11(3H, s), 2.41-2.44(4H, m), 3.00(3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.06(2H, s), 5.94(2H, s), 6.09(1H, d, J = 14.7 Hz), 6.51-6.56(2H, m), 6.70-6.96(7H, m), 7.30-7.55(7H, m), 8.14(1H, d, J = 2.5 Hz), 8.14(1H, brs).
1138	4-CF_3Ph-	-F	-H	-F	mp 169.0 - 170.0
1139	3,4-Cl_2Ph-	-F	-H	-F	mp 138.0 - 139.0

Table 249



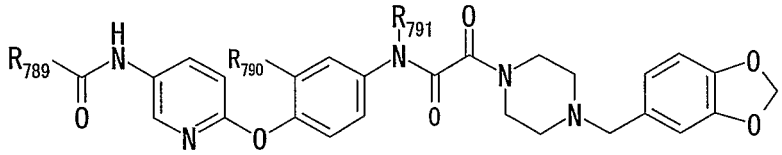
Example No.	R_{784}	R_{785}	R_{786}	^{1}H NMR (solvent) δppm
1140	3,4-Cl_2Ph-	-CH_3	-CH_3	($DMSO-d_6$) 2.00(3H, s), 2.93(3H, s), 3.23(1H, brs), 3.36(1H, brs), 3.63(1H, brs), 3.72(1H, brs), 4.07(1H, s), 4.27(1H, s), 4.29(2H, s), 4.47(2H, s), 5.99(2H, s), 6.43-6.63(2H, m), 6.77(1H, dd, J = 8.0 Hz, 1.5 Hz), 6.77-6.88(2H, m), 6.82(1H, d, J = 8.8 Hz), 6.90(1H, d, J = 8.6 Hz), 7.83(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.12(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.21(1H, d, J = 2.0 Hz), 8.40(1H, d, J = 2.6 Hz), 10.48(1H, s).
1141	4-CF_3Ph-	-CH_3	-CH_3	($CDCl_3$) 2.10(3H, s), 2.90-3.06(3H, m), 3.20-3.34(2H, m), 3.62-3.84(2H, m), 4.08(2H, s), 4.20-4.33(2H, m), 4.52(2H, s), 5.95(2H, s), 6.53(1H, dd, J = 8.6 Hz, 3.0 Hz), 6.58(1H, d, J = 3.0 Hz), 6.67-6.79(3H, m), 6.82(1H, d, J = 8.9 Hz), 6.91(1H, d, J = 8.1 Hz), 7.74(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.10(1H, s), 8.15(1H, dd, J = 9.2 Hz, 2.3 Hz), 8.22(1H, d, J = 2.3 Hz).
1142	3,4-Cl_2Ph-	-OCH_3	-C_2H_5	($CDCl_3$) 1.17(3H, t, J = 6.4 Hz), 3.17-3.30(2H, m), 3.32-3.52(2H, m), 3.70(3H, s), 3.62-3.86(2H, m), 4.03(2H, s), 4.29(2H, s), 4.50 (2H, s), 5.95(2H, s), 6.22(1H, d, J = 8.9 Hz), 6.37(1H, s), 6.70(1H, d, J = 8.2 Hz), 6.75(1H, s), 6.76(1H, d, J = 8.9 Hz), 6.86(1H, d, J = 8.9 Hz), 6.94(1H, d, J = 8.7 Hz), 7.54(1H, d, J = 8.4 Hz), 7.70 (1H, dd, J = 8.4 Hz, 2.0 Hz), 7.98(1H, d, J = 2.0 Hz), 8.08(1H, s), 8.08(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.20(1H, d, J = 2.3 Hz).
1143	4-CF_3Ph-	-OCH_3	-C_2H_5	($CDCl_3$) 1.18(3H, t, J = 6.7 Hz), 3.16-3.33(2H, m), 3.33-3.50(2H, m), 3.72(2H, s), 3.62-3.85(3H, m), 4.04(2H, s), 4.29(2H, s), 4.50 (2H, s), 5.95(2H, s), 6.23(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.38(1H, s), 6.71(1H, d, J = 8.1 Hz), 6.76(1H, s), 6.76(1H, d, J = 8.7 Hz), 6.88 (1H, d, J = 8.7 Hz), 6.95(1H, d, J = 8.7 Hz), 7.74(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.03(1H, s), 8.13(1H, dd, J = 8.7 Hz, 2.4 Hz), 8.21(1H, d, J = 2.4 Hz).

Table 250



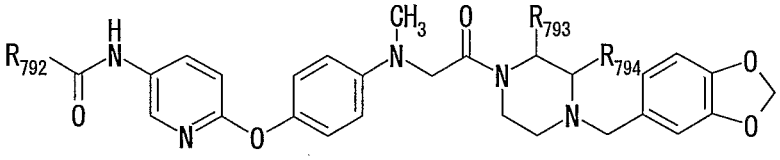
Example No.	R_{787}	R_{788}	Xb_{16}	Xb_{17}	Form	^{1}H NMR (solvent) δppm
1144	4-CF_3Ph-	-H	-N(CH_3)-	-CH(CH_3)-	free	($CDCl_3$) 1.30(3H, d, J = 6.3 Hz), 2.16-2.48 (4H, m), 2.77(3H, s), 3.26-3.56(3H, m), 3.39 (2H, s), 3.78(1H, brs), 4.56(1H, q, J = 6.6 Hz), 5.92(2H, s), 6.68-6.77(4H, m), 6.82(1H, s), 6.91(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 9.1 Hz), 7.76(2H, d, J = 8.2 Hz), 7.90(1H, brs), 7.99(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz).
1145	4-CF_3Ph-	-CH_3	-N(CH_3)-	-CH(CH_3)-	free	($CDCl_3$) 1.29(3H, d, J = 6.6 Hz), 2.14(3H, s), 2.14-2.22(1H, m), 2.29-2.35(2H, m), 2.48(1H, brs), 2.76(3H, s), 3.26-3.56(3H, m), 3.39(2H, s), 3.78(1H, brs), 4.57(1H, q, J = 6.6 Hz), 5.93 (2H, s), 6.58-6.62(2H, m), 6.68-6.75 (2H, m), 6.83(1H, brs), 6.86 (1H, d, J = 8.9 Hz), 6.95 (1H, d, J = 9.2 Hz), 7.76(2H, d, J = 8.3 Hz), 7.90(1H, brs), 7.99(2H, d, J = 8.3 Hz), 8.16 (1H, dd, J = 8.9 Hz, 2.8 Hz), 8.23(1H, d, J = 2.5 Hz).
1146	3,4-Cl_2Ph-	-H	-CH_2-	-NH-	hydro-chloride	(DMSO-d_6) 2.78-3.10(2H, m), 3.10-3.35(4H, m), 4.00-4.19(2H, m), 4.18-4.32(4H, m), 6.07 (2H, s), 6.95-7.10(3H, m), 7.06(2H, d, J = 8.6 Hz), 7.23(1H, s), 7.30(2H, d, J = 8.6 Hz), 7.39 (1H, t, J = 5.5 Hz), 7.84(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.19(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.25(1H, d, J = 2.0 Hz), 8.48(1H, d, J = 2.6 Hz), 10.62(1H, s).
1147	4-CF_3Ph-	-H	-CH_2-	-NH-	hydro-chloride	(DMSO-d_6) 2.80-3.05(2H, m), 3.11-3.38(4H, m), 4.00-4.35(4H, m), 4.24(2H, s), 6.07(2H, s), 6.98(1H, d, J = 8.7 Hz), 6.92-7.10(2H, m), 7.06(2H, d, J = 8.6 Hz), 7.24(1H, d, J = 1.3 Hz), 7.30(2H, d, J = 8.6 Hz), 7.35-7.45(1H, m), 7.93(2H, d, J = 8.3 Hz), 8.19(2H, d, J = 8.3 Hz), 8.22(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.51 (1H, d, J = 2.5 Hz), 10.70(1H, s).

Table 251



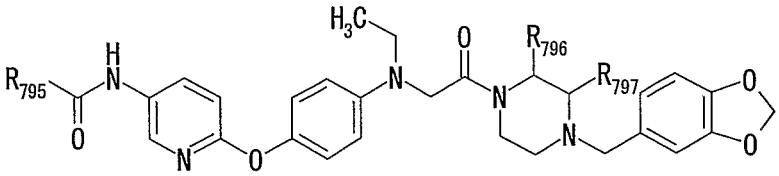
Example No.	R_{789}	R_{790}	R_{791}	^{1}H NMR (solvent) δppm
1148	4-CF_3Ph-	-CH_3	-H	($CDCl_3$) 2.17(3H, s), 2.50-2.55(4H, m), 3.46(2H, s), 3.71-3.74 (2H, m), 4.26(2H, brs), 5.95(2H, s), 6.74-6.75(2H, m), 6.86(1H, brs), 6.91-6.95(1H, m), 7.04(1H, d, J = 8.7 Hz), 7.43(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.56(1H, d, J = 2.3 Hz), 7.76(2H, d, J = 8.4 Hz), 7.94(1H, brs), 7.99(2H, d, J = 8.1 Hz), 8.20-8.23(2H, m), 9.17 (1H, brs).
1149	3,4-Cl_2Ph-	-CH_3	-H	($CDCl_3$) 2.18(3H, s), 2.50-2.56(4H, m), 3.47(2H, s), 3.72-3.75 (2H, m), 4.25-4.29(2H, m), 5.96(2H, s), 6.75(2H, brs), 6.86(1H, brs), 6.93(1H, d, J = 8.7 Hz), 7.04(1H, d, J = 8.7 Hz), 7.44(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.56-7.57(1H, m), 7.58(1H, d, J = 8.3 Hz), 7.70 (1H, brs), 7.71(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.15-8.21(2H, m), 9.16(1H, brs).
1150	3,4-Cl_2Ph-	-CH_3	-CH_3	(DMSO-d_6) 2.10-2.49(7H, m), 3.26-3.57(9H, m), 5.96-5.99(2H, m), 6.69-6.89(3H, m), 7.05-7.11(2H, m), 7.16-7.28(1H, m), 7.30-7.37(1H, m), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.18-8.22(2H, m), 8.42-8.47(1H, m), 10.54(1H, brs).
1151	4-CF_3Ph-	-CH_3	-CH_3	(DMSO-d_6) 2.10-2.46(7H, m), 3.26-3.57(9H, m), 5.96-6.00(2H, m), 6.69-6.89(3H, m), 7.06-7.12(2H, m), 7.17-7.29(1H, m), 7.31-7.37(1H, m), 7.94(1H, d, J = 8.6 Hz), 8.16(2H, d, J = 8.6 Hz), 8.21-8.25(2H, m), 8.45-8.49(1H, m), 10.61(1H, brs).
1152	4-CF_3Ph-	-H	-SO_2CH_3	($CDCl_3$) 2.45(4H, brs), 3.19(3H, s), 3.39(2H, brs), 3.46(2H, s), 3.62(2H, brs), 4.52(2H, s), 5.94(2H, s), 6.74(2H, brs), 6.84(1H, brs), 7.00(1H, d, J = 8.7 Hz), 7.10(2H, d, J = 8.7 Hz), 7.57(2H, d, J = 8.7 Hz), 7.75(2H, d, J = 8.1 Hz), 8.00(2H, d, J = 8.1 Hz), 8.15-8.24(2H, m), 8.31(1H, brs).
1153	3,4-Cl_2Ph-	-CH_3	-SO_2CH_3	($CDCl_3$) 2.16(3H, s), 2.46(4H, brs), 3.20(3H, s), 3.40(2H, brs), 3.47(2H, s), 3.63(2H, brs), 4.52(2H, s), 5.94(2H, s), 6.70-6.77 (2H, m), 6.83(1H, brs), 6.95(1H, d, J = 9.1 Hz), 6.99(1H, d, J = 8.7 Hz), 7.38-7.57(3H, m), 7.71(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.97(1H, d, J = 2.0 Hz), 8.11(1H, brs), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz).
1154	4-CF_3Ph-	-CH_3	-SO_2CH_3	($CDCl_3$) 2.18(3H, s), 2.42-2.46(4H, m), 3.21(3H, s), 3.39-3.40 (2H, m), 3.44(2H, s), 3.62(2H, brs), 4.53(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 6.96-7.03(2H, m), 7.41-7.46 (2H, m), 7.76(2H, d, J = 8.2 Hz), 7.98-8.01(3H, m), 8.21(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.26(1H, d, J = 2.3 Hz).
1155	3,4-Cl_2Ph-	-H	-SO_2CH_3	($CDCl_3$) 2.41-2.45(4H, m), 3.19(3H, s), 3.38(2H, brs), 3.44(2H, s), 3.61(2H, brs), 4.52(2H, s), 5.94(2H, s), 6.72-6.74(2H, m), 6.83(1H, brs), 6.98(1H, d, J = 8.7 Hz), 7.09(2H, d, J = 8.7 Hz), 7.55(1H, d, J = 8.4 Hz), 7.56(2H, d, J = 8.7 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.18(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.27(1H, brs), 8.30(1H, d, J = 2.1 Hz).

Table 252



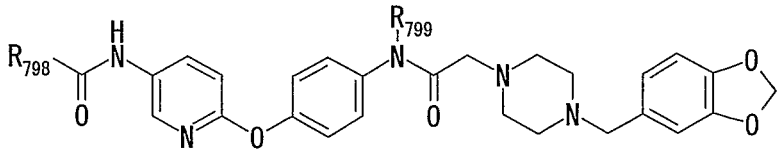
Example No.	R_{792}	R_{793}	R_{794}	^{1}H NMR ($CDCl_3$) δppm
1156	4-CF_3Ph-	-H	-CH_3	1.21(3H, t, J = 6.8 Hz), 2.05-2.14(1H, m), 2.44-2.51(1H, m), 2.70-2.74(1H, m), 2.83-3.32(6H, m), 3.55-3.59(1H, m), 3.84-4.08 (4H, m), 5.94(2H, s), 6.66(2H, d, J = 8.9 Hz), 6.74(2H, brs), 6.81-6.85 (2H, m), 6.97(2H, d, J = 8.4 Hz), 7.72(2H, d, J = 8.3 Hz), 7.98(2H, d, J = 8.3 Hz), 8.11(1H, d, J = 9.1 Hz), 8.25(1H, d, J = 2.5 Hz), 8.31(1H, brs).
1157	4-CF_3Ph-	-CH_3	-H	1.26-1.39(3H, m), 1.99-2.04(1H, m), 2.13-2.17(1H, m), 2.64-2.67 (1H, m), 2.79-2.83(1H, m), 2.98(4H, brs), 3.31-3.53(3H, m), 3.97-4.66(3H, m), 5.95(2H, s), 6.64(2H, d, J = 9.1 Hz), 6.74(2H, brs), 6.82(1H, d, J = 8.9 Hz), 6.87(1H, brs), 6.96(2H, d, J = 9.1 Hz), 7.71 (2H, d, J = 7.9 Hz), 7.98(2H, d, J = 8.3 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.25(1H, d, J = 2.5 Hz), 8.40(1H, brs).
1158	3,4-Cl_2Ph-	-H	-CH_3	1.21(3H, t, J = 6.8 Hz), 2.07-2.14(1H, m), 2.43-2.52(1H, m), 2.70(1H, brs), 2.83-3.32(6H, m), 3.55-3.60(1H, m), 3.83-4.08(4H, m), 5.94 (2H, s), 6.64(2H, d, J = 9.1 Hz), 6.74(2H, brs), 6.81(1H, d, J = 8.9 Hz), 6.85(1H, brs), 6.96(2H, d, J = 8.7 Hz), 7.53(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.98(1H, d, J = 2.0 Hz), 8.05(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.5 Hz), 8.31(1H, brs).
1159	3,4-Cl_2Ph-	-CH_3	-H	1.26-1.39(3H, m), 1.99-2.17(2H, m), 2.64-2.68(1H, m), 2.79-2.84 (1H, m), 2.99(4H, brs), 3.31-3.54(3H, m), 4.01-4.68(3H, m), 5.95(2H, s), 6.64(2H, d, J = 9.1 Hz), 6.74(2H, brs), 6.81(1H, d, J = 8.9 Hz), 6.87(1H, brs), 6.96(2H, d, J = 8.9 Hz), 7.53(1H, d, J = 8.4 Hz), 7.71 (1H, dd, J = 8.4 Hz, 2.0 Hz), 7.98(1H, d, J = 2.0 Hz), 8.06(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.24(1H, d, J = 2.3 Hz), 8.26(1H, brs).

Table 253



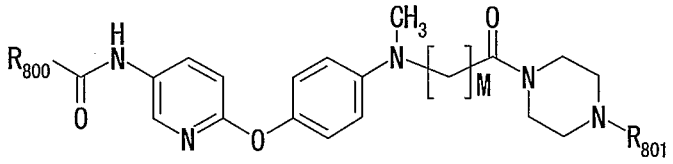
Example No.	R_{795}	R_{796}	R_{797}	^{1}H NMR ($CDCl_3$) δppm
1160	3,4-Cl_2Ph-	-H	-CH_3	1.16-1.19(6H, m), 2.04-2.14(1H, m), 2.43-2.52(1H, m), 2.66-2.74 (1H, m), 2.83-3.36(5H, m), 3.59-3.63(1H, m), 3.84-4.08(4H, m), 5.94(2H, s), 6.59(2H, d, J = 8.9 Hz), 6.74(2H, brs), 6.79(1H, d, J = 8.9 Hz), 6.85(1H, brs), 6.92(2H, d, J = 8.9 Hz), 7.50(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.0 Hz), 8.03 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.3 Hz), 8.64(1H, brs).
1161	4-CF_3Ph-	-H	-CH_3	1.09-1.15(6H, m), 2.04-2.13(1H, m), 2.43-2.51(1H, m), 2.66-2.74 (1H, m), 2.83-3.38(5H, m), 3.58-3.63(1H, m), 3.84-4.08(4H, m), 5.94(2H, s), 6.61(2H, d, J = 8.9 Hz), 6.74(2H, brs), 6.81(1H, d, J = 8.9 Hz), 6.85(1H, brs), 6.94(2H, d, J = 8.3 Hz), 7.71(2H, d, J = 7.8 Hz), 7.99(2H, d, J = 8.1 Hz), 8.10(1H, d, J = 9.1 Hz), 8.26(1H, d, J = 2.5 Hz), 8.50(1H, brs).
1162	3,4-Cl_2Ph-	-CH_3	-H	1.15(3H, t, J = 7.1 Hz), 1.26-1.43(3H, m), 2.00(1H, brs), 2.13(1H, brs), 2.64-2.68(1H, m), 2.79-2.83(1H, m), 3.02-4.68(9H, m), 5.95 (2H, s), 6.61(2H, d, J = 9.1 Hz), 6.74(2H, brs), 6.81(1H, d, J = 8.7 Hz), 6.87(1H, brs), 6.94(2H, d, J = 8.9 Hz), 7.53(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(1H, d, J = 2.0 Hz), 8.06(1H, d, J = 8.9 Hz), 8.25(1H, d, J = 2.6 Hz), 8.32(1H, brs).
1163	4-CF_3Ph-	-CH_3	-H	1.15(3H, t, J = 6.9 Hz), 1.26-1.39(3H, m), 1.99(1H, brs), 2.13(1H, brs), 2.63-2.67(1H, m), 2.79-2.83(1H, m), 3.00-4.67(9H, m), 5.95 (2H, s), 6.61(2H, d, J = 8.4 Hz), 6.74(2H, brs), 6.82(1H, d, J = 8.7 Hz), 6.87(1H, brs), 6.95(2H, d, J = 8.9 Hz), 7.71(2H, d, J = 7.9 Hz), 7.99(2H, d, J = 8.1 Hz), 8.10(1H, d, J = 8.3 Hz), 8.27(1H, d, J = 2.5 Hz), 8.38(1H, brs).

Table 254



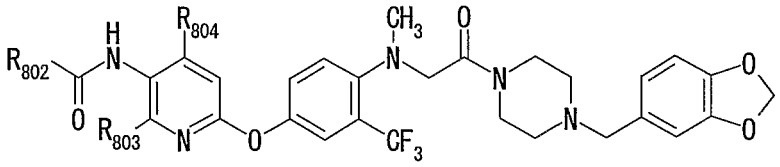
Example No.	R_{798}	R_{799}	^{1}H NMR ($CDCl_3$) δppm
1164	4-CF_3Ph-	-H	2.52(4H, brs), 2.64(4H, brs), 3.12(2H, s), 3.45(2H, brs), 5.94(2H, s), 6.75 (2H, brs), 6.86(1H, brs), 6.95(1H, d, J = 8.7 Hz), 7.11(2H, d, J = 8.9 Hz), 7.60(2H, d, J = 8.9 Hz), 7.76(2H, d, J = 8.3 Hz), 7.98(1H, brs), 8.00(2H, d, J = 8.3 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.26(1H, d, J = 2.5 Hz), 9.16(1H, brs).
1165	3,4-Cl_2Ph-	-H	2.52(4H, brs), 2.62-2.64(4H, m), 3.12(2H, s), 3.45(2H, brs), 5.95(2H, s), 6.75(2H, brs), 6.86(1H, brs), 6.94(1H, d, J = 8.7 Hz), 7.10(2H, d, J = 8.9 Hz), 7.57(1H, d, J = 8.4 Hz), 7.59(2H, d, J = 8.9 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(2H, brs), 8.17(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.25(1H, d, J = 2.8 Hz), 9.17(1H, brs).
1166	3,4-Cl_2Ph-	-CH_3	2.44(8H, brs), 2.95(2H, s), 3.26(3H, s), 3.39(2H, s), 5.92(2H, s), 6.71(2H, brs), 6.81(1H, brs), 7.02(1H, d, J = 8.7 Hz), 7.14-7.22(4H, m), 7.58(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.05(1H, d, J = 2.1 Hz), 8.27(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.32(1H, d, J = 2.6 Hz), 8.33(1H, brs).
1167	4-CF_3Ph-	-CH_3	2.50(8H, brs), 2.95(2H, s), 3.24(3H, s), 3.47(2H, s), 5.92(2H, s), 6.72(2H, brs), 6.81(1H, brs), 7.02(1H, d, J = 8.7 Hz), 7.13-7.21(4H, m), 7.74(2H, d, J = 8.4 Hz), 8.05(2H, d, J = 8.1 Hz), 8.30(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.35(1H, d, J = 2.3 Hz), 8.61(1H, brs).

Table 255



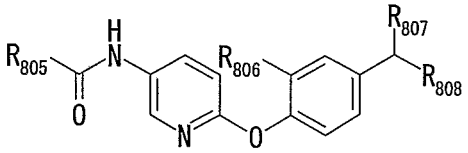
Example No.	R_{800}	R_{801}	M	Form	^{1}H NMR (solvent) δppm
1168	3,4-Cl_2Ph-	piperonyl	2	hydrochloride	(DMSO-d_6) 2.60-2.61(2H, m), 2.75-3.08(6H, m), 3.22-3.60 (5H, m), 4.03(1H, d, J = 13.9 Hz), 4.20(2H, d, J = 4.3 Hz), 4.46(1H, d, J = 13.9 Hz), 6.06(2H, s), 6.73(2H, d, J = 8.9 Hz), 6.93-6.99(5H, m), 7.20(1H, brs), 7.83(1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(1H, d, J = 2.0 Hz), 8.45(1H, d, J = 2.6 Hz), 10.57(1H, brs), 11.00(1H, brs).
1169	4-CF_3Ph-	piperonyl	2	hydrochloride	(DMSO-d_6) 2.60-2.62(2H, m), 2.88-3.08(6H, m), 3.23-3.60 (5H, m), 4.01-4.06(1H, m), 4.20-4.21(2H, m), 4.43-4.49(1H, m), 6.07(2H, s), 6.73(2H, d, J = 8.6 Hz), 6.94-6.99(5H, m), 7.20(1H, brs), 7.93(2H, d, J = 8.2 Hz), 8.14-8.19(3H, m), 8.47(1H, d, J = 2.5 Hz), 10.64(1H, brs), 11.00(1H, brs).
1170	4-CF_3Ph-	benzyl	0	free	($CDCl_3$) 2.25(4H, t, J = 4.9 Hz), 3.19(3H, s), 3.23(4H, t, J = 4.9 Hz), 3.43(2H, s), 6.95(1H, d, J = 8.7 Hz), 7.08(4H, s), 7.20-7.32(5H, m), 7.75(2H, d, J = 8.0 Hz), 8.02(2H, d, J = 8.0 Hz), 8.24(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.31(1H, d, J = 2.5 Hz), 8.34(1H, s).
1171	3,4-Cl_2Ph-	benzyl	0	hydrochloride	(DMSO-d_6) 2.70-3.00(2H, m), 3.14(3H, s), 2.95-3.30(4H, m), 3.72(2H, d, J = 13.7 Hz), 4.29(2H, s), 7.08(1H, d, J = 8.7 Hz), 7.11(2H, d, J = 8.9 Hz), 7.23(2H, d, J = 8.9 Hz), 7.39-7.48(3H, m), 7.51-7.60(2H, m), 7.84(1H, d, J = 8.5 Hz), 7.97(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.22(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.25(1H, d, J = 2.0 Hz), 8.53(1H, d, J = 2.6 Hz), 10.67(1H, s).

Table 256



Example No.	R_{802}	R_{803}	R_{804}	^{1}H NMR ($CDCl_3$) δppm
1172	3,4-Cl_2Ph-	-H	-CH_3	2.34(3H, s), 2.34-2.50(4H, m), 2.78(3H, s), 3.42(2H, s), 3.50-3.70(4H, m), 3.80(2H, s), 5.95(2H, s), 6.70-6.80(2H, m), 6.85-6.89(2H, m), 7.26-7.35(1H, m), 7.40(1H, d, J = 2.8 Hz), 7. 51(1H, d, J = 8.9 Hz), 7.57-7.61(2H, m), 7.74(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.01(1H, d, J = 2.0 Hz), 8.29(1H, s).
1173	4-CF_3Ph-	-H	-CH_3	2.36(3H, s), 2.36-2.50(4H, m), 2.79(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.80(2H, s), 5.94(2H, s), 6.70-6.75(2H, m), 6.85-6.90(2H, m), 7.30(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.40(1H, d, J = 2.8 Hz), 7.51(1H, d, J = 8.8 Hz), 7.68(1H, brs), 7.76-7.80(2H, m), 8.01-8.04(2H, m), 8.34(1H, s).
1174	3,4-Cl_2Ph-	-CH_3	-H	2.30-2.44(4H, m), 2.44(3H, s), 2.79(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.80(2H, s), 5.95(2H, s), 6.65-6.81(3H, m), 6.85(1H, s), 7.29(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.41(1H, d, J = 2.7 Hz), 7.49(1H, d, J = 8.8 Hz), 7.59(1H, d, J = 8.3 Hz), 7.67(1H, brs), 7.72(1H, dd, J = 8.3 Hz, 2.1 Hz), 8.00(1H, d, J = 2.0 Hz), 8.09(1H, d, J = 8.7 Hz).
1175	4-CF_3Ph-	-CH_3	-H	2.35-2.45(4H, m), 2.45(3H, s), 2.79(3H, s), 3.42(2H, s), 3.50-3.65(4H, m), 3.80(2H, s), 5.95(2H, s), 6.65-6.82(2H, m), 6.85(1H, s), 7.30(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.41(1H, d, J = 2.8 Hz), 7.50(1H, d, J = 8.8 Hz), 7.72(1H, brs), 7.77-7.80(2H, m), 8.00-8.03(2H, m), 8.15(1H, d, J = 8.6 Hz).

Table 257



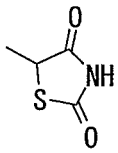
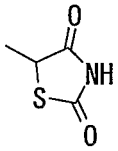
Example No.	R_{805}	R_{806}	R_{807}	R_{808}	Form	^{1}H NMR (DMSO-d_6) δppm
1176	3,4-Cl_2Ph-	-H	-H		free	3.14(1H, dd, J = 14.0 Hz, 9.4 Hz), 3.40(1H, dd, J = 14.0 Hz, 4.5 Hz), 4.93(1H, dd, J = 9.4 Hz, 4.5 Hz), 7.07(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.4 Hz), 7.29(2H, d, J = 8.4 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.22(1H, d, J = 2.0 Hz), 8.48 (1H, d, J = 2.5 Hz), 10.56(1H, s), 12.06(1H, s).
1177	4-CF_3OPh-	-CH_3	-H		hydro-chloride	2.09(3H, s), 3.09(1H, dd, J = 14.3 Hz, 9.6 Hz), 3.40(1H, dd, J = 14.3 Hz, 4.3 Hz), 4.93(1H, dd, J = 9.6 Hz, 4.3 Hz), 6.99(1H, d, J = 8.1 Hz), 7.02 (1H, d, J = 8.9 Hz), 7.12(1H, d, J = 8.1 Hz), 7.20 (1H, s), 7.55(2H, d, J = 8.8 Hz), 8.10(2H, d, J = 8.8 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.44 (1H, d, J = 2.6 Hz), 10.54(1H, s), 12.10(1H, s).
1178	3,4-Cl_2Ph-	-H	-CH_3	morpholino	hydro-chloride	1.70(3H, d, J = 6.9 Hz), 2.94-3.01 (2H, m), 3.63-4.02(6H, m), 4.50 (1H, t, J = 6.6 Hz), 7.13 (1H, d, J = 9.1 Hz), 7.23(2H, d, J = 8.7 Hz), 7.64 (2H, d, J = 8.7 Hz), 7.85(1H, d, J = 8.4 Hz), 7.96 (1H, dd, J = 8.4 Hz, 2.2 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.1 Hz), 8.54(1H, d, J = 2.1 Hz), 10.63(1H, brs), 10.89(1H, brs).
1179	4-CF_3Ph-	-H	-CH_3	morpholino	hydro-chloride	1.72(3H, d, J = 6.6 Hz), 2.92(2H, brs), 3.35(2H, brs), 3.69-3.99(4H, m), 4.49(1H, brs), 7.14(1H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.3 Hz), 7.69(2H, d, J = 8.3 Hz), 7.94(2H, d, J = 8.3 Hz), 8.20(2H, d, J = 8.1 Hz), 8.28(1H, d, J = 8.9 Hz), 8.58(1H, brs), 10.77(1H, brs), 11.47(1H, brs).
1180	Ph-	-H	-CH_3	morpholino	hydro-chloride	1.70(3H, d, J = 6.8 Hz), 2.94(2H, brs), 3.38-3.43 (2H, m), 3.62-4.02(4H, m), 4.50(1H, t, J = 6.6 Hz), 7.12(1H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.6 Hz), 7.52-7.65(5H, m), 7.96-8.00(2H, m), 8.26 (1H, dd, J = 8.7 Hz, 2.8 Hz), 8.56(1H, d; J = 2.8 Hz), 10.47(1H, brs), 10.91(1H, brs).

Table 258

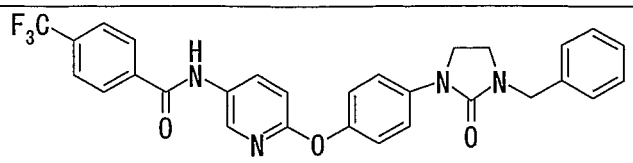
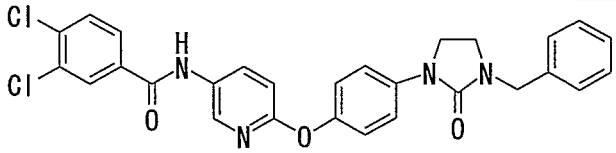
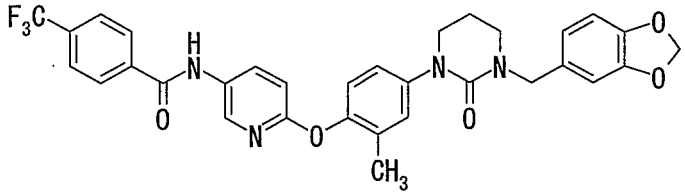
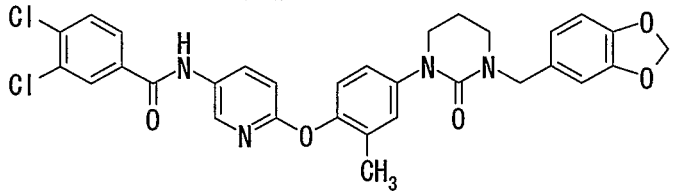
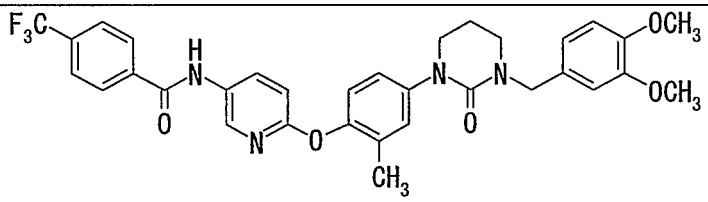
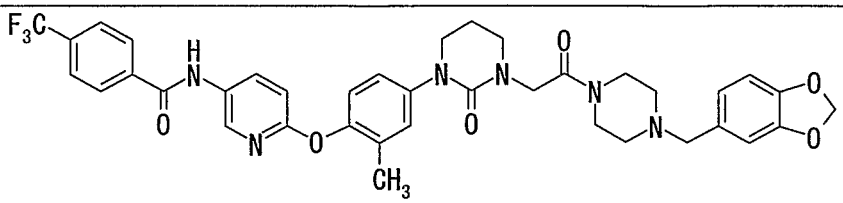
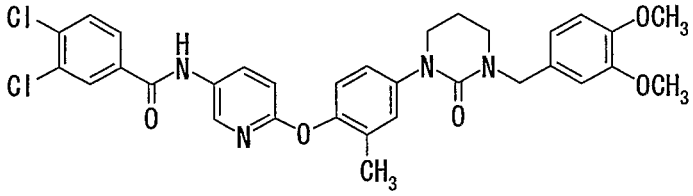
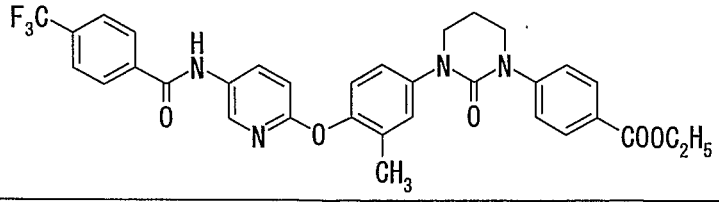
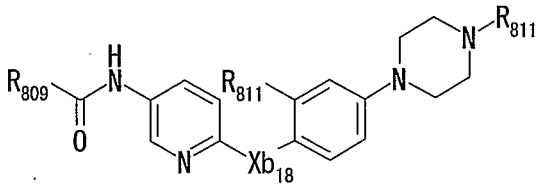
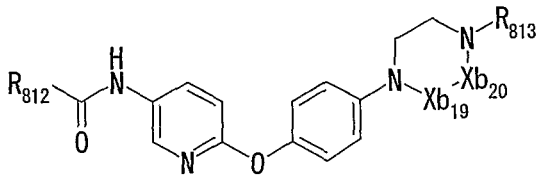
Example No.	Chemical structure	mp (℃)
1181		203.0 - 204.0
1182		186.0 - 187.0
1183		165.0 - 166.0
1184		122.0 - 124.0
1185		155.0 - 157.0
1186		182.0 - 183.5
1187		117.0 - 118.0
1188		160.0 - 161.0

Table 259



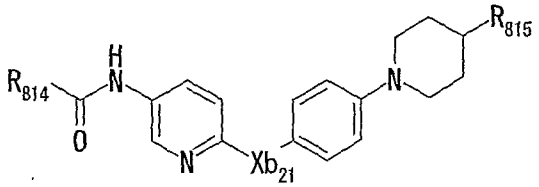
Example No.	R_{809}	R_{810}	R_{811}	Xb_{18}	^{1}H NMR ($CDCl_3$) δppm
1189	4-CF_3Ph-	-$COOCH_3$	benzyl	-O-	2.62(4H, brs), 3.23(4H, brs), 3.58(2H, s), 3.67(3H, s), 6.95(1H, d, J = 9.7 Hz), 7.06-7.14(2H, m), 7.26-7.36(5H, m), 7.49 (1H, d, J = 2.3 Hz), 7.74(2H, d, J = 8.3 Hz), 7.87(1H, s), 7.98(2H, d, J = 8.1 Hz), 8.16-8.18(2H, m).
1190	3,4-Cl_2Ph-	-H	-$COOC(CH_3)_3$	-O-	1.49(9H, s), 3.11(4H, t, J = 4.8 Hz), 3.58 (4H, t, J = 4.8 Hz), 6.92(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 8.5 Hz), 7.06(2H, d, J = 8.5 Hz), 7.58(1H, d, J = 8.5 Hz), 7.70 (1H, dd, J = 8.5 Hz, 2.0 Hz), 7.74(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.15(1H, brd, J = 9.0 Hz), 8.24 (1H, d, J = 2.5 Hz).
1191	4-CF_3Ph-	-H	-$COOC(CH_3)_3$	-O-	1.49(9H, s), 3.11(4H, t, J = 5.0 Hz), 3.58 (4H, t, J = 5.0 Hz), 6.93(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz), 7.06(2H, d, J = 9.0 Hz), 7.77(2H, d, J = 8.0 Hz), 7.82 (2H, brs), 7.99(2H, d, J = 8.0 Hz), 8.19 (1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25(1H, d, J = 2.5 Hz).
1192	4-CF_3Ph-	-H	-$CH_2COOC_2H_5$	-$N(CH_3)$-	1.30(3H, t, J = 7.1 Hz), 2.77(4H, t, J = 5.0 Hz), 3.28(4H, t, J = 5.0 Hz), 3.29(2H, s), 3.42(3H, s), 4.22(2H, q, J = 7.1 Hz), 6.47(1H, d, J = 9.2 Hz), 6.96(2H, d, J = 9.0 Hz), 7.15(2H, d, J = 9.0 Hz), 7.69(1H, brs), 7.70 (1H, d, J = 2.5 Hz), 7.74(2H, d, J = 8.1 Hz), 7.98(2H, d, J = 8.1 Hz), 8.26 (1H, d, J = 2.5 Hz).

Table 260



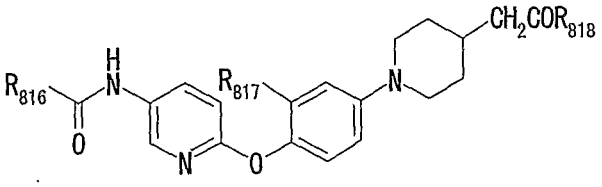
Example No.	R_{812}	R_{813}	Xb_{19}	Xb_{20}	^{1}H NMR (solvent) δppm
1193	3,4-Cl_2Ph-	-COOC(CH_3)$_3$	-CO-	-CH_2-	($CDCl_3$) 1.51(9H, s), 3.75(2H, m), 3.79(2H, m), 4.26(2H, s), 6.98(1H, d, J = 8.8 Hz), 7.14(2H, dd, J = 6.9 Hz, 2.1 Hz), 7.28(2H, dd, J = 6.9 Hz, 2.1 Hz), 7.58(1H, d, J = 8.3 Hz), 7.72(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.99 (1H, d, J = 2.1 Hz), 8.13(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.29(1H, d, J = 2.7 Hz).
1194	3,4-Cl_2Ph-	piperonyl	-CH_2-	-CO-	(DMSO-d_6) 3.22-3.50(4H, m), 3.84(2H, s), 4.50(2H, s), 6.00(2H, s), 6.77(1H, dd, J = 8.0 Hz, 1.4 Hz), 6.84(1H, d, J = 1.4 Hz), 6.87(1H, d, J = 8.0 Hz), 6.98(2H, d, J = 8.6 Hz), 6.97-7.06(3H, m), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.15 (1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.0 Hz), 8.44(1H, d, J = 2.3 Hz), 10.51 (1H, s).
1195	4-CF_3Ph-	piperonyl	-CH_2-	-CO-	(DMSO-d_6) 3.27-3.40(2H, m), 3.40-3.50 (2H, m), 3.85(2H, s), 4.50(2H, s), 6.00(2H, s), 6.77(1H, dd, J = 7.9 Hz, 1.5 Hz), 6.84 (1H, d, J = 1.5 Hz), 6.88(1H, d, J = 7.9 Hz), 6.95-7.07(5H, m), 7.93(2H, d, J = 8.1 Hz), 8.16(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.46(1H, d, J = 2.5 Hz), 10.60(1H, s).

Table 261



Example No.	R_{814}	R_{815}	Xb_{21}	^{1}H NMR ($CDCl_3$) δppm
1196	3,4-Cl_2Ph-	-$COOC_2H_5$	-O-	1.28(3H, t, J = 7.0 Hz), 1.88-1.93(2H, m), 2.03(2H, brd, J = 10.0 Hz), 2.42(1H, m), 2.78(1H, t, J = 10.5 Hz), 3.59(2H, dt, J = 12.5 Hz, 3.5 Hz), 4.16(2H, q, J = 7.0 Hz), 6.90(1H, d, J = 9.0 Hz), 6.95(2H, d, J = 9.0 Hz), 7.03(2H, d, J = 9.0 Hz), 7.58(1H, d, J = 8.5 Hz), 7.70(1H, brs), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.98 (1H, d, J = 2.0 Hz), 8.14(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).
1197	3,4-Cl_2Ph-	-$CH_2COOC_2H_5$	-O-	1.27(3H, t, J = 7.0 Hz), 1.40-1.46(2H, m), 1.82(2H, brd, J = 13.0 Hz), 1.90(1H, m), 2.27(2H, d, J = 7.0 Hz), 2.69(2H, brt, J = 13.0 Hz), 3.57(2H, brd, J = 12.0 Hz), 4.15 (2H, q, J = 7.0 Hz), 6.83(1H, d, J = 9.0 Hz), 6.90(2H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.49(1H, d, J = 8.5 Hz), 7.68(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.95(1H, d, J = 2.0 Hz), 8.10(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.21(1H, d, J = 2.5 Hz), 8.48(1H, brs).
1198	4-CF_3Ph-	-$CH_2COOC_2H_5$	-N(CH_3)-	1.28(3H, t, J = 7.1 Hz), 1.46(2H, qd, J = 12.2 Hz, 3.4 Hz), 1.86(2H, d, J = 13.5 Hz), 1.85-2.10(1H, m), 2.30 (2H, d, J = 7.1 Hz), 2.76(2H, td, J = 12.2 Hz, 2.2 Hz), 3.42(3H, s), 3.68(2H, d, J = 12.2 Hz), 4.16(2H, q, J = 7.1 Hz), 6.46(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.9 Hz), 7.72(1H, dd, J = 9.0 Hz, 2.5 Hz), 7.73(1H, d, J = 2.5 Hz), 7.74(2H, d, J = 8.2 Hz), 7.98(2H, d, J = 8.2 Hz), 8.26(1H, d, J = 2.5 Hz).
1199	4-CF_3Ph-	-$CH_2COOC_2H_5$	-O-	1.28(3H, t, J = 7.0 Hz), 1.44(2H, dq, J = 3.5 Hz, 12.0 Hz), 1.84(2H, brd, J = 13.0 Hz), 1.93(1H, m), 2.29 (2H, d, J = 7.0 Hz), 2.73(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.61(2H, brd, J = 12.0 Hz), 4.15(2H, q, J = 7.0 Hz), 6.91(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz), 7.04 (2H, d, J = 9.0 Hz), 7.74(1H, brs), 7.77(2H, d, J = 8.5 Hz), 7.99(2H, d, J = 8.5 Hz), 8.18(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25(1H, d, J = 2.5 Hz).
1200	4-CF_3Ph-	-$COOC_2H_5$	-O-	1.26(3H, t, J = 7.1 Hz), 1.77-1.98(4H, m), 2.35-2.43(1H, m), 2.68-2.76(2H, m), 3.51-3.55(2H, m), 4.14(2H, q, J = 7.1 Hz), 6.78(1H, d, J = 8.9 Hz), 6.85-6.95(4H, m), 7.61(2H, d, J = 8.2 Hz), 7.93(2H, d, J = 8.1 Hz), 8.09(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz), 9.00(1H, s).

Table 262



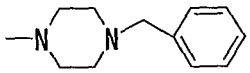
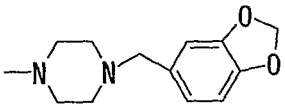
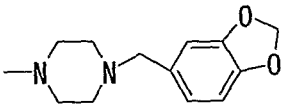
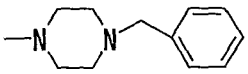
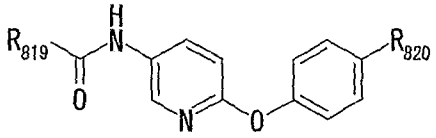
Example No.	R_{816}	R_{817}	R_{818}	^{1}H NMR ($CDCl_3$) δppm
1201	4-CF_3Ph-	-CH_3		1.31-1.43(2H, m), 1.80-1.98(3H, m), 2.10(3H, s), 2.26(2H, d, J = 6.8 Hz), 2.38-2.44(4H, m), 2.66(2H, t, J = 12.2 Hz), 3.46-3.63(8H, m), 6.72-6.81(3H, m), 6.90(1H, d, J = 8.6 Hz), 7.26-7.33(5H, m), 7.70(2H, d, J = 8.2 Hz), 8.00(2H, d, J = 8.1 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.25(1H, d, J = 2.5 Hz), 8.60(1H, s).
1202	4-CF_3Ph-	-CH_3		1.31-1.43(2H, m), 1.79-1.98(3H, m), 2.11(3H, s), 2.26(2H, d, J = 6.8 Hz), 2.36-2.39(4H, m), 2.66(2H, t, J = 12.0 Hz), 3.42(2H, s), 3.45-3.61(6H, m), 6.70-6.92(7H, m), 7.70(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.1 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.25(1H, d, J = 2.5 Hz), 8.55(1H, s).
1203	3,4-Cl_2Ph-	-CH_3		1.29-1.41(2H, m), 1.77-1.98(3H, m), 2.09(3H, s), 2.26(2H, d, J = 6.8 Hz), 2.34-2.40(4H, m), 2.62(2H, t, J = 12.0 Hz), 3.41(2H, s), 3.46-3.60(6H, m), 6.70-6.90(7H, m), 7.49(1H, d, J = 8.4 Hz), 7.73(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.99(1H, d, J = 2.0 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz), 8.99(1H, s).
1204	3,4-Cl_2Ph-	-CH_3		1.29-1.41(2H, m), 1.77-1.98(3H, m), 2.09(3H, s), 2.26(2H, d, J = 6.8 Hz), 2.37-2.44(4H, m), 2.63(2H, t, J = 11.9 Hz), 3.48-3.63(8H, m), 6.70-6.78(2H, m), 6.88(1H, d, J = 8.6 Hz), 7.26-7.33(6H, m), 7.48(1H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(1H, d, J = 2.1 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.26(1H, d, J = 2.6 Hz), 9.03(1H, s).
1205	4-CF_3Ph-	-OCH_3	-OC_2H_5	1.27(3H, t, J = 7.1 Hz), 1.39-1.42(2H, m), 1.80-1.85(3H, m), 2.28(2H, d, J = 6.9 Hz), 2.70(3H, t, J = 10.1 Hz), 3.56(2H, d, J = 12.2 Hz), 3.66(3H, s), 4.14(2H, q, J = 7.3 Hz), 6.43(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.51(1H, d, J = 2.5 Hz), 6.78(1H, d, J = 8.9 Hz), 6.90(1H, d, J = 8.7 Hz), 7.63(2H, d, J = 8.6 Hz), 7.96(2H, d, J = 8.2 Hz), 8.08(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.18(1H, d, J = 2.6 Hz), 8.95(1H, s).

Table 263



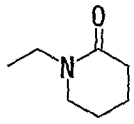
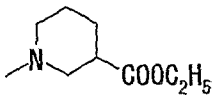
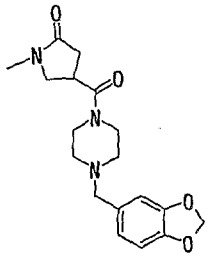
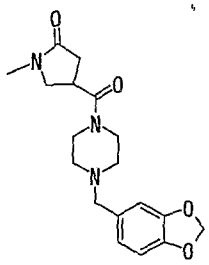
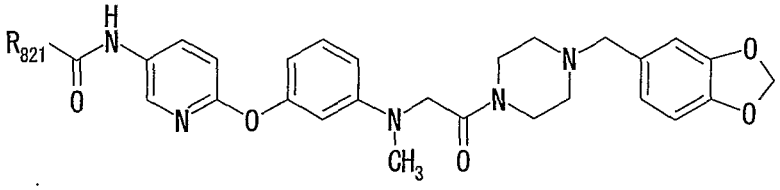
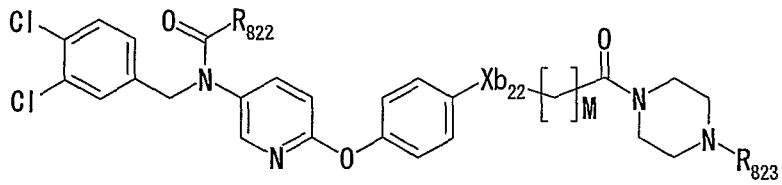
Example No.	R_{819}	R_{820}	mp (°C) or ^{1}H NMR (solvent) δppm
1206	3,4-Cl_2Ph-	morpholino	^{1}H NMR (DMSO-d_6) 3.07-3.10(4H, m), 3.73-3.77(4H, m), 6.96-7.04(5H, m), 7.83(1H, d, J = 8.2 Hz), 7.94(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22 (1H, d, J = 2.0 Hz), 8.45(1H, d, J = 2.6 Hz), 10.51(1H, brs).
1207	3,4-Cl_2Ph-		^{1}H NMR ($CDCl_3$) 1.72-1.90(4H, m), 2.40-2.53(2H, m), 3.20-3.32(2H, m), 4.58(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.08(2H, d, J = 8.6 Hz), 7.27(2H, d, J = 8.6 Hz), 7.58(1H, d, J = 8.6 Hz), 7.73(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.01(1H, d, J = 2.0 Hz), 8.11(1H, s), 8.19(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.28(1H, d, J = 2.3 Hz).
1208	4-CF_3Ph-	-NHCONHPh	mp 240.0 - 240.5
1209	3,4-Cl_2Ph-		^{1}H NMR ($CDCl_3$) 1.28(3H, t, J = 7.0 Hz), 1.60-1.70(2H, m), 1.83(1H, m), 2.03(1H, m), 2.69(1H, m), 2.82(1H, brt, J = 12.0 Hz), 3.03(1H, dd, J = 12.0 Hz, 10.0 Hz), 3.42(1H, brd, J = 12.0 Hz), 3.65(1H, brd, J = 12.0 Hz), 4.17(2H, q, J = 7.0 Hz), 6.90(1H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.03(2H, d, J = 9.0 Hz), 7.58(1H, d, J = 8.5 Hz), 7.70 (1H, dd, J = 8.5 Hz, 2.0 Hz), 7.75(1H, s), 7.97(1H, d, J = 2.0 Hz), 8.14(1H, brd, J = 9.0 Hz), 8.23(1H, d, J = 2.5 Hz).
1210	3,4-Cl_2Ph-		^{1}H NMR (DMSO-d_6) 2.33-2.38(4H, m), 2.65-2.83(2H, m), 3.41(2H, s), 3.45-3.57(4H, m), 3.65-3.75(1H, m), 3.91-4.08(2H, m), 6.00(2H, s), 6.76(1H, dd, J = 1.5 Hz, 8.1 Hz), 6.84-6.88(2H, m), 7.07(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.9 Hz), 7.67(2H, d, J = 9.1 Hz), 7.85(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.19(1H, dd, J = 2.6 Hz, 8.9 Hz), 8.23(1H, d, J = 2.1 Hz), 8.47(1H, d, J = 2.6 Hz), 10.56(1H, s).
1211	4-CF_3Ph-		^{1}H NMR (DMSO-d_6) 2.33-2.38(4H, m), 2.65-2.83(2H, m), 3.41(2H, s), 3.51(4H, brs), 3.65-3.75(1H, m), 3.91-4.08 (2H, m), 5.99(2H, s), 6.76(1H, dd, J = 1.3 Hz, 7.9 Hz), 6.84-6.88(2H, m),), 7.08(1H, d, J = 8.9 Hz), 7.15(2H, d, J = 6.9 Hz), 7.68(2H, d, J = 6.9 Hz), 7.94(2H, d, J = 8.6 Hz), 8.17(2H, d, J = 8.1 Hz), 8.23(1H, dd, J = 2.6 Hz, 8.9 Hz), 8.50(1H, d, J = 2.6 Hz), 10.64(1H, s).

Table 264



Example No.	R_{821}	^{1}H NMR (DMSO-d_6) δppm
1212	3,4-Cl_2Ph-	2.25-2.33(4H, m), 2.92(3H, s), 3.36(2H, s), 3.42(4H, brs), 4.23(2H, s), 5.98(2H, s), 6.29-6.32(2H, m), 6.42-6.45(1H, m), 6.70-6.74(1H, m), 6.80-6.84(2H, m), 6.97(1H, d, J = 8.9 Hz), 7.11-7.17(1H, m), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.16-8.22(2H, m), 8.52(1H, d, J = 2.5 Hz), 10.55(1H, s).
1213	4-CF_3Ph-	2.26-2.33(4H, m), 2.92(3H, s), 3.37-3.41(6H, m), 4.23(2H, s), 5.98(2H, s), 6.29-6.34 (2H, m), 6.42-6.45(1H, m), 6.70-6.74(1H, m), 6.80-6.84(2H, m), 6.98(1H, d, J = 8.9 Hz), 7.11-7.17(1H, m), 7.93(2H, d, J = 8.3 Hz), 8.16(2H, d, J = 8.1 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.54(1H, d, J = 2.3 Hz), 10.63(1H, s).

Table 265



Example No.	R_{822}	R_{823}	Xb_{22}	M	Form	^{1}H NMR (solvent) δppm
1214	-CH_3	piperonyl	-N(CH_3)-	1	free	($CDCl_3$) 1.90(3H, s), 2.41-2.45(4H, m), 3.03(3H, s), 3.43(2H, s), 3.49(2H, brs), 3.63(2H, brs), 4.09 (2H, s), 4.77(2H, s), 5.95(2H, s), 6.70(2H, d, J = 9.1 Hz), 6.74-6.75(2H, m), 6.81-6.85(2H, m), 7.00 (2H, d, J = 9.1 Hz), 7.04(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.24(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.31(1H, d, J = 2.1 Hz), 7.35(1H, d, J = 8.1 Hz), 7.83(1H, d, J = 2.6 Hz).
1215	-C_2H_5	piperonyl	-N(CH_3)-	1	free	($CDCl_3$) 1.08(3H, t, J = 7.4 Hz), 2.07(2H, q, J = 7.4 Hz), 2.41-2.45(4H, m), 3.03(3H, s), 3.43(2H, s), 3.48(2H, brs), 3.63(2H, brs), 4.09(2H, s), 4.77(2H, s), 5.95(2H, s), 6.70(2H, d, J = 9.2 Hz), 6.73-6.74 (2H, m), 6.82(1H, d, J = 8.7 Hz), 6.85(1H, brs), 7.00(2H, d, J = 9.1 Hz), 7.04(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.22 (1H, dd, J = 8.7 Hz, 2.8 Hz), 7.30(1H, d, J = 2.0 Hz), 7.34(1H, d, J = 8.3 Hz), 7.82(1H, d, J = 2.5 Hz).
1216	-CH_3	benzyl	none	0	hydro-chloride	(DMSO-d_6) 1.87(3H, s), 3.14(2H, brs), 3.37(6H, brs), 4.35(2H, s), 4.85(2H, s), 7.13(1H, d, J = 8.9 Hz), 7.22(2H, d, J = 8.4 Hz), 7.41-7.58(10H, m), 7.80(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.03(1H, d, J = 2.6 Hz), 10.88(1H, brs).

Example 1217

Production of 1H-indole-2-carboxylic acid {6-[4-(2,4-dioxothiazolidine-5-ylmethyl)-2-methylphenoxy]pyridin-3-yl}amide

To a solution of 5-[4-(5-aminopyridin-2-yloxy)-3-methylbenzyl]thiazolidine-2,4-dione (150 mg, 0.46 mmol) in DMF (5 mL) were added indole-2-carboxylic acid (74 mg, 0.46 mmol), 1-hydroxybenzotriazole monohydrate (70 mg, 0.46 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (110 mg, 0.57 mmol), and the resulting solution was stirred for 5 days at room temperature. This reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, evaporated, and the residue was then purified by silica gel column chromatography (chloroform : methanol = 30 : 1). To the obtained powdery substance was added ethanol, the resulting solution was filtered and the filtrate was washed with ethanol, to thereby yield 100 mg of the title compound.

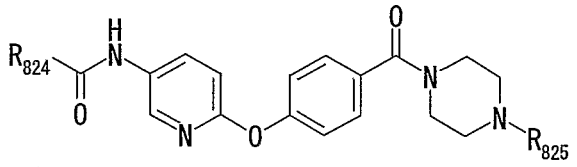
Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.10(3H, s), 3.09(1H, dd, J = 14.2 Hz, 9.7 Hz), 3.40(1H, dd, J = 14.2 Hz, 4.2 Hz), 4.94(1H, dd, J = 9.7 Hz, 4.2 Hz), 6.99(1H, d, J = 8.2 Hz), 7.04(1H, d, J = 8.9 Hz), 7.05-7.16(2H, m), 7.20(1H, s), 7.24(1H, dd, J = 7.0 Hz, 1.0 Hz), 7.39(1H,

d, J = 1.6 Hz), 7.46(1H, d, J = 8.2 Hz), 7.68(1H, d, J = 7.7 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.49(1H, d, J = 2.8 Hz), 10.37(1H, s), 11.80(1H, s), 12.09(1H, s).

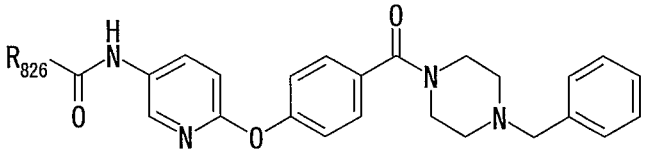
The following compounds were produced in the same manner as in Example 1217.

Table 266



Example No.	R_{824}	R_{825}	Form	^{1}H NMR (solvent) δppm
1218	3,4-$(CH_3)_2$Ph-	4-CH_3OPhCH_2-	free	($CDCl_3$) 2.34(6H, s), 2.45(4H, brs), 3.45(2H, s), 3.47-3.79(4H, m), 3.81(3H, s), 6.83-6.89(2H, m), 6.97(1H, d, J = 8.9 Hz), 7.11-7.16(2H, m), 7.21-7.26(3H, m), 7.41-7.46(2H, m), 7.59-7.62 (1H, m), 7.67(1H, d, J = 1.9 Hz), 7.92(1H, brs), 8.23-8.30(1H, m), 8.31(1H, d, J = 2.4 Hz).
1219	2-$(CH_3)_2$NPh-	benzyl	trihydro-chloride	(DMSO-d_6) 3.07(6H, s), 3.17-3.48(8H, m), 4.35(2H, s), 7.16-7.21(3H, m), 7.41-7.54(6H, m), 7.59-7.70(4H, m), 7.92(1H, d, J = 7.1 Hz), 8.27(1H, dd, J = 2.8 Hz, 8.7 Hz), 8.55(1H, d, J = 2.1 Hz), 11.30(1H, s).
1220	3,5-$(CH_3)_2$Ph-	benzyl	hydro-chloride	(DMSO-d_6) 2.36(6H, s), 3.00-3.20(2H, m), 3.20-3.40(2H, m), 3.47(2H, brs), 4.40(2H, brs), 4.33(2H, s), 7.13(1H, d, J = 8.9 Hz), 7.19(2H, d, J = 8.6 Hz), 7.24(1H, s), 7.40-7.70(7H, m), 7.51(2H, d, J = 8.6 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.56(1H, d, J = 2.6 Hz), 10.41(1H, s).
1221	2,3-$(CH_3O)_2$Ph-	benzyl	hydro-chloride	(DMSO-d_6) 3.00-3.65(6H, m), 3.80(3H, s), 3.86(3H, s), 4.20(2H, brs), 4.33(2H, brs), 7.09-7.25(6H, m), 7.40-7.80(7H, m), 8.23(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.52(1H, d, J = 2.3 Hz), 10.43(1H, s).
1222	4-$(CH_3)_2$NPh-	benzyl	free	($CDCl_3$) 2.48(4H, brs), 3.06(6H, s), 3.55(2H, s), 3.70(4H, brs), 6.71(2H, d, J = 9.0 Hz), 6.96(1H, d, J = 9.6 Hz), 7.13(2H, d, J = 8.7 Hz), 7.20-7.38(5H, m), 7.43(2H, d, J = 8.7 Hz), 7.71 (1H, brs), 7.78(2H, d, J = 9.0 Hz), 8.20-8.30(2H, m).
1223	1-naphthyl	benzyl	free	(DMSO-d_6) 2.41(4H, brs), 3.51(4H, brs), 3.52 (2H, s), 7.17(3H, d, J = 8.7 Hz), 7.21-7.38(5H, m), 7.44(2H, d, J = 8.7 Hz), 7.55-7.69(3H, m), 7.80(1H, d, J = 6.4 Hz), 7.98-8.06(1H, m), 8.10 (1H, d, J = 8.1 Hz), 8.18-8.27(1H, m), 8.32(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.58(1H, d, J = 2.6 Hz), 10.76(1H, s).

Table 267



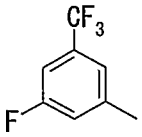
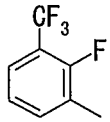
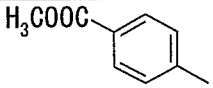
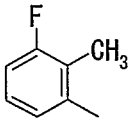
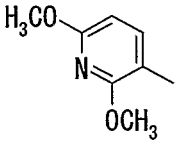
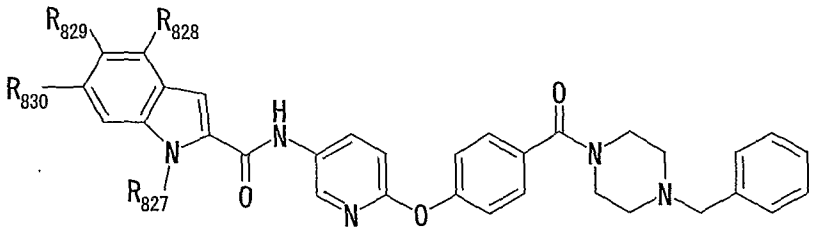
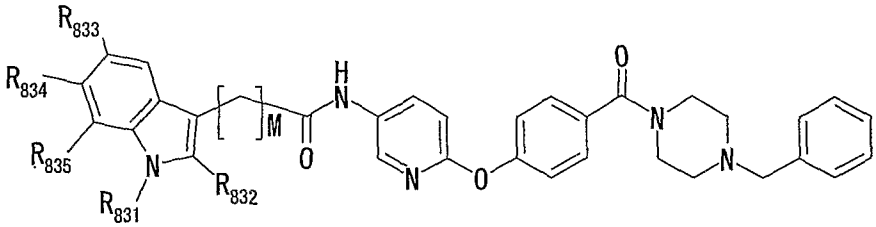
Example No.	R_{826}	Form	mp (°C)
1224		maleate	172-175
1225		maleate	143-146
1226		free	187-189
1227		free	191-192
1228		maleate	180-182
1229	2,5-$(CF_3)_2$Ph-	dihydrochloride	152-156
1230	2,5-F_2Ph-	maleate	182-184
1231	2,3-Cl_2Ph-	free	195-196
1232	3-PhOPh-	free	171-172
1233	3-CF_3Ph-	dihydrochloride	146-149

Table 268



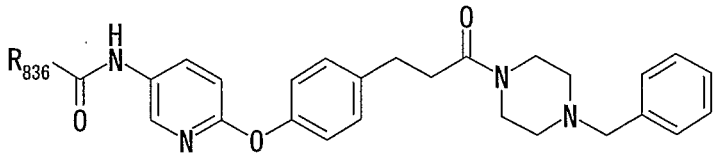
Example No.	R_{827}	R_{828}	R_{829}	R_{830}	MS (M^++H)
1234	-H	-H	-H	-H	532
1235	-H	-H	$-OCH_3$	-H	562
1236	-H	-H	-Cl	-H	566
1237	-H	-H	-F	-H	550
1238	$-CH_3$	-H	-H	-H	546
1239	-H	-H	-Br	-H	612
1240	-H	-H	$-CH_3$	-H	546
1241	-H	-H	$-OCF_3$	-H	616
1242	-H	$-OCH_3$	-H	-H	562
1243	-H	-Cl	-H	-H	566
1244	-H	-H	-H	$-OCH_3$	562
1245	-H	-Cl	-H	-Cl	600
1246	-H	-H	-H	-Cl	566
1247	-H	-H	$-OCH_3$	$-OCH_3$	592

Table 269



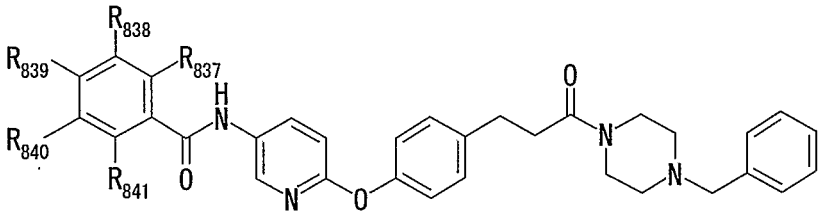
Example No.	R_{831}	R_{832}	R_{833}	R_{834}	R_{835}	M	MS (M^{+}+H)
1248	-H	-H	-H	-H	-H	0	532
1249	-H	-H	-H	-H	-H	2	560
1250	-H	-H	-H	-H	-H	1	546
1251	-H	-H	-Cl	-H	-H	1	580
1252	-H	$-CH_3$	-H	-H	-H	1	560
1253	-H	$-CH_3$	$-CH_3$	-H	-H	1	574
1254	-H	$-CH_3$	$-OCH_3$	-H	-H	1	590
1255	-H	$-CH_3$	-F	-H	-H	1	578
1256	-H	$-CH_3$	$-C(CH_3)_3$	-H	-H	1	616
1257	-H	$-CH_3$	$-CH_3$	-H	$-CH_3$	1	588
1258	-H	$-CH_3$	-Br	-H	-F	1	658
1259	-H	$-CH_3$	-H	-H	-F	1	578
1260	-H	$-CH_3$	$-C_2H_5$	-H	-H	1	588
1261	-H	-H	-F	-H	-H	1	564
1262	-H	-H	-H	-F	-H	1	564
1263	$-CH_3$	-H	-H	-H	-H	1	560
1264	-H	-H	$-OCH_3$	-H	-H	1	576
1265	-H	-H	-H	-H	$-CH_3$	1	560
1266	-H	-H	$-CH_3$	-H	-H	1	560
1267	-H	-H	-Br	-H	-H	1	626

Table 270



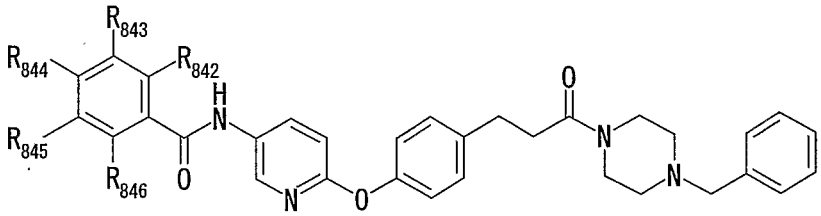
Example No.	R_{836}	^{1}H NMR (solvent) δppm
1268	3-CNPh-	($CDCl_3$) 2.37-2.44(4H, m), 2.57-2.63(2H, m), 2.88-2.95(2H, m), 3.42-3.45(2H, m), 3.55(2H, s), 3.60-3.64(2H, m), 6.90(1H, d, J = 8.9 Hz), 7.00(2H, d, J = 8.6 Hz), 7.16(2H, d, J = 8.6 Hz), 7.25-7.31(5H, m), 7.54-7.76(1H, m), 7.76-7.80(1H, m), 8.19-8.26(3H, m), 8.37(1H, d, J = 2.6 Hz), 9.41(1H, brs).
1269	2-CNPh-	($CDCl_3$) 2.35-2.45(4H, m), 2.60-2.66(2H, m), 2.95-3.01(2H, m), 3.40-3.44(2H, m), 3.52(2H, s), 3.63-3.67(2H, m), 7.05-7.13(3H, m), 7.23-7.32(8H, m), 7.69-7.80(3H, m), 7.93-7.96(2H, m), 8.23(1H, d, J = 2.5 Hz).
1270	3-N(CH_3)$_2$Ph-	($CDCl_3$) 2.35-2.44(4H, m), 2.57-2.62(2H, m), 2.91-2.98(8H, m), 3.39-3.43(2H, m), 3.53(2H, s), 3.62-3.65(2H, m), 6.84-6.92(2H, m), 7.02(2H, d, J = 8.6 Hz), 7.11(1H, d, J = 7.9 Hz), 7.19(2H, d, J = 8.6 Hz), 7.25-7.35(7H, m), 8.22-8.37 (3H, m).
1271	3-CH_3Ph-	($CDCl_3$) 2.36-2.46(7H, m), 2.57-2.63(2H, m), 2.91-2.97(2H, m), 3.40-3.44(2H, m), 3.56(2H, s), 3.62-3.66(2H, m), 6.91(1H, d, J = 8.9 Hz), 7.00-7.05(2H, m), 7.19(2H, d, J = 8.6 Hz), 7.25-7.35(7H, m), 7.66-7.71(2H, m), 8.23-8.31(2H, m), 8.43(1H, brs).
1272	3,4-(CH_3)$_2$Ph-	($CDCl_3$) 2.31(3H, s), 2.32(3H, s), 2.36-2.46(4H, m), 2.58-2.64(2H, m), 2.92-2.98 (2H, m), 3.41-3.44(2H, m), 3.56(2H, s), 3.63-3.67(2H, m), 6.90-6.94(1H, m), 7.03(2H, d, J = 8.4 Hz), 7.19-7.37(8H, m), 7.58-7.73(2H, m), 8.21-8.28(3H, m).
1273	2-FPh-	(DMSO-d_6) 2.28-2.31(4H, m), 2.59-2.64(2H, m), 2.78-2.84(2H, m), 3.44-3.47 (6H, m), 7.01(2H, d, J = 8.4 Hz), 7.02-7.05(1H, m), 7.26(2H, d, J = 8.4 Hz), 7.31-7.40(7H, m), 7.51-7.61(1H, m), 7.64-7.72(1H, m), 8.18(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.45(1H, d, J = 2.5 Hz), 10.54(1H, brs).
1274	3-FPh-	(DMSO-d_6) 2.30(4H, brs), 2.62(2H, brs), 2.81(2H, brs), 3.47(6H, brs), 7.03(3H, brs), 7.25-7.30(7H, m), 7.47(1H, brs), 7.60(1H, d, J = 6.1 Hz), 7.77-7.81(2H, m), 8.20(1H, d, J = 7.6 Hz), 8.49(1H, brs), 10.46(1H, brs).
1275	4-FPh-	(DMSO-d_6) 2.28-2.30(4H, m), 2.58-2.64(2H, m), 2.77-2.83(2H, m), 3.43-3.46 (6H, m), 7.00(2H, d, J = 8.6 Hz), 7.02(1H, d, J = 8.7 Hz), 7.25(2H, d, J = 8.6 Hz), 7.29-7.40(7H, m), 8.01-8.06(2H, m), 8.18(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.46(1H, d, J = 2.5 Hz), 10.39(1H, brs).
1276	4-AcPh-	(DMSO-d_6) 2.28-2.32(4H, m), 2.59-2.65(5H, m), 2.79-2.84(2H, m), 3.44-3.47 (6H, m), 6.99-7.06(3H, m), 7.27-7.36(7H, m), 8.09(4H, brs), 8.21(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.50(1H, d, J = 2.6 Hz), 10.56(1H, brs).
1277	3,4-F_2Ph-	(DMSO-d_6) 2.28-2.32(4H, m), 2.59-2.65(2H, m), 2.79-2.84(2H, m), 3.44-3.47 (6H, m), 7.01(2H, d, J = 8.4 Hz), 7.04(1H, d, J = 8.7 Hz), 7.27(2H, d, J = 8.4 Hz), 7.31-7.36(5H, m), 7.59-7.69(1H, m), 7.85-7.89(1H, m), 8.00-8.07(1H, m), 8.18(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.46(1H, d, J = 2.5 Hz), 10.46(1H, brs).

Table 271



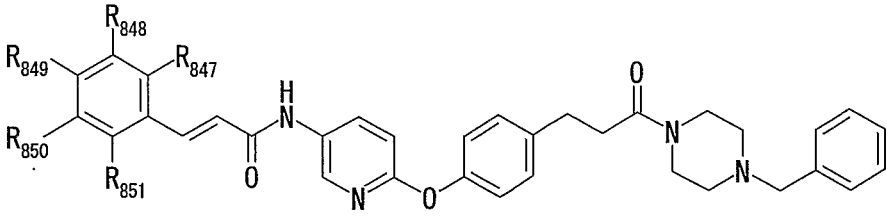
Example No.	R_{837}	R_{838}	R_{839}	R_{840}	R_{841}	^{1}H NMR (solvent) δppm or MS
1278	-H	-F	-H	-F	-H	^{1}H NMR (DMSO-d_6) 2.29-2.32(4H, m), 2.59-2.65(2H, m), 2.79-2.85(2H, m), 3.44-3.48(6H, m), 7.00-7.06(3H, m), 7.25-7.36(7H, m), 7.51-7.59(1H, m), 7.67-7.71(2H, m), 8.19(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.48(1H, d, J = 2.5 Hz), 10.51(1H, brs).
1279	-H	-H	$-SO_2NH_2$	-H	-H	^{1}H NMR (DMSO-d_6) 2.25-2.35(4H, m), 2.60-2.66(2H, m), 2.74-2.85(2H, m), 3.31 (2H, s), 3.40-3.50(4H, m), 7.00-7.06(3H, m), 7.25-7.34(7H, m), 7.53(2H, s), 7.97 (2H, d, J = 8.6 Hz), 8.12(2H, d, J = 8.6 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.49 (1H, d, J = 2.7 Hz), 10.56(1H, s).
1280	-H	-H	-NHAc	-H	-H	MS 576(M^+-1)
1281	-F	-H	$-CF_3$	-H	-H	MS 607(M^++H)
1282	$-COOC_2H_5$	-H	-H	-H	-H	MS 593(M^++1)
1283	-Cl	-Cl	-H	-H	-H	MS 590(M^++2)
1284	-H	-H	$-COOCH_3$	-H	-H	MS 579(M^++H)
1285	$-OCH_3$	-H	$-OCH_3$	-H	-H	MS 580(M^+)
1286	-Cl	-H	-Cl	-H	-H	MS 589(M^+)
1287	$-CH_3$	-H	$-CH_3$	-H	-H	MS 548(M^+)
1288	-F	-H	-F	-H	-H	MS 557(M^++H)
1289	-H	$-OCH_3$	$-OCH_3$	-H	-H	MS 580(M^+)
1290	$-CF_3$	-H	-H	-H	-H	MS 589(M^++1)
1291	-H	$-CF_3$	-H	-H	-H	MS 588(M^+)
1292	-H	$-COOCH_3$	-H	-H	-H	MS 579(M^++1)
1293	-F	-H	-H	-H	-F	MS 557(M^++1)
1294	-F	-F	-H	-H	-H	MS 557(M^++H)
1295	$-CF_3$	-H	-H	$-CF_3$	-H	MS 656(M^+)
1296	-H	-F	-H	$-CF_3$	-H	MS 606(M^+)
1297	-F	$-CF_3$	-H	-H	-H	MS 607(M^++H)
1298	-F	-H	-H	$-CF_3$	-H	MS 607(M^++1)
1299	$-CH_3$	-H	-H	$-CH_3$	-H	MS 549(M^++1)
1300	-F	-H	-H	-F	-H	MS 557(M^++H)
1301	-Cl	-H	-F	-H	-H	MS 572(M^+)
1302	-H	-OAc	-H	-H	-H	MS 579(M^++1)
1303	$-OCF_3$	-H	-H	-H	-H	MS 604(M^+)

Table 272



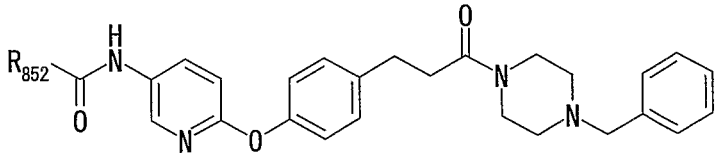
Example No.	R_{842}	R_{843}	R_{844}	R_{845}	R_{846}	^{1}H NMR or MS
1304	-H	-CF_3	-F	-H	-H	MS 607(M^++1)
1305	-OCH_3	-H	-H	-OCH_3	-H	MS 580(M^+)
1306	-Cl	-H	-H	-Cl	-H	MS 590(M^++1)
1307	-CH_3	-H	-H	-F	-H	MS 552(M^+)
1308	-$N(CH_3)_2$	-H	-H	-H	-H	MS 564(M^++H)
1309	-OCH_3	-H	-H	-H	-OCH_3	MS 581(M^++H)
1310	-H	-OPh	-H	-H	-H	MS 613(M^++H)
1311	-H	-OCH_3	-H	-OCH_3	-H	MS 581(M^++H)
1312	-H	-Cl	-H	-Cl	-H	MS 589(M^++H)
1313	-H	-CH_3	-H	-CH_3	-H	MS 549(M^++H)
1314	-OCH_3	-OCH_3	-H	-H	-H	MS 581(M^++H)
1315	-CH_3	-CH_3	-H	-H	-H	MS 549(M^++H)
1316	-CH_3	-F	-H	-H	-H	MS 553(M^++H)
1317	-H	-H	-$N(CH_3)_2$	-H	-H	MS 564(M^++H)
1318	-H	-CF_3	-H	-CF_3	-H	MS 656(M^+)
1319	-Cl	-H	-H	-CF_3	-H	MS 622(M^+)
1320	-H	-CH_3	-NHAc	-H	-H	MS 591(M^+)
1321	-H	-Cl	-NHAc	-H	-H	MS 611(M^+)
1322	-H	-OCH_3	-NHAc	-H	-H	MS 607(M^+)
1323	-H	-NHAc	-CH_3	-H	-H	MS 591(M^+)
1324	-H	-NHAc	-Cl	-H	-H	MS 611(M^+)
1325	-H	-NHAc	-OCH_3	-H	-H	MS 607(M^+)
1326	-H	-NHAc	-F	-H	-H	MS 595(M^+)
1327	-H	-CH_3	-NHCOPh	-H	-H	MS 653(M^+)
1328	-H	-Cl	-NHCOPh	-H	-H	MS 673(M^+)
1329	-H	-OCH_3	-NHCOPh	-H	-H	MS 669(M^+)
1330	-H	-NHCOPh	-CH_3	-H	-H	MS 653(M^+)
1331	-H	-NHCOPh	-Cl	-H	-H	MS 673(M^+)
1332	-H	-NHCOPh	-OCH_3	-H	-H	MS 669(M^+)
1333	-H	-NHCOPh	-F	-H	-H	MS 657(M^+)
1334	-COOH	-H	-Cl	-Cl	-H	^{1}H NMR (DMSO-d_6) δ 2.42(4H, brs), 2.62(2H, t, J = 7.1 Hz), 2.81(2H, t, J = 7.1 Hz), 3.33(1H, brs), 3.47(4H, brs), 3.60(2H, s), 7.00(2H, d, J = 8.6 Hz), 7.02(1H, d, J = 4.7 Hz), 7.26(2H, d, J = 8.6 Hz), 7.28-7.38(5H, m), 7.94(1H, s), 8.05(1H, s), 8.10(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.36(1H, d, J = 2.8 Hz), 10.68(1H, s).

Table 273



Example No.	R_{847}	R_{848}	R_{849}	R_{850}	R_{851}	MS
1335	-H	-H	-H	-H	-H	546(M^+)
1336	-H	$-OCH_3$	-H	-H	-H	577(M^++H)
1337	-Cl	-H	-H	-H	-H	581(M^++H)
1338	-H	-Cl	-H	-H	-H	581(M^++H)
1339	-H	-H	-Cl	-H	-H	581(M^++H)
1340	-F	-H	-H	-H	-H	565(M^++H)
1341	-H	-F	-H	-H	-H	565(M^++H)
1342	-H	-H	-F	-H	-H	565(M^++H)
1343	-H	-H	$-N(CH_3)_2$	-H	-H	590(M^++1)
1344	-H	$-OCH_3$	$-OCH_3$	-H	-H	606(M^+)
1345	-Cl	-H	-H	-H	-Cl	615(M^++1)
1346	-H	-Cl	-Cl	-H	-H	615(M^++H)
1347	-F	-H	-H	-H	-F	583(M^++H)
1348	-H	-F	-H	-F	-H	583(M^++H)
1349	-H	$-OCH_2O-$		-H	-H	591(M^++H)
1350	-H	$-OCH_3$	-H	$-OCH_3$	-H	607(M^++H)
1351	-H	-H	$-CH_3$	-H	-H	561(M^++H)
1352	-H	$-CF_3$	-H	-H	-H	615(M^++H)
1353	-H	-H	$-OCH_3$	-H	-H	577(M^++1)
1354	$-OCH_3$	$-OCH_3$	-H	-H	-H	606(M^+)
1355	$-OCH_3$	-H	-H	$-OCH_3$	-H	607(M^++1)
1356	-H	$-OCH_3$	$-OCH_3$	$-OCH_3$	-H	637(M^++1)

Table 274



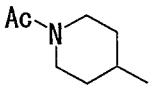
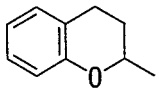
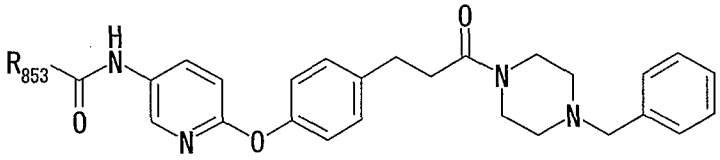
Example No.	R_{852}	^{1}H NMR (solvent) δppm
1357		($CDCl_3$) 1.68-1.86(2H, m), 1.91-2.03(2H, m), 2.12(3H, s), 2.34-2.40(2H, m), 2.40-2.46(2H, m), 2.48-2.56(1H, m), 2.62(2H, t, J = 7.9 Hz), 2.66-2.75(1H, m), 2.96(2H, t, J = 7.9 Hz), 3.08-3.18(1H, m), 3.38-3.45(2H, m), 3.51(2H, s), 3.59-3.69(2H, m), 3.88-3.97(1H, m), 4.59-4.69(1H, m), 6.89(1H, d, J = 9.7 Hz), 7.02(2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.25-7.31(1H, m), 7.31-7.38(4H, m), 7.54(1H, brs), 8.08-8.16(2H, m).
1358		($CDCl_3$) 2.05-2.18(1H, m), 2.32-2.40(2H, m), 2.40-2.47(2H, m), 2.49-2.56 (1H, m), 2.63(2H, t, J = 7.9 Hz), 2.80-2.90(1H, m), 2.90-3.02(3H, m), 3.36-3.46(2H, m), 3.51(2H, s), 3.60-3.70(2H, m), 4.64-4.70(1H, m), 6.88-7.02(3H, m), 7.04(2H, d, J = 8.4 Hz), 7.09-7.15(1H, m), 7.15-7.22(1H, m), 7.22-7.25(1H, m), 7.25-7.30(2H, m), 7.30-7.38(4H, m), 8.14(1H, dd, J = 8.8, 2.8 Hz), 8.25(1H, d, J = 2.8 Hz), 8.54(1H, brs).
1359	$-CH_2OCH_3$	($CDCl_3$) 2.30-2.38(2H, m), 2.38-2.45(2H, m), 2.62(2H, t, J = 7.9 Hz), 2.96 (2H, t, J = 7.9 Hz), 3.35-3.43(2H, m), 3.50(2H, s), 3.52(3H, s), 3.58-3.68(2H, m), 4.04(2H, s), 6.90(1H, d, J = 8.8 Hz), 7.03(2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.25-7.29(1H, m), 7.29-7.37(4H, m), 8.14(1H, dd, J = 8.8, 2.8 Hz), 8.18-8.25(2H, m).
1360	$-CH_3$	($CDCl_3$) 2.18(3H, s), 2.32-2.39(2H, m), 2.39-2.45(2H, m), 2.61(2H, t, J = 7.9 Hz), 2.95(2H, t, J = 7.9 Hz), 3.36-3.44(2H, m), 3.50(2H, s), 3.60-3.68(2H, m), 6.85-6.92(1H, m), 7.02(2H, d, J = 8.4 Hz), 7.21(2H, d, J = 8.4 Hz), 7.25-7.30(1H, m), 7.30-7.35(4H, m), 7.38(1H, brs), 8.06-8.15(2H, m).
1361	$-C(CH_3)_3$	($CDCl_3$) 1.32(9H, s), 2.32-2.38(2H, m), 2.38-2.44(2H, m), 2.62(2H, t, J = 7.9 Hz), 2.96(2H, t, J = 7.9 Hz), 3.37-3.43(2H, m), 3.50(2H, s), 3.60-3.69(2H, m), 6.87(1H, d, J = 9.8 Hz), 7.02(2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.25-7.30(1H, m), 7.30-7.37(5H, m), 8.07-8.15(2H, m).
1362	$-(CH_2)_2OPh$	(DMSO-d_6) 2.23-2.33(4H, m), 2.56-2.67(2H, m), 2.73-2.86(4H, m), 3.37-3.50(6H, m), 4.26(2H, t, J = 6.0 Hz), 6.90-6.96(3H, m), 6.96-7.02(3H, m), 7.20-7.35(9H, m), 8.07(1H, dd, J = 8.8, 2.7 Hz), 8.33(1H, d, J = 2.7 Hz), 10.23(1H, s).
1363	$3-CH_3OPhOCH_2-$	(DMSO-d_6) 2.23-2.34(4H, m), 2.58-2.68(2H, m), 2.76-2.85(2H, m), 3.38-3.50(6H, m), 3.74(3H, s), 4.68(2H, s), 6.51-6.62(3H, m), 6.95-7.04(3H, m), 7.18-7.28(4H, m), 7.28-7.37(4H, m), 8.09(1H, dd, J = 8.9, 2.7 Hz), 8.36 (1H, d, J = 2.7 Hz), 10.22(1H, s).
1364	$3-CH_3PhOCH_2-$	(DMSO-d_6) 2.23-2.34(7H, m), 2.56-2.66(2H, m), 2.74-2.84(2H, m), 3.37-3.50(6H, m), 4.67(2H, s), 6.75-6.81(2H, m), 6.81-6.88(1H, m), 6.96-7.03(3H, m), 7.14-7.21(1H, m), 7.21-7.28(3H, m), 7.28-7.36(4H, m), 8.09(1H, dd, J = 8.9, 2.7 Hz), 8.36(1H, d, J = 2.7 Hz), 10.21(1H, s).
1365	$4-CH_3PhOCH_2-$	(DMSO-d_6) 2.23(3H, s), 2.26-2.32(4H, m), 2.57-2.65(2H, m), 2.73-2.83(2H, m), 3.36-3.50(6H, m), 4.65(2H, s), 6.90(2H, d, J = 8.5 Hz), 6.95-7.02(3H, m), 7.11(2H, d, J = 8.5 Hz),7.20-7.29(3H, m), 7.29-7.35(4H, m), 8.08(1H, dd, J = 8.9, 2.7 Hz), 8.36(1H, d, J = 2.7 Hz), 10.21(1H, s).

Table 275



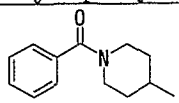
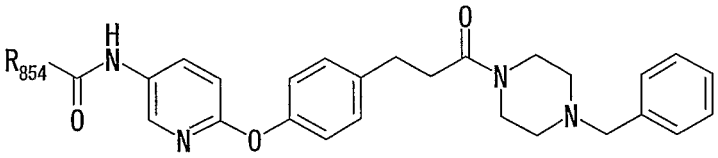
Example No.	R_{853}	^{1}H NMR (DMSO-d_6) δppm or MS
1366	$PhOCH_2$-	^{1}H NMR 2.23-2.34(4H, m), 2.57-2.65(2H, m), 2.76-2.85(2H, m), 3.38-3.50(6H, m), 4.70(2H, s), 6.92-7.05(6H, m), 7.20-7.27(3H, m), 7.27-7.38(6H, m), 8.09(1H, dd, J = 8.9, 2.7 Hz), 8.36(1H, d, J = 2.7 Hz), 10.24(1H, s).
1367	4-CH_3PhCH_2-	^{1}H NMR 2.21-2.32(7H, m), 2.56-2.65(2H, m), 2.73-2.82(2H, m), 3.37-3.49(6H, m), 3.58(2H, s), 6.92-7.00(3H, m), 7.09-7.16(2H, m), 7.19-7.21(2H, m), 7.21-7.27(3H, m), 7.27-7.35(4H, m), 8.04(1H, dd, J = 8.9, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 10.27(1H, s).
1368	4-$ClPhCH_2$-	^{1}H NMR 2.21-2.32(4H, m), 2.55-2.65(2H, m), 2.73-2.82(2H, m), 3.38-3.49(6H, m), 3.66(2H, s), 6.93-7.00(3H, m), 7.20-7.26(3H, m), 7.26-7.35(6H, m), 7.35-7.42(2H, m), 8.04(1H, dd, J = 8.9, 2.7 Hz), 8.30 (1H, d, J = 2.7 Hz), 10.33(1H, s).
1369	4-CH_3OPhCH_2-	^{1}H NMR 2.22-2.33(4H, m), 2.56-2.65(2H, m), 2.75-2.83(2H, m), 3.38-3.50(6H, m), 3.56(2H, s), 3.73(3H, s), 6.84-6.90(2H, m), 6.92-7.00 (3H, m), 7.19-7.28(5H, m), 7.28-7.36(4H, m), 8.04(1H, dd, J = 8.9, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 10.25(1H, s).
1370	4-$FPhCH_2$-	^{1}H NMR 2.23-2.32(4H, m), 2.56-2.65(2H, m), 2.75-2.84(2H, m), 3.39-3.50(6H, m), 3.64(2H, s), 6.93-7.00(3H, m), 7.11-7.19(2H, m), 7.21-7.29(3H, m), 7.29-7.40(6H, m), 8.04(1H, dd, J = 8.9, 2.7 Hz), 8.30 (1H, d, J = 2.7 Hz), 10.31(1H, s).
1371	benzyl	^{1}H NMR 2.22-2.33(4H, m), 2.56-2.67(2H, m), 2.72-2.84(2H, m), 3.37-3.50(6H, m), 3.64(2H, s), 6.90-7.00(3H, m), 7.20-7.29(4H, m), 7.29-7.38(8H, m), 8.05(1H, dd, J = 8.8, 2.7 Hz), 8.31(1H, d, J = 2.7 Hz), 10.32(1H, s).
1372	-$(CH_2)_3Ph$	MS 563(M^++1)
1373	-$(CH_2)_2CH_3$	MS 487(M^++1)
1374	-$CH(CH_3)_2$	MS 486(M^+)
1375	cyclopentyl	MS 512(M^+)
1376		MS 630(M^+)
1377	-$(CH_2)_2Ph$	MS 549(M^++H)
1378	2-furyl	MS 511(M^++H)
1379	2-thienyl	MS 527(M^++H)
1380	2-thenyl	MS 541(M^++H)
1381	cyclohexyl	MS 527(M^++H)
1382	cycloheptyl	MS 541(M^++H)
1383	cyclopentylmethyl	MS 527(M^++H)
1384	cyclohexylmethyl	MS 541(M^++H)
1385	2-$CH_3OPhOCH_2$-	MS 581(M^++1)

Table 276



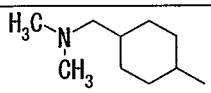
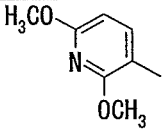
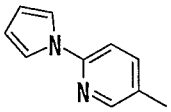
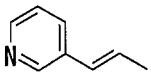
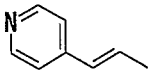
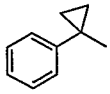
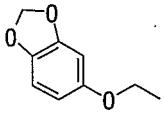
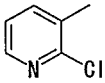
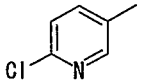
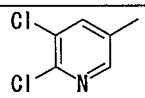
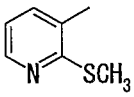
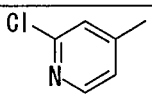
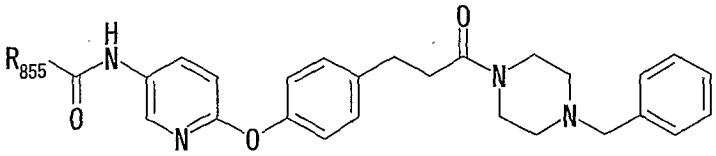
Example No.	R_{854}	MS
1386		584(M^{+}+1)
1387		582(M^{+}+1)
1388		587(M^{+}+H)
1389		547(M^{+})
1390		547(M^{+})
1391		561(M^{+}+1)
1392	2-CH_3PhOCH_2-	565(M^{+}+H)
1393	2-$ClPhOCH_2$-	585(M^{+})
1394	3-$ClPhOCH_2$-	585(M^{+}+H)
1395	4-$CNPhOCH_2$-	575(M^{+})
1396		595(M^{+}+H)
1397	3,4,5-$(CH_3O)_3PhOCH_2$-	641(M^{+}+1)
1398		556(M^{+}+1)
1399		556(M^{+}+H)
1400		590(M^{+}+H)
1401		567(M^{+})
1402		556(M^{+})

Table 277



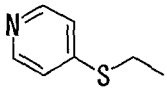
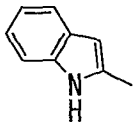
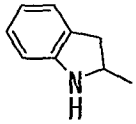
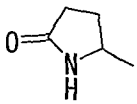
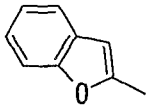
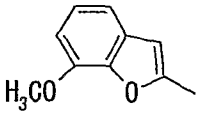
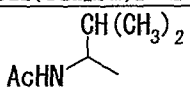
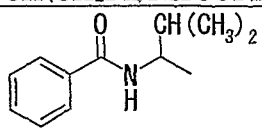
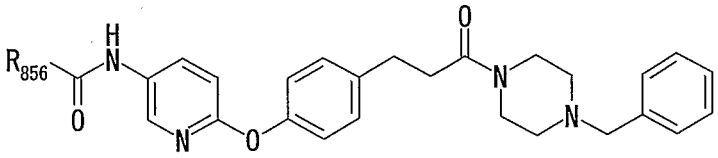
Example No.	R_{855}	MS
1403		566(M^{+}-1)
1404		559(M^{+})
1405		562(M^{+}+H)
1406		528(M^{+}+1)
1407	2-quinolyl	571(M^{+})
1408	3-quinolyl	572(M^{+}+H)
1409	4-quinolyl	571(M^{+})
1410	6-quinolyl	571(M^{+})
1411	1-isoquinolyl	571(M^{+})
1412	3-isoquinolyl	572(M^{+}+H)
1413		560(M^{+})
1414		590(M^{+})
1415	3,4-Cl_2PhCH_2-	603(M^{+}+H)
1416	2-CH_3OPhCH_2-	564(M^{+})
1417	-$CH(CH_2Ph)NHAc$	605(M^{+})
1418		557(M^{+})
1419	-CH_2NHAc	515(M^{+})
1420	-$CH(CH_3)NHAc$	529(M^{+})
1421	-$CH(CH_2Ph)NHCOPh$	667(M^{+})
1422		619(M^{+})
1423	-$CH_2NHCOPh$	577(M^{+})

Table 278



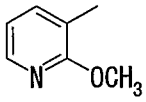
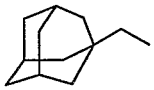
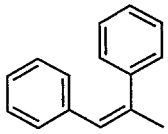
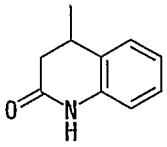
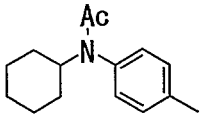
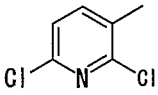
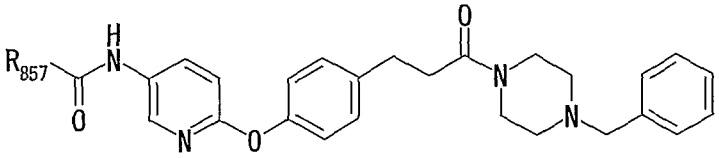
Example No.	R_{856}	MS
1424	-CH(CH$_3$)NHCOPh	591(M$^+$)
1425	2-pyridyl	522(M$^+$+H)
1426	3-pyridyl	522(M$^+$+H)
1427	4-pyridyl	522(M$^+$+H)
1428	1-naphthyl	571(M$^+$+H)
1429		551(M$^+$)
1430	2-pyrrolyl	509(M$^+$)
1431	3-pyridylmethyl	536(M$^+$+H)
1432	3-furyl	510(M$^+$)
1433	3-thienyl	526(M$^+$)
1434	3-thenyl	541(M$^+$+H)
1435		592(M$^+$)
1436	3-CH$_3$PhCH$_2$-	549(M$^+$+H)
1437	3-ClPhCH$_2$-	569(M$^+$+H)
1438	2-FPhCH$_2$-	553(M$^+$+H)
1439	3-FPhCH$_2$-	553(M$^+$+H)
1440	2,5-(CH$_3$O)$_2$PhCH$_2$-	594(M$^+$)
1441	2,4-Cl$_2$PhCH$_2$-	603(M$^+$+H)
1442	2,6-Cl$_2$PhCH$_2$-	602(M$^+$)
1443	3,4,5-(CH$_3$O)$_3$PhCH$_2$-	624(M$^+$)
1444	-CH(OCH$_3$)Ph	564(M$^+$)
1445		622(M$^+$)
1446		588(M$^+$+H)
1447		659(M$^+$)
1448		589(M$^+$)

Table 279



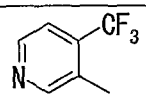
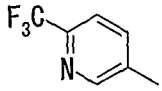
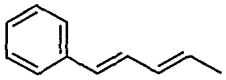
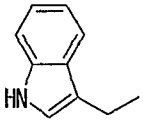
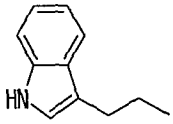
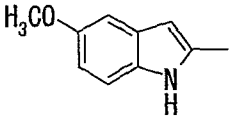
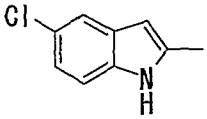
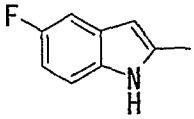
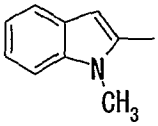
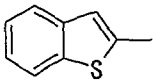
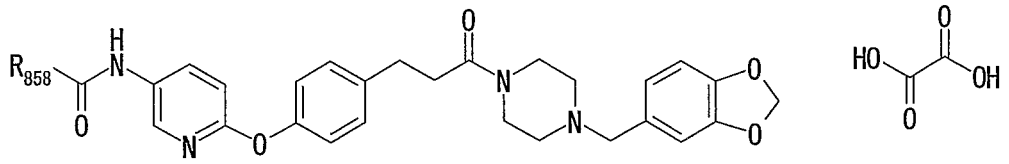
Example No.	R_{857}	MS
1449		589(M^+)
1450		590(M^++H)
1451		573(M^++H)
1452	4-$CH_3OPhO(CH_2)_2$-	595(M^++H)
1453	4-$CH_3OPh(CH_2)_2$-	579(M^++H)
1454	3,4,5-$(CH_3O)_3Ph(CH_2)_2$-	638(M^+)
1455	2,4-Cl_2PhOCH_2-	618(M^+)
1456	$PhSCH_2$-	567(M^++H)
1457	-$(CH_2)_2COPh$	577(M^++H)
1458		573(M^+)
1459		588(M^++H)
1460		590(M^++H)
1461		594(M^++H)
1462		578(M^++H)
1463		573(M^+)
1464	4-$CH_3OPh(CH_2)_3$-	593(M^++H)
1465		576(M^+)

Table 280



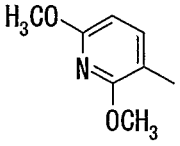
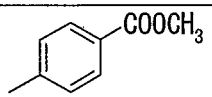
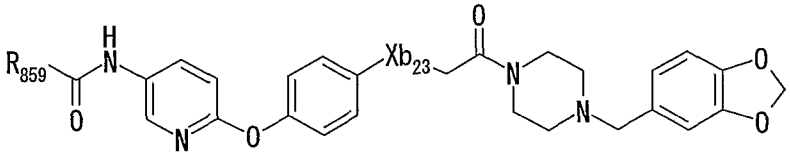
Example No.	R_{858}	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
1466	2,5-F_2Ph-	mp 173-176
1467		mp 181-182
1468		mp 199-201
1469	2,3-Cl_2Ph-	mp 149-151
1470	2,4-Cl_2Ph-	^{1}H NMR 2.54(4H, brs), 2.64(2H, t, J = 7.5 Hz), 2.81(2H, t, J = 7.5 Hz), 3.51 (4H, brs), 3.65(2H, brs), 6.01(2H, s), 6.81(1H, d, J = 8.0 Hz), 6.89(1H, d, J = 8.0 Hz), 6.92(1H, s), 7.01(2H, d, J = 8.5 Hz), 7.04(1H, d, J = 9.0 Hz), 7.26(2H, d, J = 8.5 Hz), 7.57(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.65(1H, d, J = 8.5 Hz), 7.78 (1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.41(1H, d, J = 2.5 Hz), 10.69(1H, s).
1471	2,5-$(CF_3)_2$Ph-	^{1}H NMR 2.54(4H, brs), 2.64(2H, t, J = 7.5 Hz), 2.81(2H, t, J = 7.5 Hz), 3.49 (4H, brs), 3.59(2H, brs), 6.00(2H, s), 6.79(1H, d, J = 8.0 Hz), 6.88(1H, d, J = 8.0 Hz), 6.90(1H, s), 7.02(2H, d, J = 8.5 Hz), 7.05(1H, d, J = 9.0 Hz), 7.27(2H, d, J = 8.5 Hz), 8.12-8.14(3H, m), 8.21(1H, s), 8.37(1H, d, J = 2.5 Hz), 10.84 (1H, s).
1472	3-CF_3Ph-	^{1}H NMR 2.54(4H, brs), 2.64(2H, t, J = 7.5 Hz), 2.82(2H, t, J = 7.5 Hz), 3.51 (4H, brs), 3.63(2H, brs), 6.01(2H, s), 6.81(1H, d, J = 8.0 Hz), 6.89(1H, d, J = 8.0 Hz), 6.92(1H, s), 7.02(2H, d, J = 8.5 Hz), 7.05(1H, d, J = 9.0 Hz), 7.27(2H, d, J = 8.5 Hz), 7.80(1H, t, J = 8.0 Hz), 7.99(1H, d, J = 8.0 Hz), 8.19(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.27(1H, d, J = 8.0 Hz), 8.30(1H, s), 8.48(1H, d, J = 2.5 Hz), 10.61(1H, s).
1473	2,3-F_2Ph-	^{1}H NMR 2.54(4H, brs), 2.64(2H, t, J = 7.5 Hz), 2.81(2H, t, J = 7.5 Hz), 3.51 (4H, brs), 3.62(2H, brs), 6.01(2H, s), 6.80(1H, d, J = 8.0 Hz), 6.89(1H, d, J = 8.0 Hz), 6.92(1H, s), 7.02(2H, d, J = 8.5 Hz), 7.04(1H, d, J = 9.0 Hz), 7.26(2H, d, J = 8.5 Hz), 7.36(1H, m), 7.50(1H, m), 7.60(1H, m), 8.16(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.43(1H, d, J = 2.5 Hz), 10.67(1H, s).

Table 281



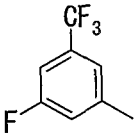
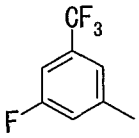
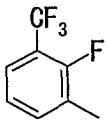
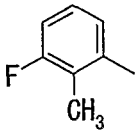
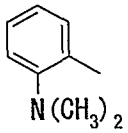
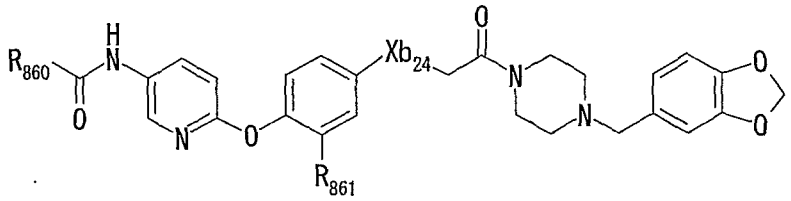
Example No.	R_{859}	Xb_{23}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1474		-N(Ac)-	free	mp 142-144
1475	3,4-F_2Ph-	-CH_2-	free	^{1}H NMR ($CDCl_3$) 2.31-2.40(4H, m), 2.59-2.65(2H, m), 2.92-2.98(2H, m), 3.38-3.41(4H, m), 3.60-3.64(2H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 6.94(1H, d, J = 8.9 Hz), 7.01-7.07(2H, m), 7.19-7.24(2H, m), 7.29-7.33 (1H, m), 7.62-7.68(1H, m), 7.74-7.81(1H, m), 8.01(1H, brs), 8.16-8.20(1H, m), 8.24(1H, d, J = 2.2 Hz).
1476		-CH_2-	hydro-chloride	^{1}H NMR (DMSO-d_6) 2.60-2.98(6H, m), 3.01-3.15(1H, m), 3.26(2H, t, J = 15.0 Hz), 3.46-3.59(1H, m), 4.00-4.11(1H, m), 4.15-4.27(2H, m), 4.30-4.51(1H, m), 6.05(2H, s), 6.97 (1H, d, J = 7.9 Hz), 6.98-7.09(4H, m), 7.20-7.31(3H, m), 7.97(1H, d, J = 8.4 Hz), 8.11-8.23(3H, m), 8.50(1H, d, J = 2.7 Hz), 10.78(1H, s), 11.38(1H, brs).
1477		-CH_2-	hydro-chloride	^{1}H NMR (DMSO-d_6) 2.60-2.99(6H, m), 3.01-3.17(1H, m), 3.25(2H, t, J = 15.0 Hz), 3.48-3.60(1H, m), 4.00-4.12(1H, m), 4.15-4.28(2H, m), 4.39-4.51(1H, m), 6.05(2H, s), 6.96 (1H, d, J = 8.8 Hz), 6.99-7.08(4H, m), 7.19-7.31(3H, m), 7.55(1H, t, J = 7.8 Hz), 7.90-8.04(2H, m), 8.16(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.43(1H, d, J = 2.7 Hz), 10.82(1H, s), 11.44(1H, brs).
1478		-CH_2-	hydro-chloride	mp 213-215
1479		-CH_2-	trihydro-chloride	^{1}H NMR (DMSO-d_6) 2.69-3.40(15H, m), 3.99-4.49(5H, m), 6.07(2H, s), 6.97-7.09(5H, m), 7.21-7.30(3H, m), 7.43-7.47(1H, m), 7.65-7.70(2H, m), 7.91(1H, d, J = 9.4 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.48(1H, d, J = 2.1 Hz), 11.23(1H, s).
1480	3-PhOPh-	-CH_2-	hydro-chloride	^{1}H NMR (DMSO-d_6) 2.60-3.09(7H, m), 3.18-3.31(2H, m), 3.38-3.50(1H, m), 4.08(1H, d, J = 14.0 Hz), 4.22(2H, brs), 4.45(1H, d, J = 14.0 Hz), 6.07(2H, s), 6.90-7.08(7H, m), 7.15-7.26(5H, m), 7.44(2H, t, J = 7.9 Hz), 7.56(1H, t, J = 7.9 Hz), 7.61(1H, s), 7.79(1H, d, J = 7.6 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.45(1H, d, J = 2.6 Hz), 10.45(1H, s), 10.90-11.20(1H, m).

Table 282



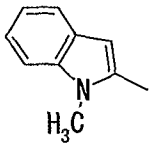
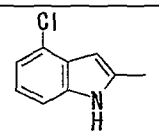
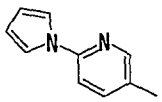
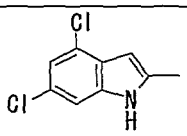
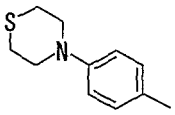
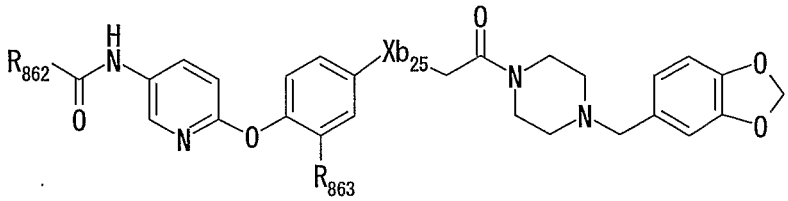
Example No.	R_{860}	R_{861}	Xb_{24}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1481	1-naphthyl	-H	$-CH_2-$	hydro-chloride	^{1}H NMR (DMSO-d_6) 2.50-3.60(10H, m), 4.00-4.20(1H, m), 4.22(2H, s), 4.35-4.51(1H, m), 6.07(2H, s), 6.91-7.08(2H, m), 7.04(2H, d, J = 8.6 Hz), 7.08(1H, d, J = 8.9 Hz), 7.21(1H, s), 7.39 (2H, d, J = 8.6 Hz), 7.55-7.67(3H, m), 7.79(1H, d, J = 7.1 Hz), 7.98-8.05(1H, m), 8.10 (1H, d, J = 8.2 Hz), 8.16-8.22(1H, m), 8.26(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.54(1H, d, J = 2.5 Hz), 10.72(1H, s)
1482		$-CH_3$	$-N(CH_3)-$	free	^{1}H NMR ($CDCl_3$) 2.13(3H, s), 2.43(4H, t, J = 4.8 Hz), 3.01(3H, s), 3.44(2H, s), 3.45-3.56 (2H, m), 3.56-3.70(2H, m), 4.08(2H, s), 4.09 (3H, s), 5.95(2H, s), 6.51-6.60(2H, m), 6.72-6.76(2H, m), 6.82(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.92(1H, d, J = 8.4 Hz), 7.04(1H, s), 7.14-7.23(1H, m), 7.28-7.40(1H, m), 7.42 (1H, d, J = 7.9 Hz), 7.67(1H, d, J = 7.9 Hz), 7.94(1H, s), 8.14(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.8 Hz).
1483	3,5-$(CH_3)_2$Ph-	-H	$-CH_2-$	hydro-chloride	H NMR (DMSO-d_6) 2.36(6H, s), 2.60-3.60 (10H, m), 4.00-4.60(2H, m), 4.29(2H, s), 6.07 (2H, s), 6.85-7.10(5H, m), 7.22(2H, s), 7.27 (2H, d, J = 8.5 Hz), 7.57(2H, s), 8.19 (1H, dd, J = 8.9 Hz, 2.7 Hz), 8.48 (1H, d, J = 2.7 Hz), 10.34(1H, s).
1484		$-CH_3$	$-N(CH_3)-$	free	mp 143-144
1485		$-CH_3$	$-N(CH_3)-$	free	mp 163-165
1486		$-CH_3$	$-N(CH_3)-$	free	mp 224-227 dec
1487		$-CH_3$	$-N(CH_3)-$	free	mp 131-134

Table 283



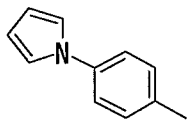
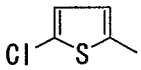
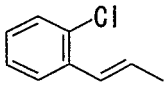
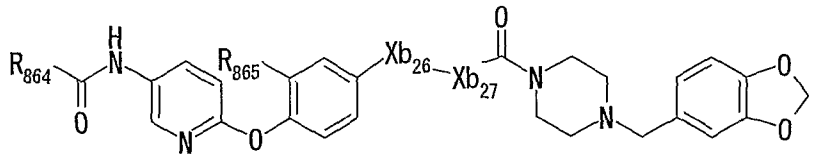
Example No.	R_{862}	R_{863}	Xb_{25}	Form	^{1}H NMR (solvent) δppm
1488	2,3-$(CH_3O)_2$Ph-	-H	-CH_2-	hydro-chloride	(DMSO-d_6) 3.80(3H, s), 3.86(3H, s), 2.60-3.60(10H, m), 4.00-4.20(1H, m), 4.22(2H, s), 4.40-4.55(1H, m), 6.07(2H, s), 6.90-7.30(11H, m), 8.18(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.45(1H, d, J = 2.6 Hz), 10.37(1H, s).
1489		-CH_3	-N(CH_3)-	free	($CDCl_3$) 2.12(3H, s), 2.35-2.50(4H, m), 3.01(3H, s), 3.43(2H, s), 3.45-3.55(2H, m), 3.57-3.70(2H, m), 4.07 (2H, s), 5.95(2H, s), 6.40(2H, t, J = 2.2 Hz), 6.50-6.5 9(2H, m), 6.74(2H, s), 6.81(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.92(1H, d, J = 8.6 Hz), 7.17(2H, t, J = 2.2 Hz), 7.49(2H, d, J = 8.8 Hz), 7.90(1H, brs), 7.95(2H, d, J = 8.8 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.22(1H, d, J = 2.3 Hz).
1490		-CH_3	-N(CH_3)-	free	($CDCl_3$) 2.04(3H, s), 2.39-2.46(4H, m), 2.94(3H, s), 3.43-3.51(4H, m), 3.59-3.63(2H, m), 4.05(2H, s), 5.94 (2H, s), 6.41-6.48(2H, m), 6.67-6.84(6H, m), 7.44(1H, d, J = 4.1 Hz), 8.01(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.17 (1H, d, J = 2.6 Hz), 8.82(1H, brs).
1491		-CH_3	-N(CH_3)-	maleate	(DMSO-d_6) 2.01(3H, s), 2.50(4H, brs), 2.93(3H, s), 3.33(4H, brs), 4.03(2H, s), 4.29(2H, s), 6.06(2H, s), 6.10(2H, s), 6.48(1H, dd, J = 8.9 Hz, 2.8 Hz), 6.56(1H, s), 6.81-7.01(6H, m), 7.43-7.53(2H, m), 7.57(1H, dd, J = 5.9 Hz, 3.6 Hz), 7.77(1H, dd, J = 5.8 Hz, 3.6 Hz), 7.88(1H, d, J = 15.7 Hz), 8.11(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.36(1H, d, J = 2.6 Hz), 10.42(1H, s).
1492	4-$(CH_3)_2$NPh-	-H	-CH_2-	free	($CDCl_3$) 2.33(2H, t, J = 5.0 Hz), 2.39(2H, t, J = 5.0 Hz), 2.61(2H, t, J = 7.5 Hz), 2.97(2H, t, J = 7.5 Hz), 3.05(6H, s), 3.32-3.45(2H, m), 3.41(2H, s), 3.63(2H, t, J = 5.0 Hz), 5.94(2H, s), 6.70(2H, d, J = 9.0 Hz), 6.74 (2H, s), 6.85(1H, s), 6.92(1H, d, J = 9.0 Hz), 7.04(2H, d, J = 8.6 Hz), 7.22(2H, d, J = 8.6 Hz), 7.72(1H, s), 7.78(2H, d, J = 9.0 Hz), 8.21(1H, d, J = 2.8 Hz), 8.23 (1H, dd, J = 8.6 Hz, 2.8 Hz).
1493	2,4-Cl_2PhOCH_2-	-CH_3	-N(CH_3)-	free	($CDCl_3$) 2.11(3H, s), 2.42(4H, brs), 3.00(3H, s), 3.43 (2H, s), 3.49(2H, brs), 3.63(2H, brs), 4.07(2H, s), 4.62 (2H, s), 5.94(2H, s), 6.54(1H, dd, J = 11.1 Hz, 2.3 Hz), 6.74-6.92(6H, m), 7.24(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.43(1H, d, J = 2.5 Hz), 8.06(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.23(1H, d, J = 2.6 Hz), 8.55(1H, s).

Table 284



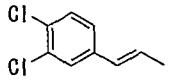
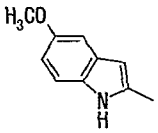
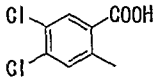
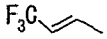
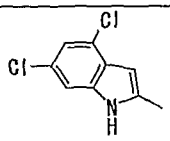
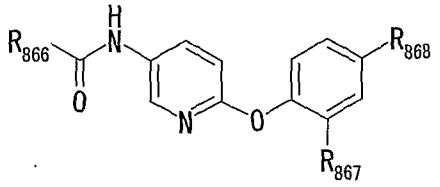
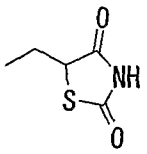
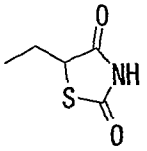
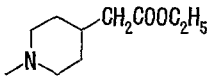
Example No.	R_{864}	R_{865}	Xb_{26}	Xb_{27}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1494		$-CH_3$	$-N(CH_3)-$	$-CH_2-$	free	^{1}H NMR ($CDCl_3$) 2.10(3H, s), 2.45(4H, brs), 3.01(3H, s), 3.45(2H, s), 3.51 (2H, brs), 3.64(2H, brs), 4.08(2H, s), 5.95 (2H, s), 6.51-6.59(3H, m), 6.75-6.92 (5H, m), 7.33(1H, d, J = 8.3 Hz), 7.45 (1H, d, J = 8.4 Hz), 7.61-7.76(3H, m), 8.16(1H, d, J = 8.9 Hz), 8.18(1H, s).
1495		$-CH_3$	$-N(CH_3)-$	$-CH_2-$	free	^{1}H NMR ($CDCl_3$) 2.09(3H, s), 2.34-2.48 (4H, m), 2.98(3H, s), 3.42(2H, s), 3.40-3.55(2H, m), 3.55-3.70(2H, m), 3.84(3H, s), 4.06(2H, s), 5.94(2H, s), 6.46-6.55(2H, m), 6.67-6.76(2H, m), 6.77(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.89(1H, d, J = 8.5 Hz), 6.93-6.98(1H, m), 6.97(1H, dd, J = 8.9 Hz, 2.3 Hz), 7.04(1H, d, J = 2.3 Hz), 7.30(1H, d, J = 8.9 Hz), 8.11(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.22(1H, s), 8.25(1H, d, J = 2.5 Hz), 9.45 (1H, s).
1496	$3,4-(CH_3)_2Ph-$	-H	$-CH_2-$	$-CH_2-$	free	^{1}H NMR ($CDCl_3$) 2.31-2.38(10H, m), 2.57-2.63(2H, m), 2.91-2.97(2H, m), 3.37-3.40(4H, m), 3.59-3.63(2H, m), 5.93(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 6.91(1H, d, J = 8.9 Hz), 7.00-7.05 (2H, m), 7.17-7.22(3H, m), 7.60(1H, dd, J = 7.8 Hz, 1.9 Hz), 7.66(1H, d, J = 1.9 Hz), 8.16-8.26(3H, m).
1497		-H	$-CH_2-$	$-CH_2-$	free	^{1}H NMR (DMSO-d_6) 2.41(4H, brs), 2.62 (2H, t, J = 7.5 Hz), 2.81(2H, t, J = 7.5 Hz), 3.32(1H, brs), 3.47(4H, brs), 3.52 (2H, s), 6.00(2H, s), 6.78(1H, d, J = 8.0 Hz), 6.87(1H, d, J = 8.0 Hz), 6.88(1H, d, J = 2.0 Hz), 7.00(2H, d, J = 8.5 Hz), 7.03(1H, d, J = 8.9 Hz), 7.26(2H, d, J = 8.5 Hz), 7.94(1H, s), 8.05(1H, s), 8.10 (1H, dd, J = 8.9 Hz, 2.6 Hz), 8.36(1H, d, J = 2.6 Hz), 10.72(1H, s).
1498		$-CH_3$	$-N(CH_3)-$	$-CH_2-$	hydro-chloride	mp 145.0 - 148.0
1499		$-CH_3$	$-N(CH_3)-$	-CO-	free	mp 269.0 - 272.0

Table 285



Example No.	R_{866}	R_{867}	R_{868}	Form	^{1}H NMR (solvent) δppm
1500	3,4-Cl_2Ph-	-CH_3		hydro-chloride	(DMSO-d_6) 2.08(3H, s), 3.09(1H, dd, J = 14.2 Hz, 9.7 Hz), 3.40(1H, dd, J = 14.2 Hz, 4.2 Hz), 4.93(1H, dd, J = 9.7 Hz, 4.2 Hz), 7.00(1H, d, J = 8.3 Hz), 7.02(1H, d, J = 8.9 Hz), 7.11(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.20 (1H, d, J = 2.0 Hz), 7.83(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.18 (1H, dd, J = 8.9 Hz, 2.5 Hz), 8.23(1H, d, J = 2.0 Hz), 8.44(1H, d, J = 2.5 Hz), 10.57 (1H, s), 12.08(1H, s).
1501	4-CF_3Ph-	-CH_3		free	(DMSO-d_6) 2.09(3H, s), 3.09(1H, dd, J = 14.1 Hz, 9.6 Hz), 3.40(1H, dd, J = 14.1 Hz, 4.3 Hz), 4.93(1H, dd, J = 9.6 Hz, 4.3 Hz), 6.99(1H, d, J = 8.2 Hz), 7.03(1H, d, J = 8.9 Hz), 7.12(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.20 (1H, d, J = 2.0 Hz), 7.93(2H, d, J = 8.2 Hz), 8.16(2H, d, J = 8.2 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.45(1H, d, J = 2.5 Hz), 10.60(1H, s), 12.07(1H, s).
1502	3-CF_3Ph-	-H		free	($CDCl_3$) 1.28(3H, t, J = 7.0 Hz), 1.46(2H, dq, J = 4.0 Hz, 12.5 Hz), 1.85(2H, brd, J = 12.5 Hz), 1.93(1H, m), 2.73(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.61(2H, brd, J = 12.0 Hz), 4.15(2H, q, J = 7.0 Hz), 6.90(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz), 7.03(2H, d, J = 9.0 Hz), 7.65(1H, t, J = 8.0 Hz), 7.83(1H, d, J = 8.0 Hz), 7.86(1H, brs), 8.07(1H, d, J = 8.0 Hz), 8.14(1H, brs), 8.18(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.27(1H, d, J = 2.5 Hz).

Example 1503

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

To a suspension of 1-(4-piperonylpiperazin-1-yl)-2-{methyl-[3-methyl-4-(5-nitropyridin-2-yloxy)phenyl]amino}ethanone (2.65 g, 5.10 mmol) in ethyl acetate (50 mL) was added 5% platinum-carbon (0.20 g) under a nitrogen atmosphere, and the resulting mixture was stirred for 11 hours under a hydrogen atmosphere. The platinum-carbon was separated off by filtration using Celite. To a solution of the resulting filtrate in ethyl acetate was added triethylamine (0.78 mL, 5.61 mmol) under ice cooling, and then to the resulting solution was added 4-(trifluoromethyl)benzoyl chloride (0.80 mL, 5.36 mmol). This reaction solution was stirred for 16 hours, and then added a saturated sodium bicarbonate solution. The resulting solution was stirred at room temperature, and after 20 minutes, extracted with ethyl acetate. The ethyl acetate layer was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was recrystallized from acetone-diethyl ether, to thereby yield 3.03 g of the title compound.

Appearance: Pale yellow powder

Melting point: 153.0-154.5°C; ^{1}H NMR ($CDCl_3$) δ 2.12(3H, s), 2.31-2.52(4H, m), 3.01(3H, s), 3.38-3.72(6H, m),

4.07(2H, s), 5.95(2H, s), 6.49-6.61(2H, m), 6.69-6.78(2H, m), 6.79-6.88(2H, m), 6.92(1H, d, J = 8.6 Hz), 7.76(2H, d, J = 8.3 Hz), 7.81-7.90(1H, m), 7.99(2H, d, J = 8.3 Hz), 8.13(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz).

A crude titled product (5.00 g, 7.6 mmol) obtained using the same procedures was recrystallized from ethanol (15 mL), to thereby yield 3.90 g of the title compound.

Appearance: Pale yellow powder

Melting point: 156-158°C

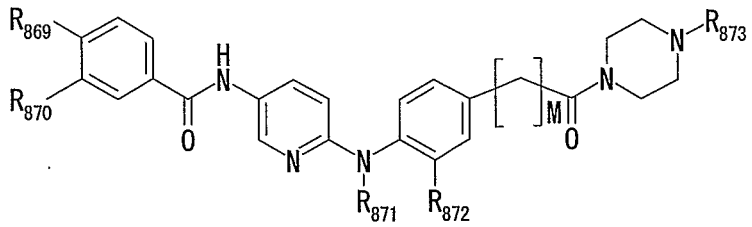
The following compounds were produced in the same manner as in Example 1503.

Example 1504

N-{6-[2-methyl-4-(2-oxo-3-piperonylimidazolidin-1-yl)phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide

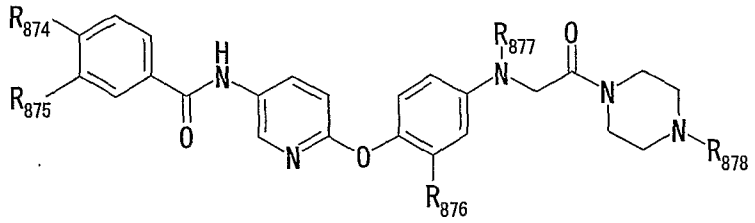
mp 188.0 - 189.0°C

Table 286



Example No.	R_{869}	R_{870}	R_{871}	R_{872}	R_{873}	M	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1505	-Cl	-Cl	cyclopentyl	-H	piperonyl	2	oxalate	mp 135-139
1506	-Cl	-Cl	$-(CH_2)_2CH_3$	-H	piperonyl	2	free	^{1}H NMR (DMSO-d_6) 0.86(3H, t, J = 7.5 Hz), 1.56(2H, q, J = 7.5 Hz), 2.27 (2H, brs), 2.64(2H, t, J = 7.4 Hz), 2.83(2H, t, J = 7.4 Hz), 3.37-3.48 (6H, m), 3.84(2H, t, J = 7.5 Hz), 5.98 (2H, s), 6.36(1H, d, J = 9.1 Hz), 6.74 (1H, d, J = 7.9 Hz), 6.83(1H, d, J = 7.9 Hz), 6.86(1H, s), 7.16(2H, d, J = 8.2 Hz), 7.30(2H, d, J = 8.2 Hz), 7.70 (1H, dd, J = 9.1 Hz, 2.6 Hz), 7.81(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 1.9 Hz), 8.19(1H, d, J = 1.9 Hz), 8.43(1H, d, J = 2.6 Hz), 10.27(1H, s).
1507	-Cl	-Cl	$-CH_3$	$-OCH_3$	piperonyl	2	free	^{1}H NMR ($CDCl_3$) 2.34-2.41(4H, m), 2.62-2.68(2H, m), 2.95-3.01(2H, m), 3.34(3H, s), 3.38-3.45(4H, m), 3.62-3.65(2H, m), 3.75(3H, s), 5.94 (2H, s), 6.25(1H, d, J = 9.2 Hz), 6.70-6.84(5H, m), 7.12(1H, d, J = 7.6 Hz), 7.53(1H, d, J = 8.2 Hz), 7.67-7.72(2H, m), 7.97(2H, d, J = 2.0 Hz), 8.24(1H, d, J = 2.5 Hz).
1508	$-CF_3$	-H	$-CH_3$	$-OCH_3$	piperonyl	2	free	^{1}H NMR ($CDCl_3$) 2.36-2.37(4H, m), 2.62-2.67(2H, m), 2.94-2.99(2H, m), 3.28-3.45(7H, m), 3.60-3.64(2H, m), 3.74(3H, s), 5.93(2H, s), 6.25(1H, d, J = 9.1 Hz), 6.70-6.84(5H, m), 7.1 1(1H, d, J = 7.6 Hz), 7.67-7.75(3H, m), 7.97(2H, d, J = 7.9 Hz), 8.16-8.32(2H, m).
1509	-Cl	-Cl	$-CH_3$	-H	benzyl	0	oxalate	mp 228-230

Table 287



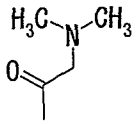
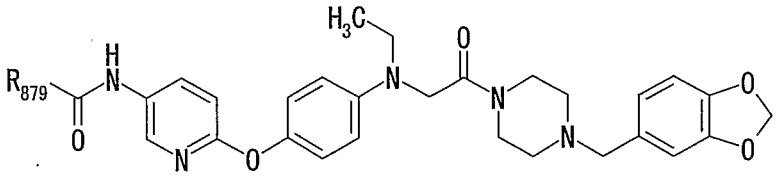
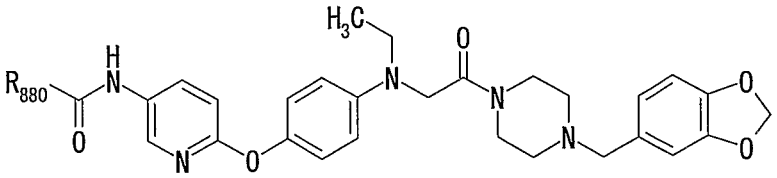
Example No.	R_{874}	R_{875}	R_{876}	R_{877}	R_{878}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
1510	-Cl	-Cl	-H		piperonyl	dioxalate	^{1}H NMR (DMSO-d_6) 2.36-2.50 (4H, m), 2.73(6H, s), 3.42-3.56 (6H, m), 3.94(2H, s), 4.56(2H, s), 5.98(2H, s), 6.76(1H, d, J = 8.0 Hz), 6.85(1H, d, J = 8.0 Hz), 6.88 (1H, s), 7.13(1H, d, J = 8.9 Hz), 7.23(2H, d, J = 8.8 Hz), 7.45(2H, d, J = 8.8 Hz), 7.83(1H, d, J = 8.4 Hz), 7.93(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.20-8.25(2H, m), 8.52(1H, d, J = 2.7 Hz), 10.63(1H, s).
1511	-CF_3	-H	-CH_3	-H	piperonyl	free	^{1}H NMR ($CDCl_3$) 2.11(3H, s), 2.42-2.48(4H, m), 3.45-3.48(4H, m), 3.66-3.70(2H, m), 3.86(2H, s), 4.83(1H, brs), 5.96(2H, s), 6.46-6.52(2H, m), 6.71-6.78(2H, m), 6.83-6.91(3H, m), 7.75-7.82 (3H, m), 7.99(2H, d, J = 8.1 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.22(1H, d, J = 2.8 Hz).
1512	-Cl	-Cl	-CH_3	-CH_3	piperonyl	hydro-chloride	mp 183-185 dec
1513	-CF_3	-H	-CH_3	-C_2H_5	benzyl	maleate	mp 165 - 167
1514	-Cl	-Cl	-CH_3	-C_2H_5	benzyl	free	mp 102 - 105
1515	-CF_3	-H	-CH_3	-CH_3	benzyl	free	mp 110 - 111
1516	-Cl	-Cl	-CH_3	-CH_3	benzyl	free	mp 111 - 113

Table 288



Example No.	R_{879}	Form	mp (℃) or MS
1517	3,4-Cl_2Ph-	maleate	mp 203-205
1518	3-PhOPh-	free	MS 686(M^++H)
1519	3,5-Cl_2Ph-	free	MS 662(M^++H)
1520	3,5-$(CH_3)_2$Ph-	free	MS 622(M^++H)
1521	2,3-$(CH_3)_2$Ph-	free	MS 622(M^++H)
1522	2,3-Cl_2Ph-	free	MS 662(M^++H)
1523	1-naphthyl	free	MS 644(M^++H)
1524	2,4-$(CH_3)_2$Ph-	free	MS 622(M^++H)
1525	3,4-$(CH_3)_2$Ph-	free	MS 622(M^++H)
1526	3,4-F_2Ph-	free	MS 630(M^++H)
1527	3-CF_3Ph-	free	MS 663(M^++H)
1528	3-CF_3OPh-	free	MS 678(M^++H)
1529	4-CF_3OPh-	free	MS 678(M^++H)
1530	3-ClPhOCH_2-	free	MS 658(M^++H)
1531	2-quinolyl	free	MS 645(M^++H)
1532	4-quinolyl	free	MS 645(M^++H)
1533	1-isoquinolyl	free	MS 645(M^++H)
1534	3-isoquinolyl	free	MS 645(M^++H)
1535	3,4-Cl_2PhCH_2-	free	MS 676(M^++H)
1536	2,4-Cl_2PhCH_2-	free	MS 676(M^++H)
1537	3,5-$(CF_3)_2$Ph-	free	MS 731(M^++H)
1538	2,4-Cl_2PhOCH_2-	free	MS 691(M^++H)
1539	4-CH_3OPh-	free	MS 624(M^++H)
1540	4-CH_3PhCH_2-	free	MS 622(M^++H)
1541	PhOCH_2-	free	MS 624(M^++H)
1542	3-pyridyl	free	MS 595(M^++H)
1543	-$CH(CH_3)_2$	free	MS 560(M^++H)
1544	cyclopentyl	free	MS 586(M^++H)
1545	cyclohexyl	free	MS 600(M^++H)
1546	cycloheptyl	free	MS 614(M^++H)
1547	cycloheptylmethyl	free	MS 628(M^++H)
1548	3-CH_3Ph-	free	MS 608(M^++H)
1549	3-$(CH_3)_2$NPh-	free	MS 637(M^++H)
1550	4-$(CH_3)_2$NPh-	free	MS 637(M^++H)
1551	2,5-$(CH_3)_2$Ph-	free	MS 622(M^++H)
1552	-$CH(CH_3)$Ph	free	MS 622(M^++H)
1553	- $C(CH_3)_3$	free	MS 574(M^++H)

Table 289



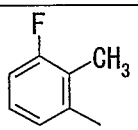
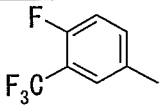
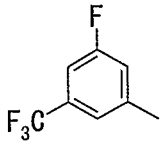
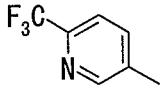
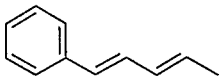
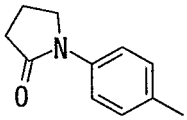
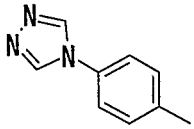
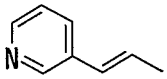
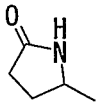
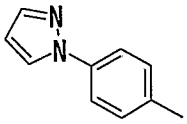
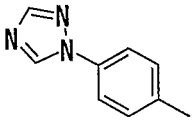
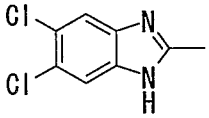
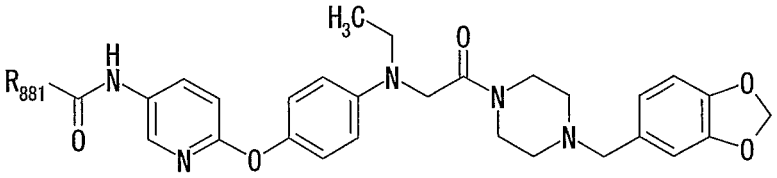
Example No.	R_{880}	MS (M^{+}+H)
1554		626
1555		681
1556		681
1557		663
1558		646
1559		677
1560		661
1561		621
1562		601
1563		660
1564		661
1565		702

Table 290



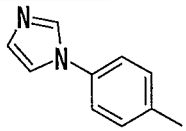
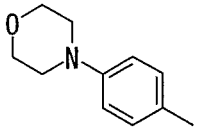
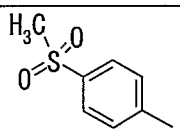
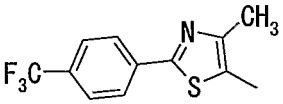
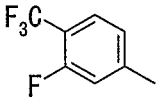
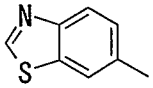
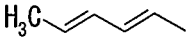
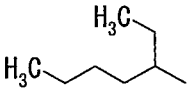
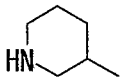
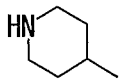
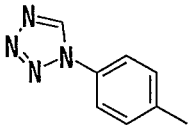
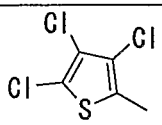
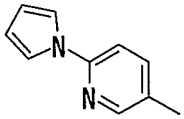
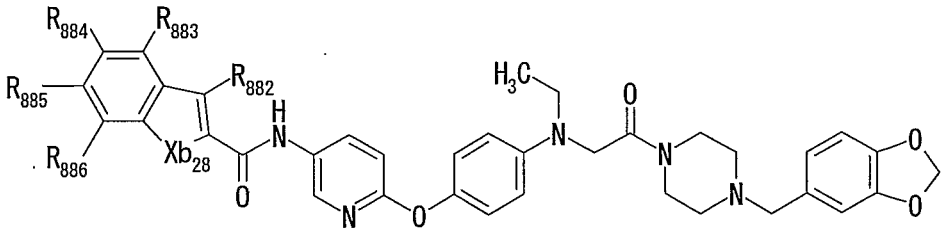
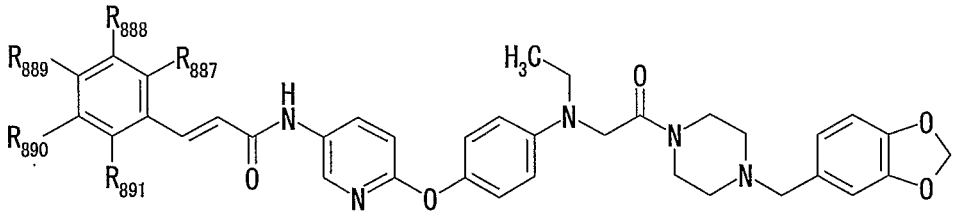
Example No.	R_{881}	MS (M^{+}+H)
1566		660
1567		679
1568		672
1569		759
1570		680
1571		651
1572		584
1573		616
1574		601
1575		601
1576		662
1577		704
1578		660

Table 291



Example No.	Xb_{28}	R_{882}	R_{883}	R_{884}	R_{885}	R_{886}	MS (M^{+}+H)
1579	-NH-	-H	-H	-H	-H	-H	634
1580	-O-	-H	-H	-H	-H	-H	634
1581	-O-	-H	-H	-H	-H	$-OCH_3$	664
1582	-NH-	-H	-H	$-OCH_3$	-H	-H	663
1583	-NH-	-H	-H	-Cl	-H	-H	667
1584	-NH-	-H	-H	-F	-H	-H	651
1585	$-N(CH_3)-$	-H	-H	-H	-H	-H	647
1586	-S-	-H	-H	-H	-H	-H	650
1587	-NH-	-H	-H	-Br	-H	-H	711
1588	-NH-	-H	-H	$-CH_3$	-H	-H	648
1589	-NH-	-H	-H	$-OCF_3$	-H	-H	717
1590	-NH-	-H	$-OCH_3$	-H	-H	-H	664
1591	-NH-	-H	-Cl	-H	-H	-H	667
1592	-NH-	-H	-H	-H	$-OCH_3$	-H	663
1593	-NH-	-H	-Cl	-H	-Cl	-H	701
1594	-NH-	-H	-H	-H	-Cl	-H	667
1595	-NH-	-H	-H	$-OCH_3$	$-OCH_3$	-H	693
1596	-O-	$-CH_3$	-H	-H	-H	-H	648
1597	-O-	-H	-H	$-OCH_3$	-H	-H	664
1598	-O-	-H	-H	-Cl	-H	-H	668

Table 292



Example No.	R_{887}	R_{888}	R_{889}	R_{890}	R_{891}	MS (M^++H)
1599	-H	-OCH_3	-H	-H	-H	650
1600	-H	-H	-OCH_3	-H	-H	650
1601	-H	-Cl	-H	-H	-H	654
1602	-F	-H	-H	-H	-H	638
1603	-H	-F	-H	-H	-H	638
1604	-OCH_3	-OCH_3	-H	-H	-H	680
1605	-OCH_3	-H	-H	-OCH_3	-H	680
1606	-H	-OCH_3	-OCH_3	-H	-H	680
1607	-Cl	-H	-H	-H	-Cl	688
1608	-H	-Cl	-Cl	-H	-H	688
1609	-F	-H	-H	-H	-F	656
1610	-H	-F	-H	-F	-H	656
1611	-H	-OCH_2O-		-H	-H	664
1612	-H	-OCH_3	-OCH_3	-OCH_3	-H	711
1613	-H	-OCH_3	-H	-OCH_3	-H	681
1614	-H	-CF_3	-H	-H	-H	689

Example 1615

Production of 3,4-dichloro-N-[6-(2-fluoro-4-{methyl[2-oxo-2-(4-piperonylpiperazin-1-yl)ethyl]amino}phenoxy)pyridin-3-yl]benzenesulfonamide

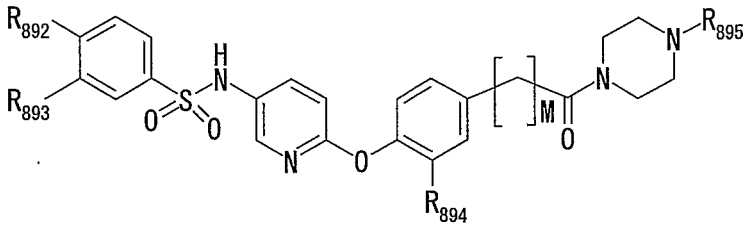
To a solution of 2-{[4-(5-aminopyridin-2-yloxy)-3-fluorophenyl]methylamino}-1-(4-piperonylpiperazin-1-yl)ethanone (15.85 g, 1.9 mmol) in

dichloromethane (150 mL) were addded 3,4-dichlorobenzenesulfonyl chloride (12.92 g, 1.9 mmol) and pyridine (11 mL, 12.4 mmol), and the resulting solution was stirred for 1 hour at room temperature. Water was added to the reaction solution, and extracted with ethyl acetate. The organic layer was washed with water and brine, and then dried over anhydrous magnesium sulfate. The solvent was evaporated under reduced pressure, and the residue was purified by silica gel column chromatography (ethyl acetate), and recrystallized from ethanol, to thereby yield 5.6 g of the title compound.

Appearance: White powder; Melting point: 185.6-187.0°C; ^{1}H NMR ($CDCl_3$) δ 2.45(4H, t, J = 4.6 Hz), 3.01(3H, s), 3.44(2H, s), 3.47(2H, brs), 3.64(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.33-6.44(2H, m), 6.71-6.78(2H, m), 6.84-6.87(2H, m), 6.98(1H, t, J = 9.1 Hz), 7.47(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.51(2H, dd, J = 8.4 Hz, 2.8 Hz), 7.68(1H, d, J = 2.1 Hz), 7.83(1H, d, J = 1.8 Hz).; MS 701(M^+).

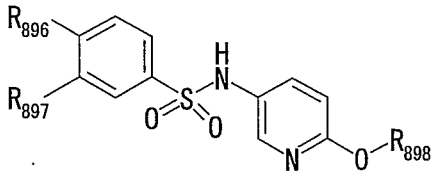
The following compounds were produced in the same manner as in Example 1615.

Table 293



Example No.	R_{892}	R_{893}	R_{894}	R_{895}	M	^{1}H NMR (solvent) δppm
1616	-CH_3	-H	-H	benzyl	2	($CDCl_3$) 2.29-2.37(2H, m), 2.37-2.45(5H, m), 2.61(2H, t, J = 7.9 Hz), 2.95(2H, t, J = 7.9 Hz), 3.35-3.42(2H, m), 3.50(2H, s), 3.59-3.68(2H, m), 6.58(1H, brs), 6.83(1H, d, J = 8.8 Hz), 7.00(2H, d, J = 8.4 Hz), 7.18-7.38(9H, m), 7.55-7.63(3H, m), 7.68(1H, d, J = 2.8 Hz).
1617	-CF_3	-H	-H	benzyl	0	($CDCl_3$) 2.46(4H, brs), 3.54(2H, s), 3.54(2H, brs), 3.79 (2H, brs), 6.88(1H, d, J = 8.7 Hz), 7.10(2H, d, J = 8.6 Hz), 7.28-7.33(5H, m), 7.42(2H, d, J = 8.6 Hz), 7.59(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.73(2H, d, J = 8.4 Hz), 7.74(1H, s), 7.86(2H, d, J = 8.4 Hz).
1618	-CF_3	-H	-CH_3	piperonyl	2	(DMSO-d_6) 1.96(3H, s), 2.20-2.40(4H, m), 2.56-2.62 (2H, m), 2.73-2.78(2H, m), 3.32(2H, s), 3.37-3.43(4H, m), 5.99(2H, s), 6.74(1H, dd, J = 7.9 Hz, 1.3 Hz), 6.82-6.93(4H, m), 7.05(1H, dd, J = 8.2 Hz, 1.9Hz), 7.12 (1H, s), 7.52(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.73(1H, d, J = 2.7 Hz), 7.89-7.98(4H, m), 10.45(1H, brs).
1619	-Cl	-Cl	-OCH_3	piperonyl	2	(DMSO-d_6) 2.20-2.40(4H, m), 2.58-2.64(2H, m), 2.75-2.81(2H, m), 3.37-3.43(6H, m), 3.60(3H, s), 5.97 (2H, s), 6.70-7.00(7H, m), 7.47(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.61(1H, dd, J = 8.5 Hz, 2.1Hz), 7.68(1H, d, J = 2.6 Hz), 7.82-7.86(2H, m), 10.32(1H, brs).
1620	-CF_3	-H	-OCH_3	piperonyl	2	(DMSO-d_6) 2.20-2.40(4H, m), 2.55-2.70(2H, m), 2.75-2.85(2H, m), 3.30-3.50(6H, m), 3.58(3H, s), 5.97 (2H, s), 6.71-7.00(7H, m), 7.47(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.67(1H, d, J = 2.7 Hz), 7.87- 7.98(4H, m), 10.40(1H, brs).
1621	-Cl	-Cl	-CH_3	piperonyl	2	(DMSO-d_6) 1.97(3H, s), 2.20-2.35(4H, m), 2.56-2.62 (2H, m), 2.73-2.79(2H, m), 3.37-3.50(6H, m), 5.98(2H, s), 6.72-6.76(1H, m), 6.82-6.94(4H, m), 7.00-7.13(2H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.62(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.72(1H, d, J = 2.6 Hz), 7.83(1H, d, J = 2.1 Hz), 7.85(1H, d, J = 8.5 Hz), 10.36(1H, brs).
1622	-CF_3	-H	-F	piperonyl	2	(DMSO-d_6) 2.20-2.35(4H, m), 2.60-2.66(2H, m), 2.78-2.84(2H, m), 3.39(2H, s), 3.42-3.50(4H, m), 5.99(2H, s), 6.72-6.76(1H, m), 6.83-6.86(2H, m), 7.03-7.24(4H, m), 7.55(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.75(1H, d, J = 2.7 Hz), 7.90-7.99(4H, m), 10.52(1H, brs).

Table 294



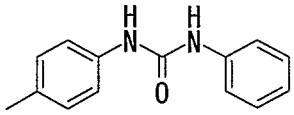
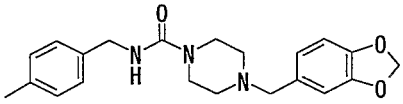
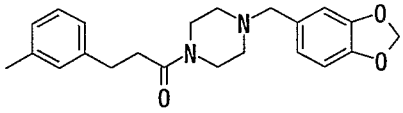
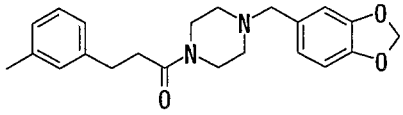
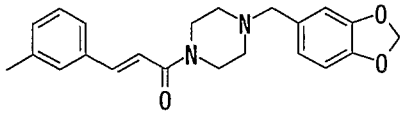
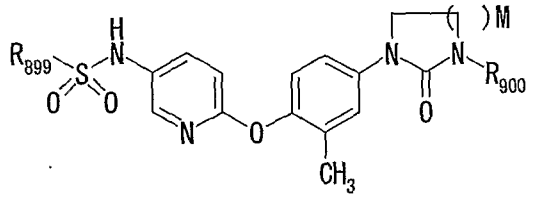
Example No.	R_{896}	R_{897}	R_{898}	mp (°C) or ^{1}H NMR (solvent) δppm
1623	-CF_3	-H		mp 208.0-209.0
1624	-Cl	-Cl		^{1}H NMR ($CDCl_3$) 1.70(1H, brs), 2.42(4H, t, J = 5.1 Hz), 3.39(4H, t, J = 5.1 Hz), 3.43(2H, s), 4.38(2H, d, J = 5.4 Hz), 4.80 (1H, t, J = 5.4 Hz), 5.94(2H, s), 6.73(2H, s), 6.84(1H, s), 6.86(1H, d, J = 8.5 Hz), 7.00(2H, d, J = 8.6 Hz), 7.27(2H, d, J = 8.6 Hz), 7.51(2H, d, J = 2.5 Hz), 7.58(1H, dd, J = 8.7 Hz, 2.7 Hz), 7.73(1H, dd, J = 2.7 Hz, 0.7 Hz), 7.83(1H, t, J = 2.5 Hz).
1625	-Cl	-Cl		^{1}H NMR (DMSO-d_6) 2.20-2.35(4H, m), 2.56-2.62(2H, m), 2.77-2.82(2H, m), 3.30-3.50(6H, m), 5.98(2H, s), 6.70-6.80 (1H, m), 6.82-6.90(3H, m), 6.93-6.97(2H, m), 7.05-7.10(1H, m), 7.24-7.35(1H, m), 7.54(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.64(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.80(1H, d, J = 2.8 Hz), 7.86(1H, d, J = 8.4 Hz), 7.89(1H, d, J = 2.0 Hz), 10.43(1H, brs).
1626	-CF_3	-H		^{1}H NMR (DMSO-d_6) 2.20-2.30(4H, m), 2.55-2.61(2H, m), 2.76-2.82(2H, m), 3.30-3.40(6H, m), 5.98(2H, s), 6.70-6.80 (1H, m), 6.82-6.95(5H, m), 7.05(1H, d, J = 7.7 Hz), 7.23-7.30(1H, m), 7.54(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.80(1H, d, J = 2.8 Hz), 7.90-7.99(4H, m), 10.52(1H, brs).
1627	-Cl	-Cl		^{1}H NMR (DMSO-d_6) 2.25-2.45(4H, m), 3.42(2H, s), 3.50-3.75(4H, m), 5.99(2H, s), 6.75-6.80(1H, m), 6.83-6.88(2H, m), 7.00(1H, d, J = 8.8 Hz), 7.05-7.10(1H, m), 7.25-7.29(1H, m), 7.35-7.65(6H, m), 7.8 0(1H, d, J = 2.7 Hz), 7.86(1H, d, J = 8.4 Hz), 7.90(1H, d, J = 2.1 Hz), 10.44 (1H, brs).

Table 295



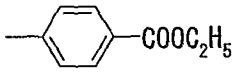
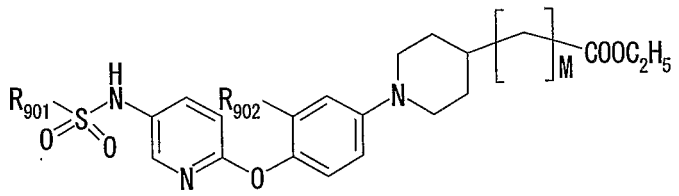
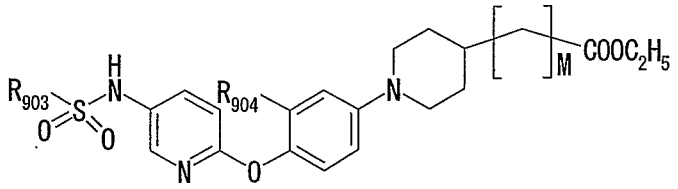
Example No.	R_{899}	R_{900}	M	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
1628	4-CF_3Ph-	piperonyl	2	^{1}H NMR 1.89-2.06(5H, m), 3.17-3.31(2H, m), 3.52-3.71(2H, m), 4.39(2H, s), 5.98(2H, m), 6.75(1H, dd, J = 1.2 Hz, 7.9 Hz), 6.83(1H, d, J = 1.2 Hz), 6.86(1H, d, J = 7.9 Hz), 6.92(1H, d, J = 8.6 Hz), 6.95(1H, d, J = 8.8 Hz), 7.09(1H, dd, J = 2.5 Hz, 8.6 Hz), 7.18(1H, d, J = 2.5 Hz), 7.53(1H, dd, J = 2.8 Hz, 8.8 Hz), 7.75(1H, d, J = 2.8 Hz), 7.90(2H, d, J = 8.4 Hz), 7.96(2H, d, J = 8.4 Hz), 10.47(1H, s).
1629	3,4-Cl_2Ph-	piperonyl	2	^{1}H NMR 1.89-2.09(5H, m), 3.19-3.33(2H, m), 3.50-3.71(2H, m), 4.39(2H, s), 5.98(2H, s), 6.73-6.78(1H, m), 6.83(1H, d, J = 1.3 Hz), 6.86(1H, d, J = 7.9 Hz), 6.93(1H, d, J = 8.6 Hz), 6.97(1H, d, J = 8.8 Hz), 7.10(1H, d, J = 2.4 Hz, 8.6 Hz), 7.19(1H, d, J = 2.4 Hz), 7.53(1H, dd, J = 2.7 Hz, 8.8 Hz), 7.62(1H, dd, J = 2.1 Hz, 8.4 Hz), 7.75(1H, d, J = 2.7 Hz), 7.83(1H, d, J = 2.1 Hz), 7.85(1H, d, J = 8.4 Hz), 10.37(1H, s).
1630	4-CF_3Ph-	piperonyl	1	mp 163.0 - 164.0
1631	3,4-Cl_2Ph-	piperonyl	1	mp 190.5 - 191.0
1632	4-CF_3Ph-	3,4-$(CH_3O)_2PhCH_2$-	2	mp 141.0 - 143.0
1633	3,4-Cl_2Ph-	3,4-$(CH_3O)_2PhCH_2$-	2	mp 135.0 - 136.0
1634	3,4-Cl_2Ph-		2	mp 181.0 - 183.0

Table 296



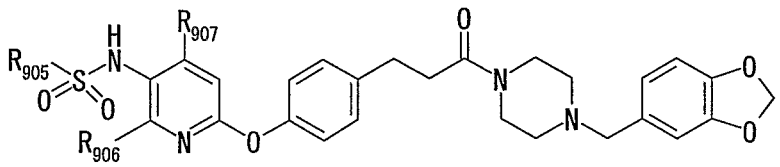
Example No.	R_{901}	R_{902}	M	^{1}H NMR ($CDCl_3$) δppm
1635	3,4-Cl_2Ph-	-CH_3	0	1.27(3H, t, J = 7.1 Hz), 1.84-2.05(4H, m), 2.06(3H, s), 2.40-2.48(1H, m), 2.71-2.81(2H, m), 3.56-3.61(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.74-6.79(3H, m), 6.89(1H, d, J = 8.6 Hz), 7.47-7.57(4H, m), 7.76-7.79(2H, m).
1636	4-CF_3Ph-	-CH_3	0	1.27(3H, t, J = 7.1 Hz), 1.84-2.00(4H, m), 2.03(3H, s), 2.42-2.51(1H, m), 2.70-2.79(2H, m), 3.55-3.60(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.68-6.78(3H, m), 6.87(1H, d, J = 8.6 Hz), 7.55 (1H, dd, J = 8.7 Hz, 2.6 Hz), 7.67(2H, d, J = 8.2 Hz), 7.79-7.84(3H, m), 8.10(1H, s).
1637	3,4-Cl_2Ph-	-H	1	1.27(3H, t, J = 7.1 Hz), 1.39-1.48(2H, m), 1.81-1.92(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.71(2H, dd, J = 12.2 Hz, 9.9 Hz), 3.59(2H, d, J = 12.4 Hz), 4.15(2H, q, J = 7.3 Hz), 6.78(1H, d, J = 8.7 Hz), 6.90-6.98(4H, m), 7.50(2H, d, J = 1.2 Hz), 7.55(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.78-7.81(3H, m).
1638	4-CF_3Ph-	-H	1	1.27(3H, t, J = 7.1 Hz), 1.36-1.48(2H, m), 1.81-1.92(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.70(2H, dd, J = 12.2 Hz, 9.9 Hz), 3.59(2H, d, J = 12.2 Hz), 4.15(2H, q, J = 7.3 Hz), 6.75(1H, d, J = 8.9 Hz), 6.89-6.97(4H, m), 7.55(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.68(2H, d, J = 8.7 Hz), 7.79-7.85(4H, m).
1639	4-CF_3Ph-	-OCH_3	1	1.27(3H, t, J = 7.1 Hz), 1.30-1.48(2H, m), 1.82-2.05(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.69-2.77(2H, m), 3.60(2H, d, J = 12.2 Hz), 3.68(3H, s), 4.15(2H, q, J = 7.1 Hz), 6.48(1H, dd, J = 8.6 Hz, 2.5 Hz), 6.56(1H, d, J = 2.6 Hz), 6.76(1H, d, J = 8.7 Hz), 6.94(1H, d, J = 8.7 Hz), 7.54(1H, dd, J = 8.7 Hz, 2.8 z), 7.66-7.73(4H, m), 7.83(2H, d, J = 8.2 Hz).
1640	3,4-Cl_2Ph-	-OCH_3	1	1.28(3H, t, J = 7.1 Hz), 1.30-1.48(2H, m), 1.82-2.05(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.73(2H, t, J = 12.0 Hz), 3.60(2H, d, J = 12.2 Hz), 3.69(3H, s), 4.16(2H, q, J = 7.1 Hz), 5.29(2H s), 6.48(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.56(1H, d, J = 2.6 Hz), 6.77(1H, d, J = 8.7 Hz), 6.94(1H, d, J = 8.6 Hz), 7.46-7.75(3H, m), 7.79-7.80(3H, m).
1641	4-CF_3Ph-	-H	0	1.27(3H, t, J = 7.1 Hz), 1.81-1.94(2H, m), 2.00-2.05(2H, m), 2.40-2.54(1H, m), 2.71-2.82(2H, m), 3.56-3.60(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.78(1H, d, J = 8.9 Hz), 6.90-6.99(5H, m), 7.56(1H, dd, J = 8.9 Hz, 2.8 z), 7.70(2H, d, J = 8.4 Hz), 7.77(1H, d, J = 2.8 Hz), 7.84(2H, d, J = 8.2 Hz).
1642	3,4-Cl_2Ph-	-H	0	1.27(3H, t, J = 7.3 Hz), 1.89-1.94(2H, m), 2.01-2.05(2H, m), 2.38-2.54(1H, m), 2.72-2.82(2H, m), 3.56-3.61(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.80(1H, d, J = 8.7 Hz), 6.91-7.00(4H, m), 7.26(1H, brs), 7.51-7.58(3H, m), 7.77(1H, d, J = 2.8 Hz), 7.82(1H, s).

Table 297



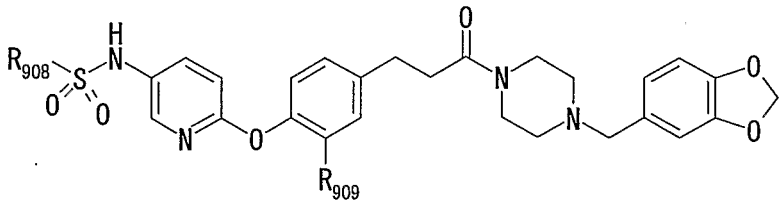
Example No.	R_{903}	R_{904}	M	^{1}H NMR ($CDCl_3$) δppm
1643	4-CF_3Ph-	-CH_3	1	1.27(3H, t, J = 7.1 Hz), 1.38-1.43(2H, m), 1.80-2.01(3H, m), 2.02(3H, s), 2.29(2H, d, J = 6.9 Hz), 2.69(2H, t, J = 12.0 Hz), 3.58(2H, d, J = 12.0 Hz), 4.15(2H, q, J = 7.3 Hz), 6.67-6.87(4H, m), 7.53-7.68(3H, m), 7.79-7.84(4H, m).
1644	3,4-Cl_2Ph-	-CH_3	1	1.27(3H, t, J = 7.1 Hz), 1.30-1.48(2H, m), 1.80-2.04(3H, m), 2.05(3H, s), 2.29(2H, d, J = 6.9 Hz), 2.69(2H, t, J = 12.0 Hz), 3.58(2H, d, J = 12.0 Hz), 4.15(2H, q, J = 7.1 Hz), 6.71-6.79(3H, m), 6.88(1H, d, J = 8.6 Hz), 7.49-7.57(4H, m), 7.77(2H, d, J = 2.8 Hz).

Table 298



Example No.	R_{905}	R_{906}	R_{907}	Form	mp (℃)
1645	4-CF_3Ph-	-H	-CH_3	hydrochloride	189.0 - 191.0
1646	3,4-Cl_2Ph-	-H	-CH_3	free	180.0 - 182.0
1647	4-CF_3Ph-	-CH_3	-H	free	129.5 - 131.0
1648	3,4-Cl_2Ph-	-CH_3	-H	free	129.0 - 130.0

Table 299



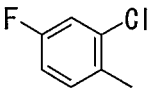
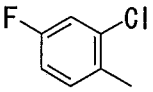
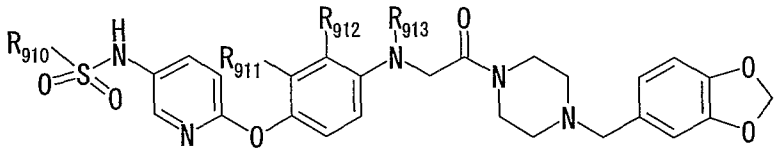
Example No.	R_{908}	R_{909}	^{1}H NMR (DMSO-d_6) δppm
1649		-F	2.20-2.35(4H, m), 2.60-2.66(2H, m), 2.77-2.83(2H, m), 3.39(2H, s), 3.39-3.50(4H, m), 5.99(2H, s), 6.65-6.76(1H, m), 6.83-6.86(2H, m), 7.01-7.25(4H, m), 7.30-7.40(1H, m), 7.55(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.72(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.78(1H, d, J = 2.3 Hz), 8.00-8.05(1H, m), 10.65(1H, brs).
1650		-CH_3	1.94(3H, s), 2.20-2.35(4H, m), 2.56-2.61(2H, m), 2.72-2.78(2H, m), 3.38(2H, s), 3.38-3.50(4H, m), 5.98(2H, s), 6.72-6.75(1H, m), 6.82-6.91(4H, m), 7.03-7.12(2H, m), 7.30-7.45(1H, m), 7.52(1H, dd, J = 8.8 Hz, 2.2 Hz), 7.71(1H, dd, J = 8.7 Hz, 2.1 Hz), 7.78(1H, d, J = 2.7 Hz), 7.98-8.04(1H, m), 10.58(1H, brs).
1651	3,4-Cl_2Ph-	-H	2.20-2.35(4H, m), 2.57-2.63(2H, m), 2.76-2.82(2H, m), 3.39(2H, s), 3.39-3.43(4H, m), 5.99(2H, s), 6.70-6.76(1H, m), 6.82-6.86(2H, m), 6.93-6.98(3H, m), 7.22-7.26(2H, m), 7.51-7.55(1H, m), 7.63(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.79(1H, d, J = 2.7 Hz), 7.86(1H, d, J = 8.5 Hz), 7.88(1H, d, J = 2.1 Hz), 10.41(1H, brs).
1652	4-CF_3Ph-	-H	2.20-2.35(4H, m), 2.57-2.63(2H, m), 2.76-2.82(2H, m), 3.32(2H, s), 3.32-3.50(4H, m), 5.98(2H, s), 6.70-6.76(1H, m), 6.82-6.86(2H, m), 6.92-6.98(3H, m), 7.22-7.25(2H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.78(1H, d, J = 2.7 Hz), 7.90-7.99(4H, m), 10.50(1H, brs).
1653	3,4-Cl_2Ph-	-F	2.20-2.35(4H, m), 2.60-2.66(2H, m), 2.78-2.84(2H, m), 3.39(2H, s), 3.42-3.50(4H, m), 5.99(2H, s), 6.70-6.76(1H, m), 6.82-6.86(2H, m), 7.04-7.30(4H, m), 7.55(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.63(1H, dd, J = 8.5 Hz, 2.2 Hz), 7.75(1H, d, J = 2.6 Hz), 7.85(1H, d, J = 8.5 Hz), 7.88(1H, d, J = 2.1 Hz), 10.43(1H, brs).

Table 300



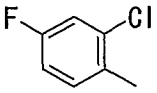
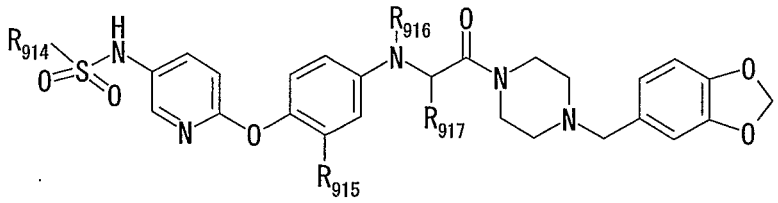
Example No.	R_{910}	R_{911}	R_{912}	R_{913}	mp (°C) or ^{1}H NMR (solvent) δppm
1654	4-CF_3Ph-	-F	-H	-CH_3	mp 186.0-188.0
1655	3,4-Cl_2Ph-	-F	-H	-C_2H_5	mp 157.3-160.1
1656	4-CF_3Ph-	-F	-H	-C_2H_5	mp 173.0-176.8
1657	4-CF_3Ph-	-OCH_3	-H	-C_2H_5	mp 179.0-181.0
1658	3,4-Cl_2Ph-	-OCH_3	-H	-C_2H_5	mp 175.0-176.0
1659	4-CF_3Ph-	-CH_3	-H	-CH_3	mp 170.0-172.0
1660	3,4-Cl_2Ph-	-CH_3	-H	-CH_3	mp 170.0-173.0
1661	3,4-Cl_2Ph-	-H	-H	-CH_3	mp 135.0-137.0
1662	4-CF_3Ph-	-H	-H	-CH_3	mp 189.0-190.0
1663	4-CF_3Ph-	-F	-F	-CH_3	mp 159.5-160.0
1664	3,4-Cl_2Ph-	-F	-F	-CH_3	mp 136.0 - 137.0
1665	Ph-	-H	-H	-CH_3	^{1}H NMR ($CDCl_3$) 2.41-2.45(4H, m), 3.01(3H, s), 3.43 (2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.63(1H, brs), 6.66(2H, d, J = 9.1 Hz), 6.71-6.77(3H, m), 6.85(1H, brs), 6.93(2H, d, J = 9.1 Hz), 7.42-7.59(4H, m), 7.68-7.73(3H, m).
1666	-$(CH_2)_3CH_3$	-H	-H	-CH_3	^{1}H NMR ($CDCl_3$) 0.93(3H, t, J = 7.3 Hz), 1.36-1.50(2H, m), 1.75-1.87(2H, m), 2.41-2.45(4H, m), 3.01-3.06(5H, m), 3.44(2H, s), 3.47-3.49(2H, m), 3.63(2H, brs), 4.09 (2H, s), 5.95(2H, s), 6.37(1H, brs), 6.69(2H, d, J = 9.1 Hz), 6.72-6.77(2H, m), 6.82-6.96(2H, m), 6.99(2H, d, J = 9.1 Hz), 7.65(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.00(1H, d, J = 2.8 Hz).
1667	4-CH_3Ph-	-H	-H	-CH_3	^{1}H NMR ($CDCl_3$) 2.39(3H, s), 2.41-2.44(4H, m), 3.01 (3H, s), 3.43(2H, s), 3.47-3.49(2H, m), 3.62(2H, brs), 4.07(2H, s), 5.95(2H, s), 6.46-6.51(1H, m), 6.66(2H, d, J = 8.9 Hz), 6.70-6.77(3H, m), 6.85(1H, brs), 6.94(2H, d, J = 8.9 Hz), 7.23(2H, d, J = 8.1 Hz), 7.50(1H, dd, J = 8.2 Hz, 2.8 Hz), 7.58(2H, d, J = 8.4 Hz), 7.66(1H, d, J = 2.6 Hz).
1668		-F	-H	-CH_3	^{1}H NMR (DMSO-d_6) 2.25-2.45(4H, m), 2.91(3H, s), 3.42 (6H, brs), 4.26(2H, s), 5.99(2H, s), 6.30-6.40(1H, m), 6.45-6.55(1H, m), 6.74-6.77(1H, m), 6.83-7.05(4H, m), 7.30-7.45(1H, m), 7.51(1H, dd, J = 8.9 Hz, 2.8Hz), 7.71 (1H, dd, J = 8.7 Hz, 2.5Hz), 7.79(1H, d, J = 2.7 Hz), 8.02(1H, dd, J = 8.9 Hz, 5.9Hz), 10.60(1H, brs).
1669	3,4-Cl_2Ph-	-$COOCH_3$	-H	-C_2H_5	^{1}H NMR (DMSO-d_6) 1.11(3H, t, J = 7.0 Hz), 2.20-2.5 (4H, m), 3.30-3.50(11H, m), 4.22(2H, s), 5.99(2H, s), 6.75-7.00(7H, m), 7.45-7.55(1H, m), 7.60-7.70 (2H, m), 7.83-7.87(2H, m), 10.31(1H, brs).

Table 301



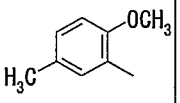
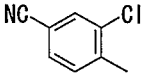
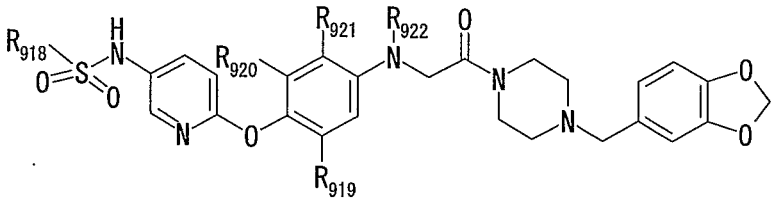
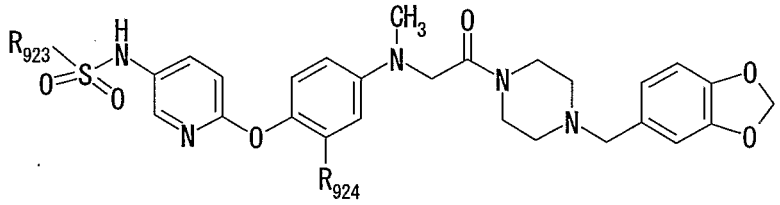
Example No.	R_{914}	R_{915}	R_{916}	R_{917}	^{1}H NMR (solvent) δppm
1670		-F	-CH_3	-H	(DMSO-d_6) 2.23(3H, s), 2.25-2.45(4H, m), 2.91(3H, s), 3.41(6H, brs), 3.83(3H, s), 4.25(2H, s), 5.99(2H, s), 6.30-6.40(1H, m), 6.45-6.55(1H, m), 6.75-6.77(1H, m), 6.83-6.99(4H, m), 7.07(1H, d, J = 8.5Hz), 7.30-7.40(1H, m), 7.48(1H, d, J = 1.9Hz), 7.51(1H, dd, J = 8.8 Hz, 2.7Hz), 7.74(1H, d, J = 2.6Hz), 9.85(1H, brs).
1671	3,4-Cl_2Ph-	-CH_3	-CH_3	-CH_3	($CDCl_3$) 1.28(3H, d, J = 6.6 Hz), 2.05(3H, s), 2.08-2.21 (1H, m), 2.33(2H, brs), 2.50(1H, brs), 2.75(3H, s), 3.29-3.57(3H, m), 3.38(2H, s), 3.77(1H, brs), 4.55(1H, q, J = 6.6 Hz), 5.94(2H, s), 6.56-6.59(2H, m), 6.68-6.75(2H, m), 6.79-6.82(2H, m), 6.89-6.93(1H, m), 7.51-7.52(2H, m), 7.57(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.71(1H, dd, J = 2.8 Hz, 0.5 Hz), 7.79(1H, dd, J = 1.7 Hz, 0.8 Hz).
1672	4-CF_3Ph-	-CH_3	-CH_3	-CH_3	($CDCl_3$) 1.28(3H, d, J = 6.4 Hz), 2.07(3H, s), 2.17-2.20 (1H, m), 2.33-2.36(2H, m), 2.47-2.49(1H, m), 2.75(3H, s), 3.28-3.30(1H, m), 3.38(2H, s), 3.38-3.50(1H, m), 3.52-3.56(1H, m), 3.77-3.82(1H, m), 4.55(1H, q, J = 6.6 Hz), 5.94(2H, s), 6.55-6.59(2H, m), 6.68-6.75(2H, m), 6.78-6.82(2H, m), 6.89-6.92(1H, m), 7.57(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.70(1H, dd, J = 2.8 Hz, 0.5 Hz), 7.73(2H, d, J = 8.3 Hz), 7.85(2H, d, J = 8.3 Hz).
1673		-F	-CH_3	-H	(DMSO-d_6) 2.20-2.50(4H, m), 2.91(3H, s), 3.35-3.50 (6H, m), 4.26(2H, s), 5.99(2H, s), 6.20-6.30(1H, m), 6.45-6.55(1H, m), 6.75-6.80(1H, m), 6.84-7.01(4H, m), 7.52(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.79(1H, d, J = 2.8 Hz), 7.97(1H, dd, J = 8.2 Hz, 1.5 Hz), 8.09(1H, d, J = 8.2 Hz), 8.29(1H, d, J = 1.5 Hz), 10.80(1H, brs).
1674	4-PhOPh-	-F	-CH_3	-H	(DMSO-d_6) 2.20-2.45(4H, m), 2.92(3H, s), 3.35-3.50 (6H, m), 4.26(2H, s), 5.99(2H, s), 6.35-6.45(1H, m), 6.45-6.60(1H, m), 6.76(1H, d, J = 7.9 Hz), 6.83-6.87 (2H, m), 6.93-7.14(6H, m), 7.20-7.3 0(1H, m), 7.43-7.55(3H, m), 7.68-7.74(3H, m), 10.17(1H, brs).
1675	3,4-Cl_2Ph-	-CF_3	-C_2H_5	-H	(DMSO-d_6) 1.11(3H, t, J = 6.9 Hz), 2.25-2.45(4H, m), 3.35-3.55(8H, m), 4.27(2H, s), 5.99(2H, s), 6.67-6.88(5H, m), 6.94-7.05(2H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.63(1H, dd, J = 8.4 Hz, 2.2 Hz), 7.75(1H, d, J = 2.7 Hz), 7.83-7.87(2H, m), 10.38(1H, brs).

Table 302



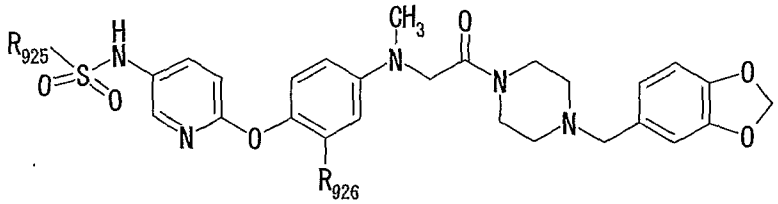
Example No.	R_{918}	R_{919}	R_{920}	R_{921}	R_{922}	Form	Property
1676	4-CF_3Ph-	-F	-F	-H	-CH_3	free	mp 199.0-200.0℃
1677	3,4-Cl_2Ph-	-F	-F	-H	-CH_3	free	mp 198.0-199.0℃
1678	4-CF_3Ph-	-F	-H	-F	-CH_3	free	mp 176.0-177.0℃
1679	3,4-Cl_2Ph-	-F	-H	-F	-CH_3	free	mp 115.0-116.0℃
1680	4-CF_3Ph-	-F	-H	-F	-C_2H_5	free	mp 173.0-174.0℃
1681	3,4-Cl_2Ph-	-F	-H	-F	-C_2H_5	free	mp 156.0-157.0℃
1682	3,4-Cl_2Ph-	-CH_3	-H	-CH_3	-C_2H_5	hydro-chloride	^{1}H NMR (DMSO-d_6) δ 0.95(3H, t, J = 7.0 Hz), 1.97(3H, s), 2.28(3H, s), 2.70-4.40(14H, m), 6.07(2H, s), 6.86(1H, brs), 6.93-7.10(3H, m), 7.20-7.40(2H, m), 7.56(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.66 (1H, dd, J = 8.5 Hz, 2.1 Hz), 7.78(1H, d, J = 2.6 Hz), 7.85-7.88(2H, m), 10.55(1H, brs), 11.47(1H, brs).
1683	4-CF_3Ph-	-CH_3	-H	-CH_3	-C_2H_5	free	^{1}H NMR (DMSO-d_6) δ 0.92(3H, t, J = 7.0 Hz), 1.91(3H, s), 2.16(3H, s), 2.20-2.40(4H, m), 2.98(2H, q, J = 7.0 Hz), 3.30-3.50(6H, m), 3.77(2H, s), 5.98 (2H, s), 6.72-6.76(2H, m), 6.82-6.90(3H, m), 7.01(1H, s), 7.51(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.75(1H, d, J = 2.7 Hz), 7.89-7.99(4H, m), 10.45(1H, brs).
1684	3,4-Cl_2Ph-	-F	-H	-H	-H	hydro-chloride	^{1}H NMR (DMSO-d_6) δ 2.75-3.65(7H, m), 3.85-4.55(6H, m), 6.08(2H, s), 6.47-6.50(1H, m), 6.59(1H, dd, J = 13.5 Hz, 2.6 Hz), 6.92-7.01(4H, m), 7.20(1H, s), 7.52(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.64 (1H, dd, J = 8.4 Hz, 2.1 Hz), 7.76(1H, d, J = 2.5 Hz), 7.86(1H, d, J = 8.6 Hz), 7.89 (1H, d, J = 2.2 Hz), 10.45(1H, s), 10.90 (1H, brs).
1685	4-CH_3OPh-	-H	-H	-H	-CH_3	free	MS 646(M^++H)
1686	1-naphthyl	-H	-H	-H	-CH_3	free	MS 666(M^++H)
1687	2-naphthyl	-H	-H	-H	-CH_3	free	MS 666(M^++H)
1688	2-CH_3Ph-	-H	-H	-H	-CH_3	free	MS 630(M^++H)
1689	4-FPh-	-H	-H	-H	-CH_3	free	MS 634(M^++H)
1690	2-CF_3Ph-	-H	-H	-H	-CH_3	free	MS 684(M^++H)
1691	2-ClPh-	-H	-H	-H	-CH_3	free	MS 650(M^++H)

Table 303



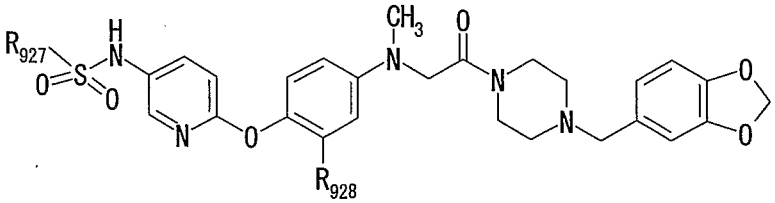
Example No.	R_{923}	R_{924}	MS (M^{+}+H)
1692	2-thienyl	-H	622
1693	2-CF_3OPh-	-H	700
1694	3-CF_3OPh-	-H	700
1695	3-CH_3OPh-	-H	646
1696	3-FPh-	-H	634
1697	2,3-Cl_2Ph-	-H	684
1698	3-CF_3Ph-	-H	684
1699	4-CF_3OPh-	-H	700
1700	4-biphenylyl	-H	692
1701	3,4-$(CH_3O)_2$Ph-	-H	676
1702	2,5-$(CH_3O)_2$Ph-	-H	676
1703	3-CH_3Ph-	-H	630
1704	2,5-Cl_2Ph-	-H	684
1705	3-ClPh-	-H	650
1706	2,4-Cl_2Ph-	-H	684
1707	2,3,4-Cl_3Ph-	-H	720
1708	-C_2H_5	-H	568
1709	2,6-Cl_2Ph-	-H	684
1710	4-CH_3OPh-	-F	664
1711	4-ClPh-	-F	668
1712	1-naphthyl	-F	684
1713	2-naphthyl	-F	684
1714	2-CH_3Ph-	-F	648
1715	4-FPh-	-F	652
1716	2-CF_3Ph-	-F	702
1717	2-thienyl	-F	640
1718	2-ClPh-	-F	668
1719	2-CF_3OPh-	-F	718
1720	3-CF_3OPh-	-F	718
1721	2-CNPh-	-F	660
1722	3-CH_3OPh-	-F	664
1723	3-FPh-	-F	652
1724	2,3-Cl_2Ph-	-F	702
1725	3-CF_3Ph-	-F	702
1726	4-CF_3OPh-	-F	718
1727	4-biphenylyl	-F	710
1728	3,4-$(CH_3O)_2$Ph-	-F	694
1729	2,5-$(CH_3O)_2$Ph-	-F	694

Table 304



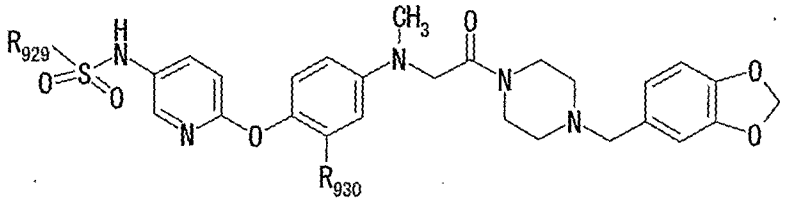
Example No.	R_{925}	R_{926}	MS (M^{+}+H)
1730	3-CH_3Ph-	-F	648
1731	2,5-Cl_2Ph-	-F	702
1732	3-ClPh-	-F	668
1733	2,4-Cl_2Ph-	-F	702
1734	-CH_3	-F	572
1735	2,3,4-Cl_3Ph-	-F	738
1736	-$(CH_2)_3CH_3$	-F	614
1737	-C_2H_5	-F	586
1738	2,6-Cl_2Ph-	-F	702
1739	4-CH_3OPh-	-CH_3	660
1740	4-ClPh-	-CH_3	664
1741	1-naphthyl	-CH_3	680
1742	2-naphthyl	-CH_3	680
1743	2-CH_3Ph-	-CH_3	644
1744	4-FPh-	-CH_3	648
1745	2-CF_3Ph-	-CH_3	698
1746	2-thienyl	-CH_3	636
1747	2-ClPh-	-CH_3	664
1748	2-CF_3OPh-	-CH_3	714
1749	2-CNPh-	-CH_3	656
1750	3-CH_3OPh-	-CH_3	660
1751	3-FPh-	-CH_3	648
1752	2,3-Cl_2Ph-	-CH_3	698
1753	3-CF_3Ph-	-CH_3	698
1754	4-CF_3OPh-	-CH_3	714
1755	4-biphenylyl	-CH_3	706
1756	3,4-$(CH_3O)_2$Ph-	-CH_3	690
1757	2,5-$(CH_3O)_2$Ph-	-CH_3	690
1758	3-CH_3Ph-	-CH_3	644
1759	2,5-Cl_2Ph-	-CH_3	698
1760	3-ClPh-	-CH_3	664
1761	2,4-Cl_2Ph-	-CH_3	698
1762	-CH_3	-CH_3	568
1763	2,3,4-Cl_3Ph-	-CH_3	734
1764	-$(CH_2)_3CH_3$	-CH_3	610
1765	-C_2H_5	-CH_3	582
1766	2,6-Cl_2Ph-	-CH_3	698
1767	2,4,5-Cl_3Ph-	-H	719

Table 305



Example No.	R_{927}	R_{928}	MS (M^{+}+H)
1768	2,4,6-$(CH_3)_3$Ph-	-H	658
1769	4-C_2H_5Ph-	-H	644
1770	2,5-$(CH_3)_2$Ph-	-H	644
1771	2-FPh-	-H	634
1772	2,4,6-$(CH_3)_3$Ph-	-F	676
1773	4-CH_3Ph-	-F	648
1774	4-C_2H_5Ph-	-F	662
1775	2,5-$(CH_3)_2$Ph-	-F	662
1776	2-FPh-	-F	652
1777	2,4,5-Cl_3Ph-	-CH_3	732
1778	2,4,6-$(CH_3)_3$Ph-	-CH_3	672
1779	4-CH_3Ph-	-CH_3	644
1780	4-C_2H_5Ph-	-CH_3	658
1781	2,5-$(CH_3)_2$Ph-	-CH_3	658
1782	2-FPh-	-CH_3	648
1783	4-BrPh-	-H	696
1784	-$CH(CH_3)_2$	-H	582
1785	8-quinolyl	-H	667
1786	3-CNPh-	-H	641
1787	4-PhOPh-	-H	708
1788	3-BrPh-	-H	696
1789	4-CNPh-	-H	641
1790	2,4-F_2Ph-	-H	652
1791	4-BrPh-	-F	714
1792	-$CH(CH_3)_2$	-F	600
1793	8-quinolyl	-F	685
1794	3-CNPh-	-F	659
1795	4-CNPh-	-F	659
1796	2,4-F_2Ph-	-F	670
1797	4-BrPh-	-CH_3	710
1798	-$CH(CH_3)_2$	-CH_3	596
1799	8-quinolyl	-CH_3	681
1800	3-CNPh-	-CH_3	655
1801	3-BrPh-	-CH_3	710
1802	4-CNPh-	-CH_3	655
1803	2,4-F_2Ph-	-CH_3	666
1804	2,4,6-Cl_3Ph-	-H	720
1805	2,4,6-Cl_3Ph-	-F	738

Table 306



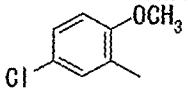
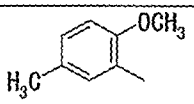
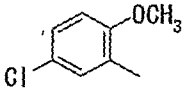
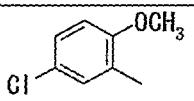
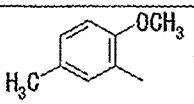
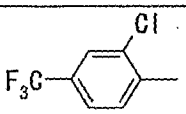
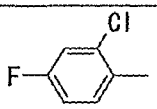
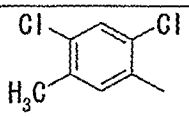
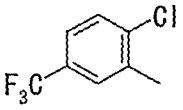
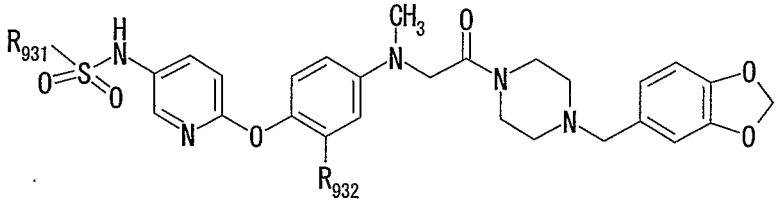
Example No.	R_{929}	R_{930}	MS (M^{+}+H)
1806	2,4,5-Cl_3Ph-	-F	738
1807	2,4,6-Cl_3Ph-	-CH_3	734
1808	Ph-	-F	634
1809	Ph-	-CH_3	630
1810	2,5-F_2Ph-	-F	670
1811	2,5-F_2Ph-	-CH_3	666
1812	2,6-F_2Ph-	-CH_3	666
1813	3,4-F_2Ph-	-CH_3	666
1814	2,6-F_2Ph-	-H	652
1815	3,4-F_2Ph-	-H	652
1816	2,6-F_2Ph-	-F	670
1817	3,4-F_2Ph-	-F	670
1818	-CH_3	-H	554
1819		-H	680
1820		-H	660
1821		-F	698
1822		-CH_3	694
1823		-CH_3	674
1824		-H	718
1825		-H	668
1826		-H	698
1827		-H	718

Table 307



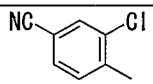
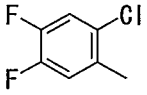
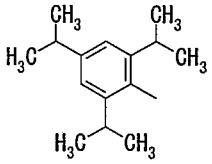
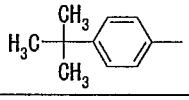
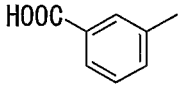
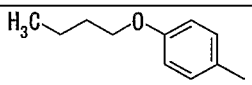
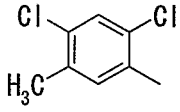
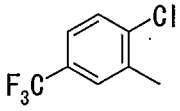
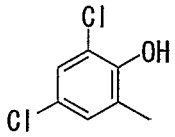
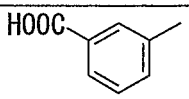
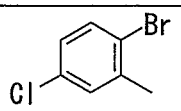
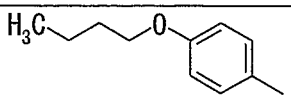
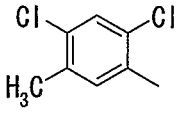
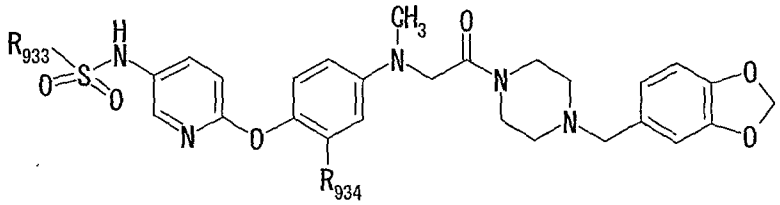
Example No.	R_{931}	R_{932}	MS (M^{+}+H)
1828		-H	675
1829		-H	686
1830		-H	742
1831		-H	672
1832		-H	660
1833		-H	688
1834		-F	716
1835		-F	736
1836		-F	718
1837		-F	678
1838		-F	747
1839		-F	706
1840		$-CH_3$	712

Table 308



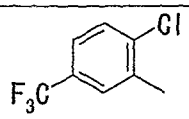
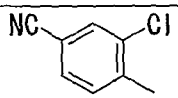
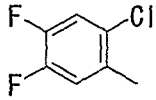
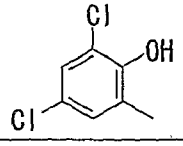
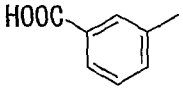
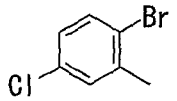
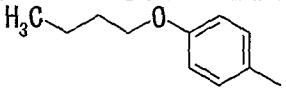
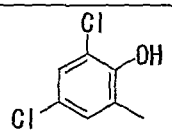
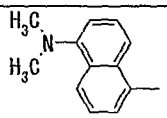
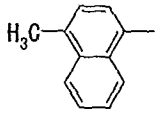
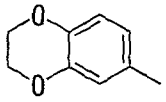
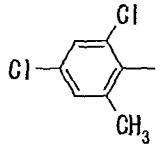
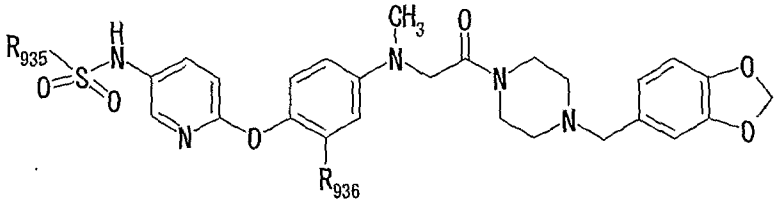
Example No.	R_{933}	R_{934}	MS (M^{+}+H)
1841		-CH_3	732
1842		-CH_3	689
1843		-CH_3	700
1844		-CH_3	714
1845		-CH_3	674
1846		-CH_3	743
1847		-CH_3	702
1848		-H	700
1849		-H	709
1850		-H	680
1851		-H	674
1852		-H	698

Table 309



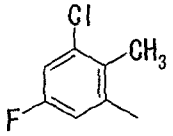
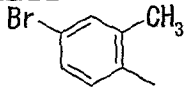
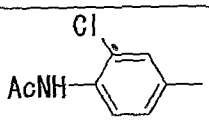
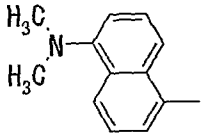
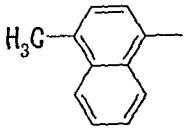
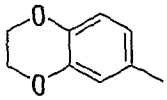
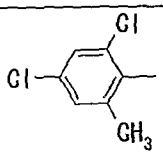
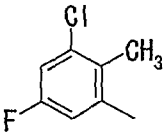
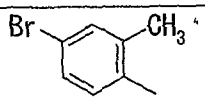
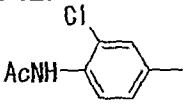
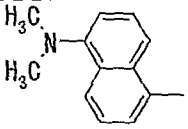
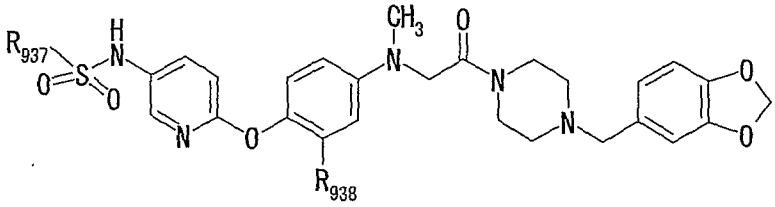
Example No.	R_{935}	R_{936}	MS (M^{+}+H)
1853		-H	682
1854		-H	710
1855		-H	707
1856		-F	727
1857		-F	698
1858		-F	692
1859		-F	716
1860		-F	700
1861		-F	728
1862		-F	725
1863		-CH_3	723

Table 310



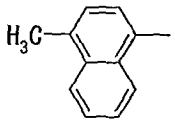
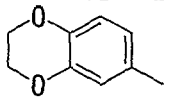
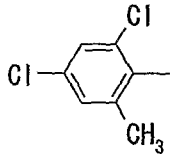
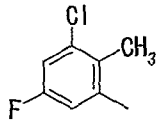
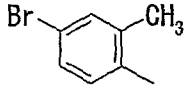
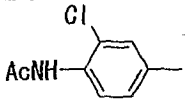
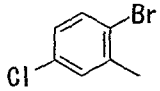
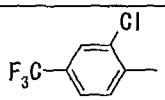
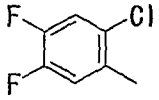
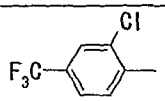
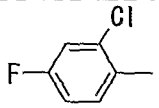
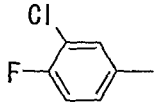
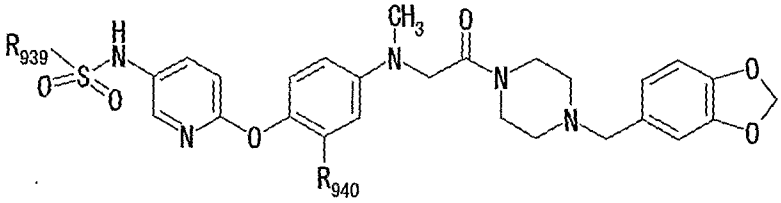
Example No.	R_{937}	R_{938}	MS (M^{+}+H)
1864		-CH_3	694
1865		-CH_3	688
1866		-CH_3	712
1867		-CH_3	696
1868		-CH_3	724
1869		-CH_3	721
1870		-H	730
1871		-F	736
1872		-F	704
1873		-CH_3	732
1874		-CH_3	682
1875		-H	668

Table 311



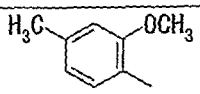
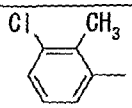
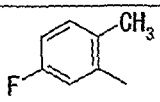
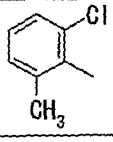
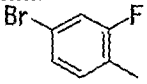
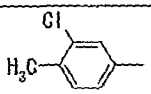
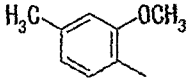
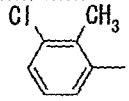
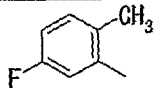
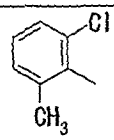
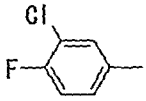
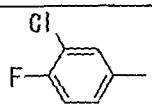
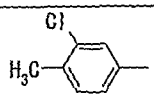
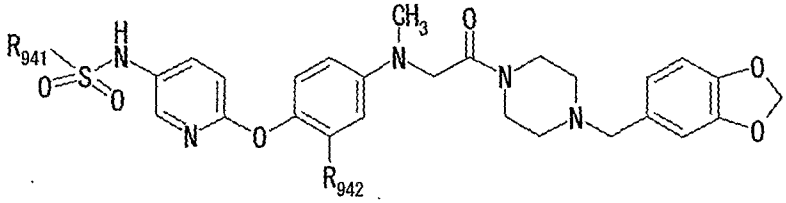
Example No.	R_{939}	R_{940}	MS (M^{+}+H)
1876		-H	660
1877		-H	664
1878		-H	648
1879		-H	664
1880		-H	714
1881		-H	664
1882		-F	678
1883		-F	682
1884		-F	666
1885		-F	682
1886		-F	686
1887		$-CH_3$	682
1888		-F	682

Table 312



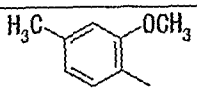
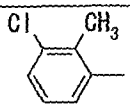
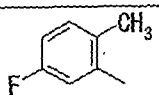
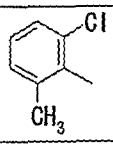
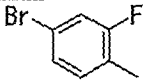
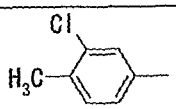
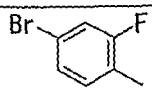
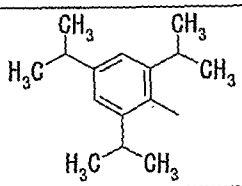
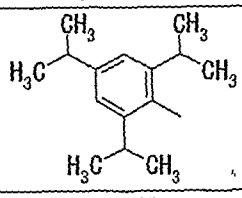
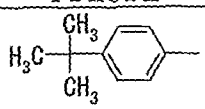
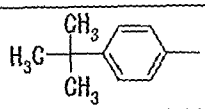
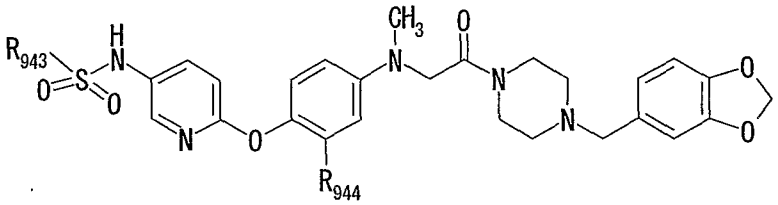
Example No.	R_{941}	R_{942}	MS (M^{+}+H)
1889		-CH_3	674
1890		-CH_3	678
1891		-CH_3	662
1892		-CH_3	678
1893		-CH_3	728
1894		-CH_3	678
1895		-F	732
1896		-F	760
1897		-CH_3	756
1898	3-BrPh-	-F	714
1899	4-PhOPh-	-CH_3	722
1900		-F	690
1901		-CH_3	686

Table 313



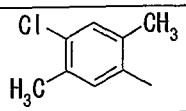
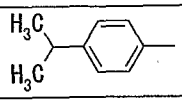
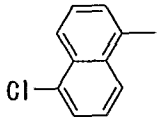
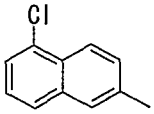
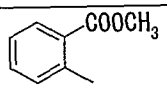
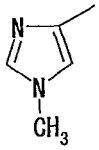
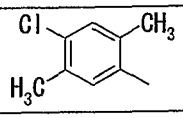
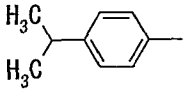
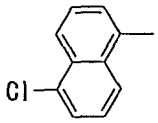
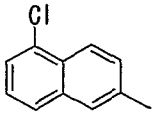
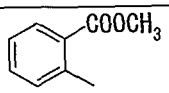
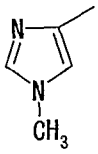
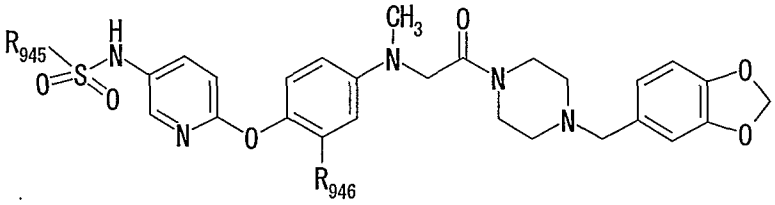
Example No.	R_{943}	R_{944}	MS (M^{+}+H)
1902		-H	678
1903		-H	658
1904		-H	700
1905		-H	700
1906		-H	674
1907		-H	620
1908		-F	696
1909		-F	676
1910		-F	718
1911		-F	718
1912		-F	692
1913		-F	638

Table 314



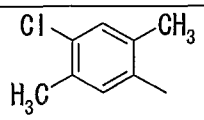
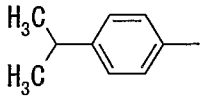
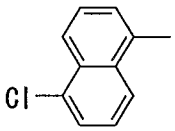
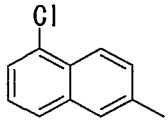
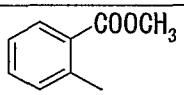
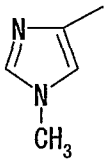
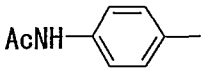
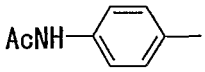
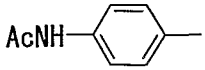
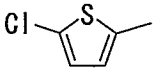
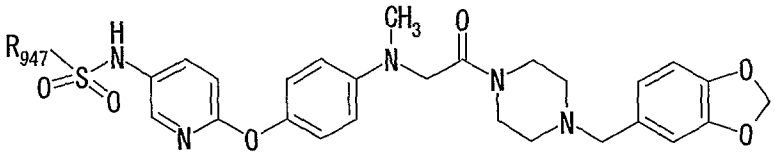
Example No.	R_{945}	R_{946}	MS (M^{+}+H)
1914		-CH_3	692
1915		-CH_3	672
1916		-CH_3	714
1917		-CH_3	714
1918		-CH_3	688
1919		-CH_3	634
1920		-H	673
1921	vinyl	-H	566
1922	-$(CH_2)_3Cl$	-H	616
1923	cyclohexylmethyl	-H	636
1924		-F	691
1925	vinyl	-F	584
1926	-$(CH_2)_3Cl$	-F	634
1927	cyclohexylmethyl	-F	654
1928		-CH_3	687
1929	vinyl	-CH_3	580
1930	-$(CH_2)_3Cl$	-CH_3	630
1931	cyclohexylmethyl	-CH_3	650
1932	2-BrPh-	-H	696
1933		-H	656

Table 315



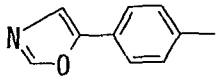
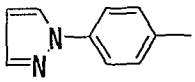
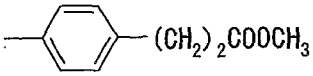
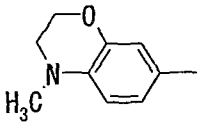
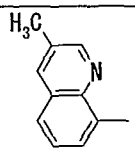
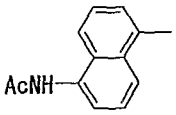
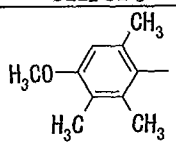
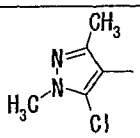
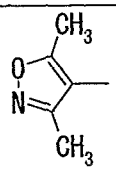
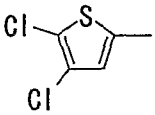
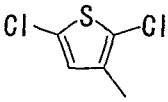
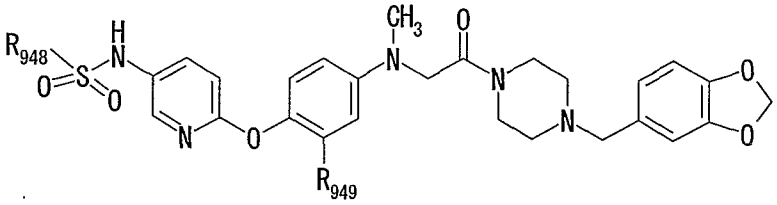
Example No.	R_{947}	MS (M^{+}+H)
1934	3,5-Cl_2Ph	684
1935		683
1936		682
1937		702
1938		687
1939		681
1940		723
1941	5-isoquinolyl	667
1942	-CH_2CF_3	622
1943		688
1944		668
1945		635
1946		690
1947		690

Table 316



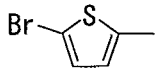
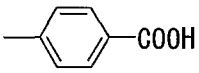
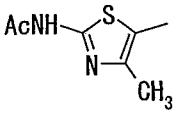
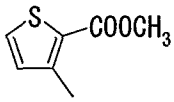
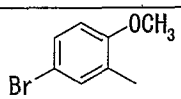
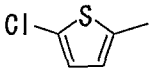
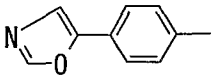
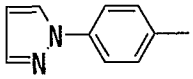
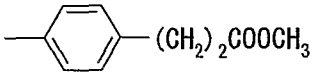
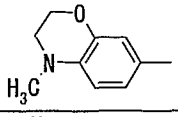
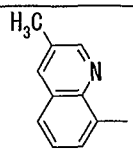
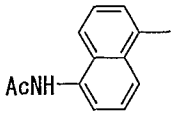
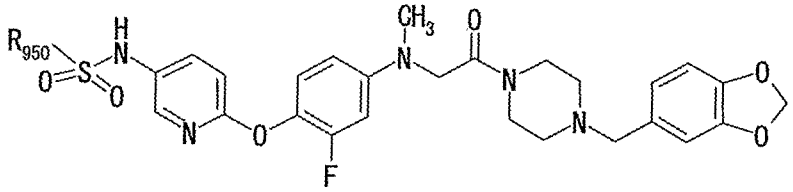
Example No.	R_{948}	R_{949}	MS (M^++H)
1948	$-CH_2Cl$	-H	588
1949		-H	702
1950		-H	660
1951		-H	694
1952		-H	680
1953		-H	726
1954	benzyl	-H	630
1955	PhCH=CH-	-H	642
1956	$-(CH_2)_2CH_3$	-H	582
1957	2-BrPh-	-F	714
1958		-F	674
1959	3,5-Cl_2Ph	-F	702
1960		-F	701
1961		-F	700
1962		-F	720
1963		-F	705
1964		-F	699
1965		-F	741

Table 317



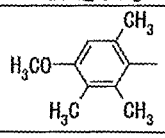
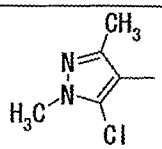
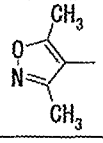
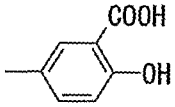
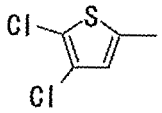
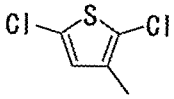
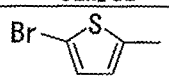
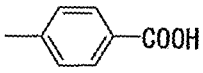
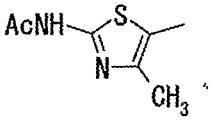
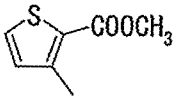
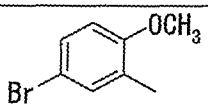
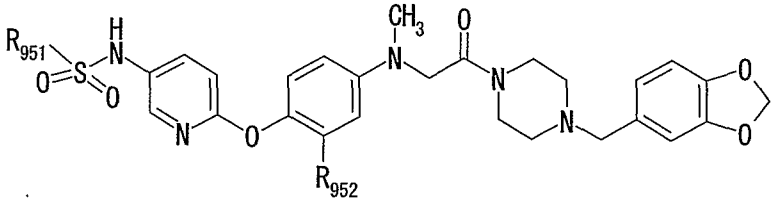
Example No.	R_{950}	MS (M^{+}+H)
1966	5-isoquinolyl	685
1967	$-CH_2CF_3$	640
1968		706
1969		686
1970		653
1971		694
1972		708
1973		708
1974	$-CH_2Cl$	606
1975		720
1976		678
1977		712
1978		698
1979		744
1980	benzyl	648
1981	PhCH=CH-	660

Table 318



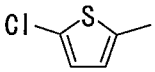
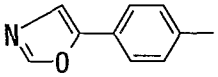
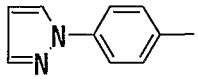
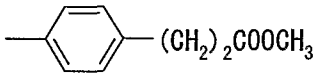
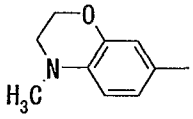
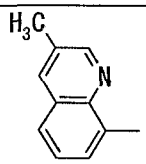
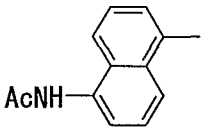
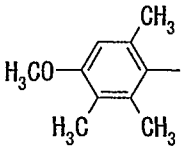
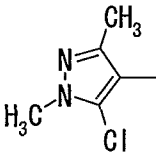
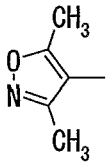
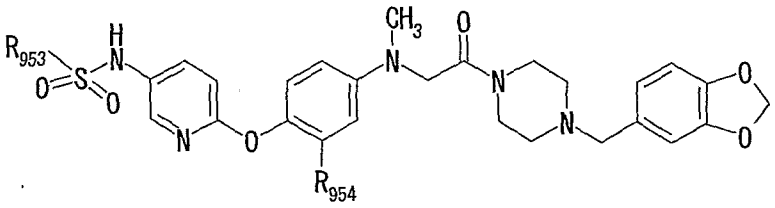
Example No.	R_{951}	R_{952}	MS (M^{+}+H)
1982	$-(CH_2)_2CH_3$	-F	600
1983	2-BrPh-	$-CH_3$	710
1984		$-CH_3$	670
1985	3,5-Cl_2Ph	$-CH_3$	698
1986		$-CH_3$	697
1987		$-CH_3$	696
1988		$-CH_3$	716
1989		$-CH_3$	701
1990		$-CH_3$	695
1991		$-CH_3$	737
1992	5-isoquinolyl	$-CH_3$	681
1993	$-CH_2CF_3$	$-CH_3$	636
1994		$-CH_3$	702
1995		$-CH_3$	682
1996		$-CH_3$	649

Table 319



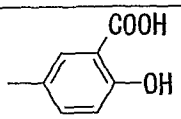
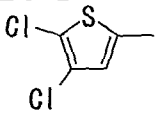
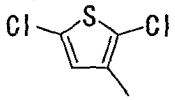
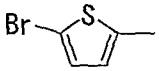
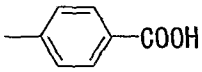
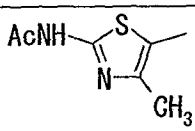
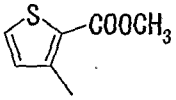
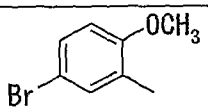
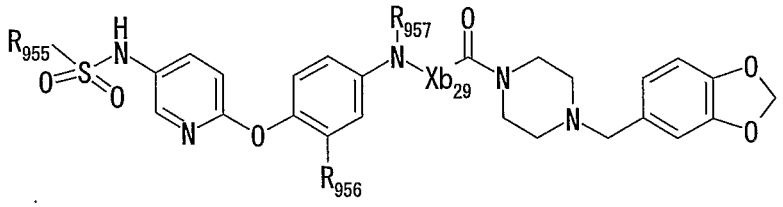
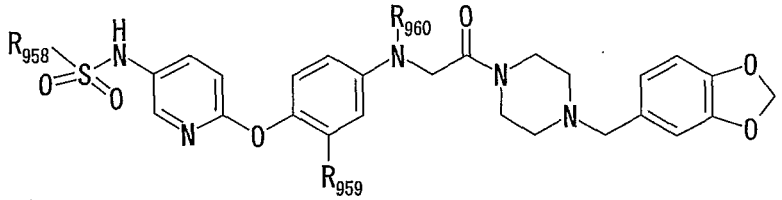
Example No.	R_{953}	R_{954}	MS (M^{+}+H)
1997		-CH_3	690
1998		-CH_3	704
1999		-CH_3	704
2000	-CH_2Cl	-CH_3	602
2001		-CH_3	716
2002		-CH_3	674
2003		-CH_3	708
2004		-CH_3	694
2005		-CH_3	740
2006	benzyl	-CH_3	644
2007	-$CHCl_2$	-CH_3	636
2008	PhCH=CH-	-CH_3	656
2009	-$(CH_2)_2CH_3$	-CH_3	596
2010	2,3,4-F_3Ph-	-H	670
2011	2,3,4-F_3Ph-	-F	688
2012	2,3,4-F_3Ph-	-CH_3	684

Table 320



Example No.	R_{955}	R_{956}	R_{957}	Xb_{29}	^{1}H NMR (solvent) δppm
2013	3,4-Cl_2Ph-	-CH_3	-H	-CO-	($CDCl_3$) 2.12(3H, s), 2.50-2.52(4H, m), 3.45(2H, s), 3.72(2H, brs), 4.24(2H, brs), 5.95(2H, s), 6.71-6.78(2H, m), 6.85-6.89(2H, m), 7.00(1H, d, J = 8.6 Hz), 7.42(1H, dd, J = 8.6 Hz, 2.5 Hz), 7.52-7.55(3H, m), 7.60(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.70(1H, d, J = 2.6 Hz), 7.79(1H, brs), 9.17(1H, brs).
2014	4-CF_3Ph-	-CH_3	-H	-CO-	($CDCl_3$) 2.10(3H, s), 2.50-2.54(4H, m), 3.45(2H, s), 3.70-3.73(2H, m), 4.23(2H, brs), 5.95(2H, s), 6.71-6.78(2H, m), 6.83-6.87(2H, m), 6.99(1H, d, J = 8.6 Hz), 7.42(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.54(1H, d, J = 2.5 Hz), 7.60(1H, dd, J = 8.7 Hz, 3.3 Hz), 7.70(1H, d, J = 3.3 Hz), 7.72(2H, d, J = 8.9 Hz), 7.85(2H, d, J = 8.3 Hz), 9.18(1H, brs).
2015	3,4-Cl_2Ph-	-CH_3	-CH_3	-CO-	($CDCl_3$) 2.12(3H, brs), 2.20-2.50(4H, m), 3.27-3.46(9H, m), 5.95-5.96(2H, m), 6.66-6.77(3H, m), 6.85-7.04(2H, m), 7.08-7.22(2H, m), 7.51-7.53(2H, m), 7.55-7.72(2H, m), 7.78-7.80(1H, m).
2016	4-CF_3Ph-	-CH_3	-CH_3	-CO-	(DMSO-d_6) 2.11(3H, s), 2.19-2.51(4H, m), 3.28-3.71(9H, m), 5.96(2H, s), 6.65-6.78(3H, m), 6.85-7.04(2H, m), 7.08-7.22(2H, m), 7.57-7.65(1H, m), 7.70-7.73(3H, m), 7.84-7.87(2H, m).
2017	3,4-Cl_2Ph-	-H	-SO_2CH_3	-CH_2-	($CDCl_3$) 2.42(4H, brs), 3.20(3H, s), 3.37-3.39(2H, m), 3.42(2H, s), 3.61(2H, brs), 4.54(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.83(1H, brs), 6.93(1H, d, J = 8.6 Hz), 7.08(2H, d, J = 8.9 Hz), 7.53-7.54(2H, m), 7.58-7.63(3H, m), 7.77(1H, d, J = 2.6 Hz), 7.88(1H, d, J = 1.0 Hz).
2018	4-CF_3Ph-	-H	-SO_2CH_3	-CH_2-	($CDCl_3$) 2.42(4H, brs), 3.19(3H, s), 3.37(2H, brs), 3.42(2H, s), 3.61(2H, brs), 4.53(2H, s), 5.95(2H, s), 6.73-6.77(2H, m), 6.83(1H, brs), 6.92(1H, d, J = 8.7 Hz), 7.08(2H, d, J = 8.7 Hz), 7. 59(2H, d, J = 8.7 Hz), 7.61(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.73-7.76(3H, m), 7.87(2H, d, J = 8.6 Hz).
2019	3,4-Cl_2Ph-	-CH_3	-SO_2CH_3	-CH_2-	($CDCl_3$) 2.12(3H, s), 2.42(4H, brs), 3.21(3H, s), 3.38(2H, brs), 3.42(2H, s), 3.61(2H, brs), 4.53(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.83(1H, brs), 6.91(1H, d, J = 8.7 Hz), 6.98(1H, d, J = 8.4 Hz), 7.40-7.50(2H, m), 7.53-7.56(2H, m), 7.60(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.71(1H, d, J = 2.3 Hz), 7.80(1H, dd, J = 1.7 Hz, 0.8 Hz).

Table 321



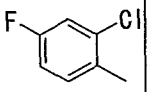
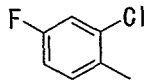
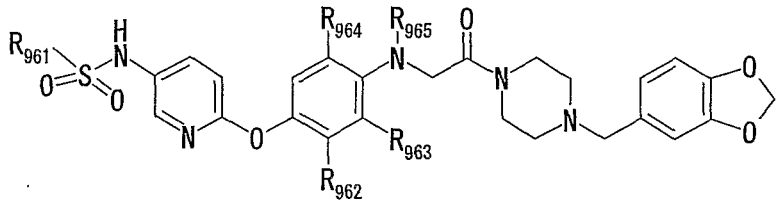
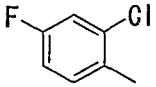
Example No.	R_{958}	R_{959}	R_{960}	^{1}H NMR (solvent) δppm
2020	4-CF_3Ph-	-CH_3	-SO_2CH_3	($CDCl_3$) 2.10(3H, s), 2.40-2.42(4H, m), 3.20(3H, s), 3.37(2H, brs), 3.42(2H, s), 3.60(2H, brs), 4.53(2H, s), 5.94(2H, s), 6.69-6.76(2H, m), 6.83(1H, brs), 6.87(1H, d, J = 8.7 Hz), 6.96(1H, d, J = 8.4 Hz), 7.40(1H, d, J = 8.6 Hz), 7.44(1H, brs), 7.59(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.72(2H, d, J = 8.2 Hz), 7.73(1H, d, J = 2.8 Hz), 7.86(2H, d, J = 8.2 Hz).
2021	4-CF_3Ph-	-CF_3	-C_2H_5	(DMSO-d_6) 1.11(3H, t, J = 6.9 Hz), 2.25-2.45(4H, m), 3.35-3.55(8H, m), 4.26(2H, s), 5.99(2H, s), 6.67-7.04(7H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.74(1H, d, J = 2.6 Hz), 7.88-7.98(4H, m), 10.48(1H, brs).
2022		-CF_3	-C_2H_5	(DMSO-d_6) 1.11(3H, t, J = 6.9 Hz), 2.25-2.45(4H, m), 3.35-3.55(8H, m), 4.26(2H, s), 5.99(2H, s), 6.67-7.03(7H, m), 7.30-7.45(1H, m), 7.52(1H, dd, J = 8.8 Hz, 2.6 Hz), 7.71(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.79(1H, d, J = 2.7 Hz), 7.99-8.05(1H, m), 10.61(1H, brs).
2023	3,4-Cl_2Ph-	-CF_3	-CH_3	(DMSO-d_6) 2.20-2.45(4H, m), 2.97(3H, s), 3.40-3.55(6H, m), 4.34(2H, s), 5.99(2H, s), 6.70-6.80(2H, m), 6.83-6.88(3H, m), 6.97(1H, d, J = 8.8 Hz), 7.03-7.07(1H, m), 7.52(1H, dd, J = 8.8 Hz, 2.8 Hz), 7.63(1H, dd, J = 8.6 Hz, 2.2 Hz), 7.75(1H, d, J = 2.7 Hz), 7.83-7.87(2H, m), 10.39(1H, brs).
2024		-CF_3	-CH_3	(DMSO-d_6) 2.25-2.50(4H, m), 2.97(3H, s), 3.35-3.55(6H, m), 4.34(2H, s), 5.99(2H, s), 6.74-7.05(7H, m), 7.30-7.45(1H, m), 7.52(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.71(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.80(1H, d, J = 2.7 Hz), 8.00-8.06(1H, m), 10.61(1H, brs).
2025	3,4-Cl_2Ph-	-CN	-CH_3	(DMSO-d_6) 2.25-2.50(4H, m), 2.94(3H, s), 3.35-3.50(6H, m), 4.33(2H, s), 5.99(2H, s), 6.74-7.11(7H, m), 7.50-7.65(2H, m), 7.78(1H, d, J = 2.6 Hz), 7.83(1H, d, J = 8.5 Hz), 7.89(1H, d, J = 1. 5 Hz), 10.45(1H, brs).
2026	4-CF_3Ph-	-OCH_3	-SO_2CH_3	($CDCl_3$) 2.43(4H, brs), 3.20(3H, s), 3.38(2H, brs), 3.43(2H, s), 3.61(2H, brs), 3.68(3H, s), 4.54(2H, s), 5.94(2H, s), 6.73-6.76(2H, m), 6.80-6.90(2H, m), 7.04(1H, d, J = 8.4 Hz), 7.15-7.19(1H, m), 7.24-7.26(1H, m), 7.57(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.70-7.72(4H, m), 7.85(2H, d, J = 8.2 Hz).
2027	3,4-Cl_2Ph-	-OCH_3	-SO_2CH_3	($CDCl_3$) 2.43(4H, brs), 3.21(3H, s), 3.37(2H, brs), 3.43(2H, s), 3.61(2H, brs), 3.71(3H, s), 4.54(2H, s), 5.95(2H, s), 6.73-6.77(2H, m), 6.83(1H, s), 6.92(1H, d, J = 8.7 Hz), 7.06(1H, d, J = 8.6 Hz), 7.18(1H, dd, J = 8.4 Hz, 2.3 Hz), 7.25(2H, s), 7.52(2H, s), 7.57(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.70(1H, d, J = 2.6 Hz), 7.81(1H, s).

Table 322



Example No.	R_{961}	R_{962}	R_{963}	R_{964}	R_{965}	^{1}H NMR (DMSO-d_6) δppm
2028	3,4-Cl_2Ph-	-CH_3	-H	-CH_3	-CH_3	1.93(3H, s), 2.16(3H, s), 2.20-2.40(4H, m), 2.63(3H, s), 3.39(2H, s), 3.39-3.50(4H, m), 3.74(2H, s), 5.99(2H, s), 6.72-6.92(5H, m), 6.98(1H, s), 7.51(1H, dd, J = 8.8 Hz, 2.4 Hz), 7.63(1H, dd, J = 8.5 Hz, 1.4 Hz), 7.73(1H, d, J = 2.6 Hz), 7.82-7.87(2H, m), 10.35(1H, brs).
2029		-CH_3	-H	-CH_3	-CH_3	1.90(3H, s), 2.15(3H, s), 2.25-2.40(4H, m), 2.62(3H, s), 3.38(2H, s), 3.38-3.50(4H, m), 3.73(2H, s), 5.98(2H, s), 6.72-6.76(2H, m), 6.82-6.88(3H, m), 6.97(1H, s), 7.30-7.45(1H, m), 7.51(1H, dd, J = 8.8 Hz, 2.7 Hz), 7.72(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.78(1H, d, J = 2.8 Hz), 7.98-8.04(1H, m), 10.56(1H, brs).
2030	3,4-Cl_2Ph-	-H	-CF_3	-H	-C_2H_5	0.92(3H, t, J = 7.1 Hz), 2.20-2.40(4H, m), 3.11(2H, q, J = 7.1 Hz), 3.35-3.50(6H, m), 3.83(2H, s), 5.98(2H, s), 6.70-6.90(3H, m), 7.05(1H, d, J = 8.8 Hz), 7.32-7.36(2H, m), 7.56-7.75(3H, m), 7.81-7.91(3H, m), 10.48(1H, brs).

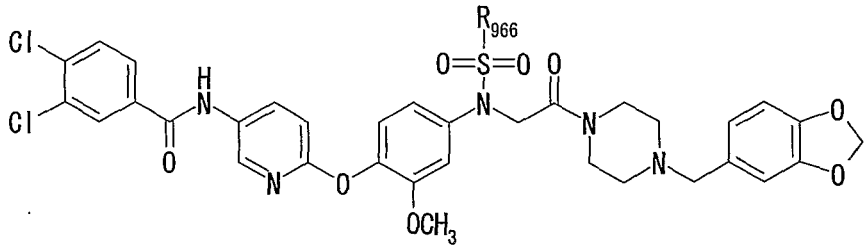
Example 2031

N-{4-[4-(4-benzenesulfonylpiperazin-1-yl)phenoxy]phenyl}-3,4-dichlorobenzamide

Melting point: 191-192 °C

The following compounds were produced in the same manner as in Reference Example 292.

Table 323



Example No.	R_{966}	^{1}H NMR ($CDCl_3$) δppm
2032	$-CH_3$	2.41(4H, brs), 3.20(3H, s), 3.36(2H, brs), 3.42(2H, s), 3.59(2H, brs), 3.66(3H, s), 4.50(2H, s), 5.94(2H, s), 6.70-6.76(2H, m), 6.83(1H, s), 6.93(1H, d, J = 8.7 Hz), 6.99-7.04(2H, m), 7.13(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.51(1H, d, J = 2.3 Hz), 7.69(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.95(1H, d, J = 2.1 Hz), 8.12(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz), 8.53(1H, s).
2033	$-C_2H_5$	1.37(3H, t, J = 7.4 Hz), 2.42(4H, brs), 3.38-3.46(6H, m), 3.60(2H, brs), 3.71(3H, s), 4.53(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 6.97(1H, d, J = 8.7 Hz), 7.06(1H, d, J = 8.6 Hz), 7.14-7.18(1H, m), 7.26(1H, s), 7.55(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.98(1H, d, J = 2.1 Hz), 8.16-8.23(3H, m).

Example 2034

Production of *t*-butyl 4-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]phenylcarbamoyl}piperidine-1-carboxylate

To a solution of N-[6-(4-aminophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide dihydrochloride (1.0 g, 2.24 mmol) in DMF (15 mL) were added, piperidine-1,4-dicarboxylic acid mono-*t*-butyl ester (510 mg, 2.22 mmol), triethylamine (0.94 mL, 6.74 mmol), 1-hydroxybenzotriazole monohydrate (350 mg, 2.29 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (514 mg, 2.68 mmol) under ice cooling. The resulting solution was then stirred under ice cooling for 1 hour, and at room temperature for 17 hours. This reaction solution was concentrated under

reduced pressure. The residue was diluted with water and ethyl acetate, whereupon a white powder was precipitated. The white powder was filtered, then washed with water, and subsequently washed with ethyl acetate, to thereby yield 1.04 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 1.41(9H, s), 1.35-1.50(2H, m), 1.70-1.85(2H, m), 2.40-2.60(1H, m), 2.65-2.90(2H, m), 3.90-4.11(2H, m), 7.03(1H, d, J = 8.9 Hz), 7.06(2H, d, J = 8.9 Hz), 7.62(2H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.46(1H, d, J = 2.6 Hz), 9.96(1H, s), 10.54(1H, s).

The following compound was produced in the same manner as in Example 2034.

Example 2035

3,4-Dichloro-N-(6-{4-[2-(2,4-dioxothiazolidine-5-yl)-acetylamino]phenoxy}pyridin-3-yl)benzamide

^{1}H NMR (DMSO-d_6) δ 3.07(1H, dd, J = 16.5 Hz, 8.9 Hz), 3.24(1H, dd, J = 16.5 Hz, 4.0 Hz), 4.73(1H, dd, J = 9.0 Hz, 4.0 Hz), 7.04(1H, d, J = 8.9 Hz), 7.08(2H, d, J = 8.9 Hz), 7.58(2H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.2 Hz), 7.94(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.46(1H, d, J = 2.6 Hz), 10.21(1H, s), 10.53(1H, s), 12.00(1H, s).

Example 2036

Production of 3,4-dichloro-N-(6-{4-[4-piperonyl-piperazin-1-ylmethyl]phenoxy}pyridin-3-yl)benzamide

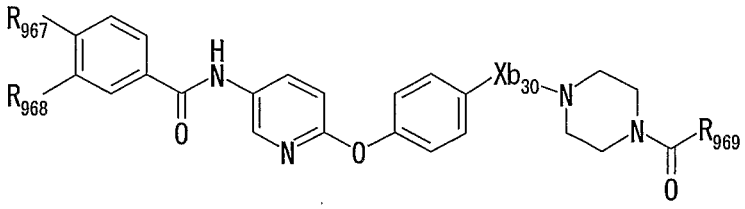
To a solution of 3,4-dichloro-N-[6-(4-piperazin-1-ylmethylphenoxy)pyridin-3-yl]benzamide (300 mg, 0.66 mmol) in DMF (10 mL) were added piperonylic acid (120 mg, 0.72 mmol), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (140 mg, 0.73 mmol) and 1-hydroxybenzotriazole monohydrate (100 mg, 0.74 mmol) under ice cooling. The resulting reaction solution was stirred overnight at room temperature. To the residue was added a saturated sodium bicarbonate solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated, to thereby yield 110 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.46(4H, brs), 3.53(2H, s), 3.60(4H, brs), 5.99(2H, s), 6.79(1H, d, J = 7.9 Hz), 6.85-6.96(3H, m), 7.08(2H, d, J = 8.6 Hz), 7.33(2H, d, J = 8.3 Hz), 7.54(1H, d, J = 8.3 Hz), 7.69-7.73(1H, m), 7.99(1H, d, J = 2.3 Hz), 8.16-8.21(1H, m), 8.27-8.30(2H, m).

The following compounds were produced in the same manner as in Example 2036.

Table 324



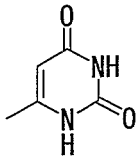
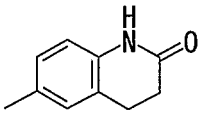
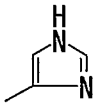
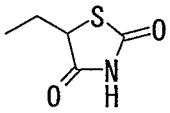
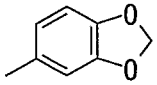
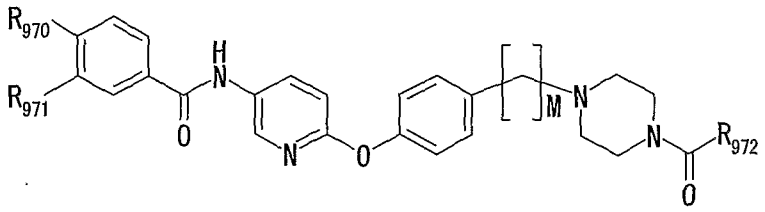
Example No.	R_{967}	R_{968}	Xb_{30}	R_{969}	mp (°C) or ^{1}H NMR (solvent) δppm
2037	-CF_3	-H	-CO-		^{1}H NMR (DMSO-d_6) 3.52(4H, brs), 3.60(4H, brs), 5.57(1H, s), 7.17(1H, d, J = 8.9 Hz), 7.20(2H, d, J = 8.9 Hz), 7.51(2H, d, J = 8.4 Hz), 7.95(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.27(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.55(1H, d, J = 2.6 Hz), 10.69(1H, brs), 11.18(1H, brs), 11.32(1H, brs).
2038	-Cl	-Cl	-CH_2-		mp 250-251
2039	-CF_3	-H	-CH_2-	2-CNPh-	mp 189-192
2040	-CF_3	-H	-CH_2-	4-pyridyl	mp 122-124
2041	-CF_3	-H	-CH_2-	3-pyridyl	mp 167-168
2042	-CF_3	-H	-CH_2-	2-pyridyl	mp 189-191
2043	-CF_3	-H	-CH_2-		^{1}H NMR (DMSO-d_6) 2.45(4H, brs), 3.36(2H, s), 3.54-4.18(4H, m), 7.09(3H, d, J = 8.9 Hz), 7.36(2H, d, J = 8.4 Hz), 7.59(1H, brs), 7.72(1H, s), 7.94(2H, d, J = 8.4 Hz), 8.18(2H, d, J = 8.4 Hz), 8.24(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.53(1H, d, J = 2.6 Hz), 10.67(1H, s), 12.48(1H, brs).
2044	-CF_3	-H	-CH_2-		^{1}H NMR ($CDCl_3$ + CD_3OD) 2.98-3.15(5H, m), 3.34-3.47(1H, m), 3.61-3.76(4H, m), 4.18(2H, s), 4.57(1H, dd, J = 10.2 Hz, 3.1 Hz), 7.04(1H, d, J = 8.7 Hz), 7.19(2H, d, J = 8.6 Hz), 7.49(2H, d, J = 8.6 Hz), 7.79(2H, d, J = 8.3 Hz), 8.11(2H, d, J = 8.1 Hz), 8.25 (1H, dd, J = 8.9 Hz, 2.8 Hz), 8.52(1H, d, J = 2.3 Hz).
2045	-CF_3	-H	-$(CH_2)_3$-		^{1}H NMR ($CDCl_3$) 1.81-1.89(2H, m), 2.40-2.45(6H, m), 2.62-2.68(2H, m), 3.61(4H, brs), 5.98(2H, s), 6.76-6.93(4H, m), 7.03(2H, d, J = 8.4 Hz), 7.19(2H, d, J = 8.4 Hz), 7.68(2H, d, J = 8.4 Hz), 7.99(2H, d, J = 8.3 Hz), 8.18-8.23(1H, m), 8.30(1H, d, J = 2.6 Hz), 8.73(1H, s).
2046	-CF_3	-H	-$(CH_2)_3$-	3,4-$(CH_3O)_2$Ph-	^{1}H NMR ($CDCl_3$) 1.78-1.89(2H, m), 2.39-2.45(6H, m), 2.63-2.68(2H, m), 3.62(4H, brs), 3.85(3H, s), 3.89(3H, s), 6.82-6.85(1H, m), 6.91-6.95(3H, m), 7.01-7.06(2H, m), 7.18-7.23(2H, m), 7.70(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.20-8.24(1H, m), 8.29(1H, d, J = 2.6 Hz), 8.51(1H, brs).

Table 325



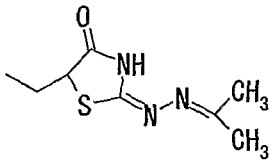
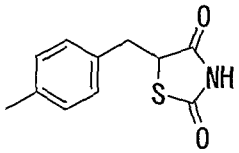
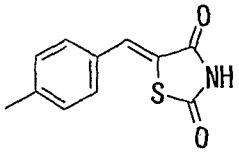
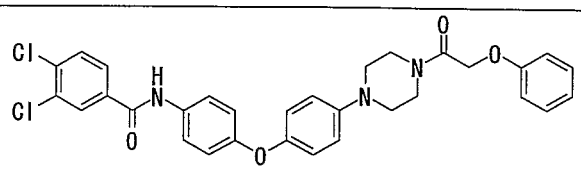
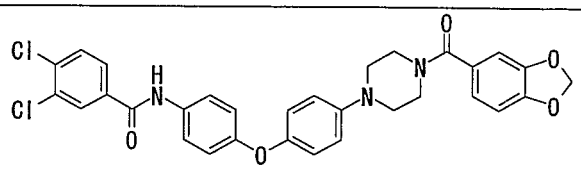
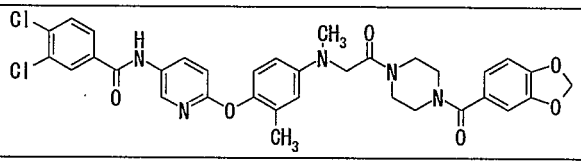
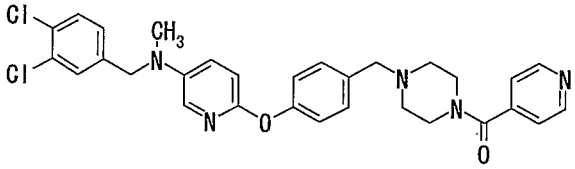
Example No.	R_{970}	R_{971}	R_{972}	M	Form	^{1}H NMR (solvent) δppm
2047	-CF_3	-H		1	free	(DMSO-d_6) 1.94(6H, s), 2.49-2.51(4H, m), 2.76-2.93(1H, m), 3.17-3.51(7H, m), 4.20(1H, dd, J = 10.4 Hz, 3.0 Hz), 7.09-7.13(3H, m), 7.42 (2H, brs), 7.94(2H, d, J = 8.4 Hz), 8.16-8.26(3H, m), 8.54(1H, d, J = 2.5 Hz), 10.67(1H, s), 11.68 (1H, brs).
2048	-CF_3	-H		1	free	($CDCl_3$ + CD_3OD) 2.46-2.59(4H, m), 3.16(1H, dd, J = 14.2 Hz, 9.4 Hz), 3.32(4H, brs), 3.51(1H, dd, J = 14.0 Hz, 3.8 Hz), 3.79(2H, brs), 4.50(1H, dd, J = 9.4 Hz, 4.0 Hz), 6.93(1H, d, J = 8.9 Hz), 7.06(2H, d, J = 8.4 Hz), 7.26-7.46(6H, m), 7.72 (2H, d, J = 8.3 Hz), 8.05(2H, d, J = 8.1 Hz), 8.27 (1H, d, J = 2.1 Hz), 8.33(1H, dd, J = 8.9 Hz, 2.8 Hz).
2049	-CF_3	-H		1	free	(DMSO-d_6) 2.49-2.52(4H, m), 3.34-3.40(4H, m), 3.57(2H, s), 7.06-7.10(3H, m), 7.36(2H, d, J = 8.6 Hz), 7.54(2H, d, J = 8.1 Hz), 7.67(2H, d, J = 8.4 Hz), 7.79(1H, s), 7.94(2H, d, J = 8.6 Hz), 8.15-8.25(3H, m), 8.51(1H, d, J = 2.8 Hz), 10.64 (1H, s).
2050	-CF_3	-H	4-pyridyl	3	hydro-chloride	(DMSO-d_6) 2.04(2H, brs), 2.63-2.69(2H, m), 3.10-3.59(9H, m), 4.54(1H, brs), 7.05-7.08(3H, m), 7.28(2H, d, J = 8.2 Hz), 7.45(2H, d, J = 4.9 Hz), 7.94(2H, d, J = 8.2 Hz), 8.18-8.26(3H, m), 8.53(1H, d, J = 2.3 Hz), 8.70(2H, d, J = 5.4 Hz), 10.72(1H, s), 11.27(1H, brs).
2051	-Cl	-Cl	3,4-F_2Ph-	1	free	($CDCl_3$) 2.46(4H, brs), 3.47-3.72(6H, m), 6.91 (1H, d, J = 8.9 Hz), 7.05-7.33(7H, m), 7.50(1H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.97(1H, d, J = 2.1 Hz), 8.14-8.18(1H, m), 8.28 (1H, d, J = 2.6 Hz), 8.68(1H, s).

Table 326

Example No.	Chemical structure	mp (°C) or ^{1}H NMR
2052		mp 171-173
2053		mp 116-118
2054		mp 133-135
2055		^{1}H NMR ($CDCl_3$) δ 2.39 (2H, brs), 2.55(2H, brs), 3.00 (3H, s), 3.35(2H, brs), 3.51 (2H, s), 3.79(2H, brs), 4.40 (2H, s), 6.82(1H, d, J = 8.9 Hz), 6.99-7.13(4H, m), 7.25-7.29(5H, m), 7.32(1H, d, J = 1.8 Hz), 7.39(1H, d, J = 3.3 Hz), 8.68-8.70(2H, m).

Example 2056

Production of N-{6-[4-(4-chloroacetylpiperazino)phenoxy]-3-pyridyl}-4-(trifluoromethyl)benzamide

To a solution of N-[6-(4-piperazinophenoxy)-3-pyridyl]-4-(trifluoromethyl)benzamide (885 mg, 2.00 mmol) in DMF (20 mL) were added triethylamine (0.418 mL, 3.00 mmol) and chloroacetyl chloride (0.191 g, 2.40 mmol), and the resulting reaction solution was stirred for 10 minutes at room temperature. To this reaction solution was added ethyl acetate. The resulting solution was washed with water, and then dried over

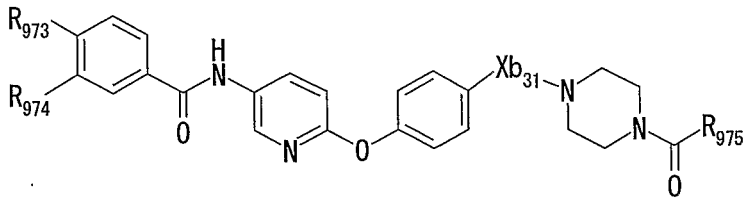
anhydrous magnesium sulfate. The solvent was evaporated, to thereby yield 1.00 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 3.17(2H, t, J = 5.0 Hz), 3.22(2H, t, J = 5.0 Hz), 3.70(2H, t, J = 5.0 Hz), 3.80(2H, t, J = 5.0 Hz), 6.95(1H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.08(2H, d, J = 9.0 Hz), 7.77(1H, brs), 7.78(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.20(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.26(1H, d, J = 2.5 Hz).

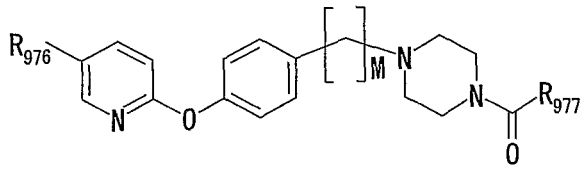
The following compounds were produced in the same manner as in Example 2056.

Table 327



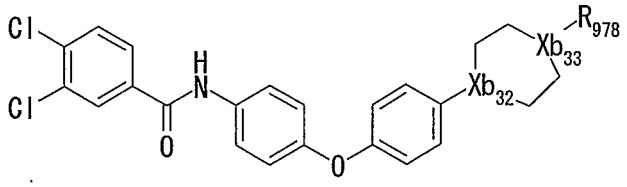
Example No.	R_{973}	R_{974}	Xb_{31}	R_{975}	mp (°C) or ^{1}H NMR (solvent) δppm
2057	-CF_3	-H	-CO-	4-CNPh-	^{1}H NMR (DMSO-d_6) 3.29-3.69(8H, m), 7.14-7.20(3H, m), 7.49(2H, d, J = 8.6 Hz), 7.63(2H, d, J = 8.1 Hz), 7.93-7.95(4H, m), 8.17(2H, d, J = 8.1 Hz), 8.27(1H, dd, J = 8.9 Hz, 2.4 Hz), 8.55(1H, d, J = 2.4 Hz), 10.66(1H, s).
2058	-CF_3	-H	-CO-	-CH_3	^{1}H NMR ($CDCl_3$) 2.13(3H, s), 3.35-3.90(8H, m), 7.02(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.6 Hz), 7.44(2H, d, J = 8.6 Hz), 7.75(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.25(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.33(1H, d, J = 2.5 Hz), 8.38(1H, brs).
2059	-Cl	-Cl	-CH_2-	-Ph	^{1}H NMR ($CDCl_3$) 2.08-2.55(4H, m), 3.43-3.45(2H, m), 3.55(2H, s), 3.79-3.81(2H, m), 6.96(1H, d, J = 8.9 Hz), 7.07-7.12(2H, m), 7.33-7.46(7H, m), 7.57(1H, d, J = 8.6 Hz), 7.69-7.73(1H, m), 7.94-7.99(2H, m), 8.17-8.21(1H, m), 8.27(1H, d, J = 2.6 Hz).
2060	-Cl	-Cl	-CH_2-	4-CNPh-	^{1}H NMR ($CDCl_3$) 2.44(2H, brs), 2.58(2H, brs), 3.39(2H, brs), 3.56(2H, s), 3.81(2H, brs), 6.96(1H, d, J = 8.9 Hz), 7.08-7.12(2H, m), 7.34(2H, d, J = 8.4 Hz), 7.48-7.51(2H, m), 7.57(1H, d, J = 8.4 Hz), 7.69-7.77(3H, m), 7.95(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.14-8.21(1H, m), 8.27(1H, d, J = 2.3 Hz).
2061	-CF_3	-H	-CH_2-	4-CNPh-	mp 167-168
2062	-CF_3	-H	-CH_2-	-Ph	^{1}H NMR ($CDCl_3$) 2.41-2.53(4H, m), 3.43(2H, brs), 3.53 (2H, s), 3.78(2H, brs), 6.95(1H, d, J = 8.9 Hz), 7.06-7.11 (2H, m), 7.33-7.41(7H, m), 7.71(2H, d, J = 8.4 Hz), 7.99 (2H, d, J = 8.4 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.31 (1H, d, J = 2.7 Hz), 8.39(1H, s).
2063	-CF_3	-H	-CH_2-	3,4-F_2Ph-	mp 130-133
2064	-CF_3	-H	-CH_2-	3-CNPh-	^{1}H NMR ($CDCl_3$) 2.43(2H, brs), 2.56(2H, brs), 3.39(2H, brs), 3.55(2H, s), 3.79(2H, brs), 6.97(1H, d, J = 8.9 Hz), 7.07-7.12(2H, m), 7.32-7.37(2H, m), 7.50-7.77(6H, m), 8.00(2H, d, J = 8.1 Hz), 8.07(1H, brs), 8.23(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.28(1H, d, J = 2.7 Hz).
2065	-CF_3	-H	-CH_2-	4-CH_3Ph-	mp 193-194
2066	-CF_3	-H	-CH_2-	4-ClPh-	mp 176-178
2067	-CF_3	-H	-CH_2-	4-CH_3OPh-	mp 190-191

Table 328



Example No.	R_{976}	R_{977}	M	^{1}H NMR ($CDCl_3$) δppm
2068	3,4-$Cl_2PhCH_2N(CH_3)$-	-Ph	1	2.38(2H, brs), 2.53(2H, brs), 2.99(3H, s), 3.42(2H, brs), 3.50(2H, s), 3.79(2H, brs), 4.39(2H, s), 6.81(1H, d, J = 8.9 Hz), 6.99-7.12(4H, m), 7.26-7.39(9H, m), 7.69(1H, d, J = 3.1 Hz).
2069	3,4-$Cl_2PhCH_2N(CH_3)$-	4-CNPh-	1	2.39(2H, brs), 2.55(2H, brs), 3.01(3H, s), 3.35(2H, brs), 3.51(2H, s), 3.79(2H, brs), 4.40(2H, s), 6.82(1H, d, J = 8.9 Hz), 6.99-7.13(4H, m), 7.25-7.33(3H, m), 7.39(1H, d, J = 8.1 Hz), 7.48-7.52(2H, m), 7.69-7.73(3H, m).
2070	3,4-$Cl_2PhCH_2N(CH_3)$-	4-ClPh-	1	2.34-2.59(4H, m), 3.00(3H, s), 3.36(2H, brs), 3.52(2H, s), 3.83(2H, brs), 4.40(2H, s), 6.82(1H, d, J = 8.9 Hz), 6.98-7.13(4H, m), 7.25-7.41(8H, m), 7.70(1H, d, J = 3.3 Hz).
2071	3,4-$Cl_2PhCH_2N(CH_3)$-	3,4-F_2Ph-	1	2.33-2.57(4H, m), 3.00(3H, s), 3.37-3.51(4H, m), 3.75 (2H, brs), 4.40(2H, s), 6.82(1H, d, J = 8.9 Hz), 7.00-7.32 (10H, m), 7.39(1H, d, J = 8.1 Hz), 7.69(1H, d, J = 3.1 Hz).
2072	4-$CF_3PhCONH$-	-Ph	3	1.78-1.89(2H, m), 2.39-2.49(6H, m), 2.66(2H, t, J = 7.6 Hz), 3.44(2H, brs), 3.79(2H, brs), 6.94(1H, d, J = 8.7 Hz), 7.02-7.07(2H, m), 7.18-7.23(2H, m), 7.35-7.42(5H, m), 7.72(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.1 Hz), 8.19-8.29(3H, m).
2073	4-$CF_3PhCONH$-	4-CNPh-	3	1.79-1.90(2H, m), 2.41-2.69(8H, m), 3.39(2H, brs), 3.81 (2H, brs), 6.95(1H, d, J = 8.9 Hz), 7.02-7.07(2H, m), 7.18-7.23(2H, m), 7.49(2H, d, J = 7.9 Hz), 7.69-7.77(4H, m), 8.00(2H, d, J = 8.1 Hz), 8.06(1H, brs), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.28(1H, d, J = 2.6 Hz).
2074	4-$CF_3PhCONH$-	3,4-F_2Ph-	3	1.82-1.87(2H, m), 2.41-2.69(8H, m), 3.47-3.76(4H, m), 6.95(1H, d, J = 8.7 Hz), 7.02-7.07(2H, m), 7.11-7.28(5H, m), 7.75(2H, d, J = 8.4 Hz), 7.99-8.06(3H, m), 8.19-8.23 (1H, m), 8.28(1H, d, J = 2.6 Hz).

Table 329



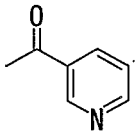
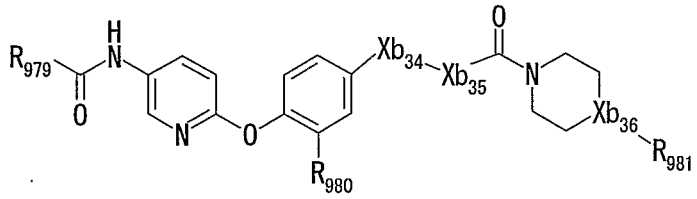
Example No.	Xb_{32}	Xb_{33}	R_{978}	mp (°C) or ^{1}H NMR (solvent) δppm
2075	N	N	-COPh	mp 136-138
2076	N	N	4-CH_3OPhCO-	mp 161-162
2077	N	N	4-CF_3PhCO-	mp 143-144
2078	N	N		mp 163-165
2079	N	N	4-ClPhCO-	mp 147-151
2080	N	H C	-$N(CH_3)COPh$	mp 231-232
2081	N	H C	-$N(CH_3)COCH_2Cl$	^{1}H NMR ($CDCl_3$) 1.70-1.76(2H, m), 1.80-1.90(2H, m), 2.80-2.88(2H, m), 2.98(3H, s), 3.56-3.68(2H, m), 4.10 (2H, s), 4.57(1H, m), 6.94-6.99(6H, m), 7.53-7.58(3H, m), 7.69-7.71(2H, m), 7.97(1H, d, J = 2.0 Hz).
2082	N	N	-$COCH_2Cl$	^{1}H NMR (DMSO-d_6) 3.08(2H, m), 3.14(2H, m), 3.61(4H, m), 4.44(2H, s), 6.93-7.02(6H, m), 7.71(2H, d, J = 9.0 Hz), 7.82(1H, d, J = 8.5 Hz), 7.93(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.39(1H, s).
2083	H C	N	-$COCH_2Cl$	^{1}H NMR ($CDCl_3$) 1.66(1H, m), 1.74(1H, m), 1.91-1.98 (2H, m), 2.72-2.77(2H, m), 3.24(1H, m), 3.99(1H, brd, J = 13.0 Hz), 4.11(2H, s), 4.73(1H, brd, J = 13.0 Hz), 6.96 (2H, d, J = 8.5 Hz), 7.02(2H, d, J = 9.0 Hz), 7.15(2H, d, J = 8.5 Hz), 7.56-7.79(3H, m), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.90(1H, brs), 7.98(1H, d, J = 2.0 Hz).

Table 330



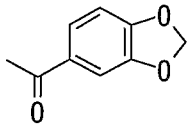
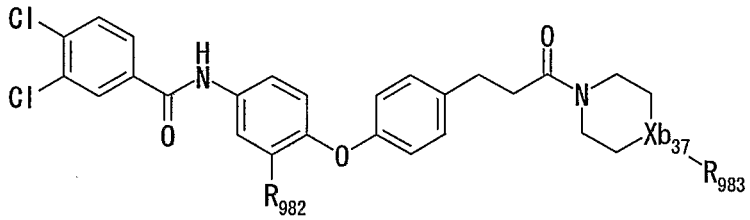
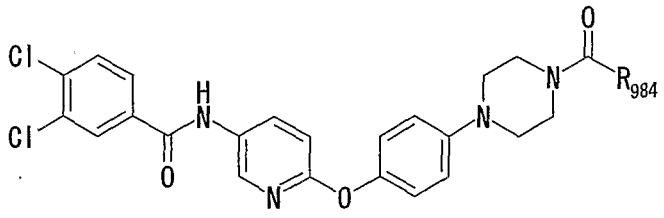
Example No.	R_{979}	R_{980}	Xb_{34}	Xb_{35}	Xb_{36}	R_{981}	mp (°C) or MS
2084	3,4-Cl_2Ph-	-H	none	none		-N(CH_3)$COCH_2Ph$	MS 616(M^+)
2085	4-CF_3Ph-	-CH_3	-N(CH_3)-	-CH_2-		4-CNPhCO-	mp 131-132
2086	4-CF_3Ph-	-CH_3	-N(CH_3)-	-CH_2-			mp 143-145

Table 331



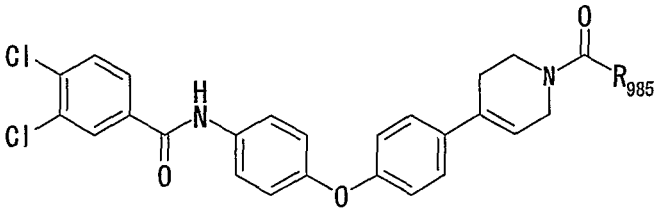
Example No.	R_{982}	Xb_{37}	R_{983}	Property
2087	-H		-Ac	mp 138-140°C
2088	-F		-N(CH_3)$COCH_2Ph$	MS 661(M^+)
2089	-H		-$COCH_2Cl$	^{1}H NMR ($CDCl_3$) δ 2.62(2H, t, J = 7.6 Hz), 2.95(2H, t, J = 7.6 Hz), 3.31-3.73(8H, m), 4.05(2H, s), 6.91(2H, d, J = 8.5 Hz), 6.97(2H, d, J = 8.9 Hz), 7.15(2H, d, J = 8.5 Hz), 7.49-7.60(3H, m), 7.68(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.91(1H, brs), 7.95(1H, d, J = 2.1 Hz).

Table 332



Example No.	R_{984}	mp (°C)
2090	2-pyridyl	217-218
2091	3-pyridyl	191-192
2092	4-pyridyl	204-205

Table 333



Example No.	R_{985}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2093	-Ph	mp 185-186
2094	$-CH_2Cl$	a mixture of the rotational isomers ^{1}H NMR 2.57(0.4H, brs), 2.65(0.6H, brs), 3.74(0.6H, t, J = 6.0 Hz), 3.85 (0.4H, t, J = 6.0 Hz), 4.13(0.8H, s), 4.15(1.2H, s), 4.22(1.2H, m), 4.25 (0.8H, m), 5.89(0.4H, brs), 6.04(0.6H, brs), 6.98(2H, d, J = 8.5 Hz), 7.04 (2H, d, J = 9.0 Hz), 7.34(2H, dd, J = 8.5 Hz, 4.0 Hz), 7.56-7.60(3H, m), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.89(1H, brs), 7.89(1H, d, J = 2.0 Hz).

Example 2095

Production of 1-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}-4-benzoyloxypiperidine

To a solution of 1-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}-4-hydroxypiperidine (200 mg, 0.44 mmol) in dichloromethane (8 mL) were added with triethylamine

(0.091 mL, 0.65 mmol), benzoyl chloride (74 mg, 0.53 mmol) and 4-(dimethylamino)pyridine (3 mg, 0.025 mmol), and the resulting solution was stirred for 2.5 days at room temperature. This reaction solution was purified by silica gel column chromatography (methanol : dichloromethane = 7 : 93), to thereby yield 80 mg of the title compound.

Appearance: White powder

Melting point: 188-190°C

Example 2096

Production of 3,4-dichloro-N-(6-{4-[[2-oxo-2-(4-piperonylpiperazin-1-yl)ethyl](2,2,2-trifluoroacetyl)amino]phenoxy}pyridin-3-yl)benzamide

To a solution of 3,4-dichloro-N-(6-{4-[2-oxo-2-(4-piperonylpiperazin-1-yl)ethylamino]phenoxy}pyridin-3-yl)benzamide (0.152 g, 0.239 mmol) in THF (5 mL) were added triethylamine (0.0500 mL, 0.359 mmol) and trifluoroacetic anhydride (0.0410 mL, 0.287 mmol), and the resulting solution was stirred for 6 hours. Water was added to the resulting reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 20 : 1) to yield a solid. This solid was recrystallized from methanol, to thereby yield 28.8 mg of the title

compound.

Appearance: White powder

Melting point: 211-213°C

The following compound was produced in the same manner as in Example 2096.

Example 2097

N-[6-(4-Acetyl[2-oxo-2-(4-piperonylpiperazin-1-yl)ethyl]amino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide

^{1}H NMR ($CDCl_3$) δ 1.90(3H, s), 2.28(2H, brs), 2.38(2H, brs), 3.37(4H, brs), 3.49(2H, brs), 3.67(3H, s), 4.43(2H, s), 5.93(2H, s), 6.68-6.75(2H, m), 6.82(1H, s), 6.91-6.97(2H, m), 7.07-7.10(2H, m), 7.53(1H, d, J = 8.4 Hz), 7.76(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.05(1H, d, J = 2.0 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.37(1H, d, J = 2.6 Hz), 9.26(1H, s).

Example 2098

Production of N-[6-(benzoyl{4-[3-oxo-3-(4-piperonylpiperazin-1-yl)propyl]phenyl}amino)pyridin-3-yl]-3,4-dichlorobenzamide monooxalate

To a solution of 3,4-dichloro-N-(6-{4-[3-oxo-3-(4-piperonylpiperazin-1-yl)propyl]phenylamino}-pyridin-3-yl)benzamide (250 mg, 0.395 mmol) in THF (5 mL) were added triethylamine (0.132 mL, 0.949 mmol) and benzoyl chloride (0.0550 mL, 0.474 mmol), and the

resulting solution was stirred for 7 hours at room temperature. Water was added to the resulting reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 10 : 1) to yield 0.300 g of a free form. To this free form were added isopropanol (5 mL) and oxalic acid dihydrate (100 mg, 0.793 mmol), and the resulting solution was dissolved under heat. The solvent was evaporated, and the resulting solid was recrystallized from isopropanol, to thereby yield 80.0 mg of the title compound.

Appearance: Yellow powder

Melting point: 140-143°C

The following compound was produced in the same manner as in Example 2098.

Example 2099

N-[6-(Acetyl{4-[3-oxo-3-(4-piperonylpiperazin-1-yl)propyl]phenyl}amino)pyridin-3-yl]-3,4-dichlorobenzamide

Melting point: 150-165°C

^{1}H NMR (DMSO-d_6) δ 1.98(3H, s), 2.62-2.98(7H, m), 3.04(1H, t, J = 12.1 Hz), 3.26(2H, t, J = 14.7 Hz), 3.35-3.50(2H, m), 4.06(1H, d, J = 13.8 Hz), 4.13-

4.26(2H, m), 4.44(1H, d, J = 13.8 Hz), 6.07(2H, s), 6.95-7.02(2H, m), 7.20-7.24(3H, m), 7.28(2H, d, J = 8.3 Hz), 7.52(1H, d, J = 8.9 Hz), 7.85(1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.23-8.26(2H, m), 8.77(1H, s), 10.77(1H, s), 11.10(1H, brs).

Example 2100

Production of 6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}-N-(3,4-dichlorophenyl)nicotinamide

To a solution of 6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}nicotinic acid (1.23 g, 2.5 mmol) in THF (35 mL) was added N,N'-carbonyldiimidazole (540 mg, 3.3 mmol), and the resulting solution was stirred for 30 minutes at room temperature. The resulting reaction solution was concentrated under reduced pressure, and to the residue was added 3,4-dichloroaniline (4.07 g, 25 mmol). The resulting solution was stirred for 3 days at room temperature. The solvent was evaporated under reduced pressure. The residue was purified by silica gel column chromatography (ethyl acetate), and the resulting product was recrystallized from diethyl ether, to thereby yield 510 mg of the title compound.

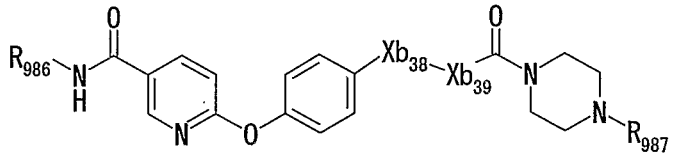
Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.33(4H, brs), 2.59-2.65(2H, m), 2.91-2.97(2H, m), 3.40(4H, brs), 3.59(2H, s), 5.94(2H, s), 6.70-6.76(2H, m), 6.83(1H, s), 6.96-7.06(3H, m), 7.20-7.26(2H, m), 7.40(1H, d, J = 8.6 Hz), 7.50-7.54(1H, m),

7.86(1H, d, J = 1.8 Hz), 8.18-8.22(1H, m), 8.44(1H, brs), 8.66(1H, brs).

The following compounds were produced in the same manner as in Example 2100.

Table 334



Example No.	R_{986}	Xb_{38}	Xb_{39}	R_{987}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2101	3,4-Cl_2Ph-	none	none	benzyl	mp 206-207
2102	4-CF_3Ph-	none	none	benzyl	^{1}H NMR 2.44(4H, brs), 3.53-3.70(6H, m), 6.93(1H, d, J = 8.4 Hz), 7.11-7.14(2H, m), 7.27-7.40(7H, m), 7.56(2H, d, J = 8.9 Hz), 7.83(2H, d, J = 8.4 Hz), 8.23-8.27(1H, m), 8.71(1H, d, J = 2.4 Hz), 9.39(1H, brs).
2103	4-CF_3Ph-	-N(CH_3)-	-CH_2-	piperonyl	^{1}H NMR 2.42(4H, brs), 3.03(3H, s), 3.43-3.52(4H, m), 3.60(2H, brs), 4.10(2H, s), 5.95(2H, s), 6.66-6.77(4H, m), 6.85(1H, brs), 6.89(1H, d, J = 8.6 Hz), 6.98(2H, d, J = 6.6 Hz), 7.60(2H, d, J = 8.4 Hz), 7.76(2H, d, J = 8.4 Hz), 8.14(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.33(1H, brs), 8.63(1H, brs).
2104	3,4-Cl_2Ph-	-N(CH_3)-	-CH_2-	piperonyl	^{1}H NMR 2.42-2.44(4H, m), 3.05(3H, s), 3.44(2H, brs), 3.47-3.57(2H, m), 3.63(2H, brs), 4.11(2H, s), 5.95(2H, s), 6.68-6.74(4H, m), 6.85(1H, brs), 6.92 (1H, d, J = 8.9 Hz), 7.00(2H, d, J = 8.7 Hz), 7.42-7.44(2H, m), 7.80-7.86(1H, m), 7.87(1H, d, J = 2.1 Hz), 8.13(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.63(1H, d, J = 2.1 Hz).
2105	4-CF_3Ph-	none	none	piperonyl	^{1}H NMR 2.71(4H, brs), 3.46-3.92(6H, m), 5.91(2H, s), 6.65-6.73(2H, m), 6.81(1H, d, J = 1.5 Hz), 7.01 (1H, d, J = 9.1 Hz), 7.14(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.60(2H, d, J = 8.6 Hz), 7.82(2H, d, J = 8.6 Hz), 8.29(1H, dd, J = 2.6 Hz, 8.6 Hz), 8.71(1H, d, J = 2.1 Hz), 8.87(1H, brs).

Example 2106

Production of (4-benzylpiperazin-1-yl){4-[5-(3,4-dichlorophenylsulfanyl)pyridin-2-yloxy]phenyl}methanone

To a solution of [4-(5-aminopyridin-2-yloxy)phenyl](4-benzylpiperazin-1-yl)methanone (0.73 g, 1.88 mmol) in concentrated sulfuric acid (0.38 mL) - water (1.1 mL) were added dropwise a solution of sodium nitrate (0.13 g, 1.88 mmol) in water (0.6 mL) under ice cooling. The reaction mixture was stirred for 10 minutes. This reaction mixtue was added to a solution of 3,4-dichlorobenzenethiol (0.24 mL, 1.88 mmol) in 2 N aqueous sodium hydroxide (2 mL) under cooling with ice. Water was added to the resulting reaction solution, and extracted with dichloromethane. The dichloromethane layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel chromatography (dichloromethane : methanol = 80 : 1), to thereby yield 0.1 g of the title compound.

Appearance: Yellow oil

^{1}H NMR ($CDCl_3$) δ 2.49(4H, brs), 3.56(2H, s), 3.56(2H, brs), 3.78(2H, brs), 6.99(1H, d, J = 8.9 Hz), 7.20(2H, d, J = 8.7 Hz), 7.25-7.39(5H, m), 7.46(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.47(2H, d, J = 8.7 Hz), 7.56(1H, d, J = 8.2 Hz), 7.76(1H, d, J = 2.0 Hz), 7.86(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.50(1H, d, J = 2.5 Hz).

The following compound was produced in the same manner as in Example 2106.

Example 2107

2-({4-[5-(3,4-Dichlorophenylsulfanyl)pyridin-2-yloxy]-3-methoxyphenyl}ethylamino)-1-(4-piperonylpiperazin-1-yl)ethanone

^{1}H NMR ($CDCl_3$) δ 1.20(3H, t, J = 7.0 Hz), 2.43(4H, t, J = 4.9 Hz), 3.43(2H, s), 3.35-3.50(2H, m), 3.49-3.60(2H, m), 3.60-3.70(2H, m), 3.73(3H, s), 4.05(2H, s), 5.95(2H, s), 6.22(1H, dd, J = 8.9 Hz, 2. 7 Hz), 6.35(1H, d, J = 2.7 Hz), 6.70-6.76(2H, m), 6.85(1H, s), 6.90(1H, d, J = 9.0 Hz), 6.98(1H, d, J = 8.8 Hz), 7.46(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.55(1H, d, J = 8.2 Hz), 7.75(1H, d, J = 2.0 Hz), 7.78(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.49(1H, d, J = 2.5 Hz).

Example 2108

Production of 1-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3-(3,4-dichlorophenyl)urea

To a solution of 3-[4-(5-aminopyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propane-1-one (600 mg, 1.3 mmol) in toluene (20 mL) were added ethyldiisopropylamine (0.454 mL, 2.6 mmol) and 3,4-dichlorophenylisocyanate (270 mg, 1.4 mmol), and the resulting solution was stirred for 1 day under reflux. The reaction solution was evaporated under reduced pressure. The residue was purified by silica gel column chromatography (methanol : chloroform = 1 : 19), and then recrystallized from ethyl acetate to thereby

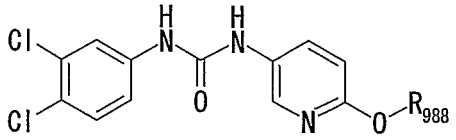
yield 280 mg of the title compound.

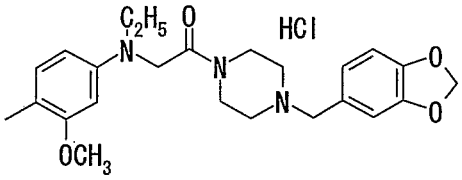
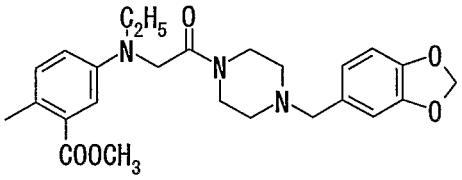
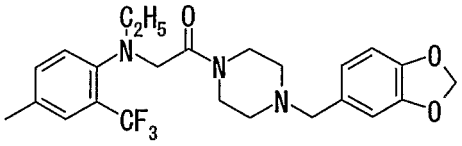
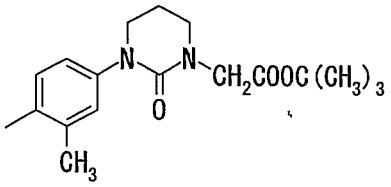
Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 2.37-2.39(4H, m), 2.61-2.67(2H, m), 2.89-2.94(2H, m), 3.41-3.47(4H, m), 3.61-3.65(2H, m), 5.94(2H, s), 6.69-6.83(4H, m), 6.95(2H, d, J = 8.4 Hz), 7.10-7.26(4H, m), 7.49(1H, d, J = 2.3 Hz), 7.93-7.96(2H, m), 8.15(1H, s), 8.21(1H, s).

The following compounds were produced in the same manner as in Example 2108.

Table 335



Example No.	R_{988}	^{1}H NMR (solvent) δppm
2109		(DMSO-d_6) 1.13(3H, t, J = 6.9 Hz), 2.20-2.60(1H, m), 2.75-3.20(2H, m), 3.20-3.65(7H, m), 3.64(3H, s), 4.05-4.52(4H, m), 6.07(2H, brs), 6.10(1H, dd, J = 8.8 Hz, 2.7 Hz), 6.27(1H, brs), 6.80(1H, d, J = 8.6 Hz), 6.84(1H, d, J = 8.6 Hz), 7.01(2H, brs), 7.19(1H, brs), 7.33(1H, dd, J = 8.9 Hz, 2.6 Hz), 7.51(1H, d, J = 8.9 Hz), 7.85(1H, dd, J = 8.9 Hz, 2.6 Hz), 7.86(1H, d, J = 2.6 Hz), 8.07(1H, d, J = 2.6 Hz), 8.94(1H, s), 9.28(1H, s).
2110		($CDCl_3$) 1.14(3H, t, J = 7.0 Hz), 2.35-2.55(4H, m), 3.38(2H, q, J = 7.0 Hz), 3.44(2H, s), 3.45-3.55(2H, m), 3.60(3H, s), 3.60-3.75(2H, m), 4.02(2H, s), 5.95(2H, s), 6.60-6.80(4H, m), 6.85(1H, s), 6.92(1H, d, J = 8.9 Hz), 7.00-7.15(2H, m), 7.22(1H, d, J = 8.7 Hz), 7.45(1H, d, J = 2.3 Hz), 7.75-7.85(2H, m), 7.95(1H, s), 7.97(1H, s).
2111		($CDCl_3$) 1.09(3H, t, J = 7.1 Hz), 2.35-2.45(4H, m), 3.10(2H, q, J = 7.1 Hz), 3.43(2H, s), 3.55-3.65(4H, m), 3.85(2H, s), 5.95(2H, s), 6.70-6.80(2H, m), 6.85(1H, s), 6.90(1H, d, J = 8.8 Hz), 7.05-7.35(4H, m), 7.46(1H, d, J = 8.8 Hz), 7.53(1H, d, J = 2.4 Hz), 7.79(1H, brs), 7.85(1H, brs), 7.93(1H, d, J = 2.6 Hz), 7.99(1H, dd, J = 8.8 Hz, 2.8 Hz).
2112		($CDCl_3$) 1.44(9H, s), 1.96(3H, s), 2.10-2.30(2H, m), 3.42-3.61(2H, m), 3.62-3.78(2H, m), 4.04(2H, s), 6.58(1H, d, J = 8.8 Hz), 6.60(1H, d, J = 8.5 Hz), 6.91(1H, dd, J = 2.6 Hz, 8.5 Hz), 7.00(1H, d, J = 2.6 Hz), 7.31(1H, d, J = 8.8 Hz), 7.36(1H, dd, J = 2.3 Hz, 8.8 Hz), 7.69(1H, d, J = 2.3 Hz), 7.79(1H, dd, J = 2.8 Hz, 8.8 Hz), 7.91(1H, d, J = 2.8 Hz), 7.93(1H, s), 8.05(1H, s).

Example 2113

Production of 4-piperonylpiperazine-1-carboxylic acid {4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]phenyl}amide hydrochloride

To a solution of {4-[5-(3,4-dichlorobenzoyl-amino)pyridin-2-yloxy]phenyl}- carbamic acid phenyl ester (320 mg , 0.65 mmol) in DMF (4 mL) was added 1-piperonylpiperazine (285 mg, 1.29 mmol), and the resulting solution was stirred for 17 hours at room temperature. This reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (dichloromethane : methanol = 25 : 1). The obtained residue was dissolved in a mixed solvent of ethanol-ethyl acetate. To the resulting solution was added a solution of 4 N hydrogen chloride in ethyl acetate to bring the pH to 3. The precipitated white powder was then filtered off and washed with ethanol, to thereby yield 330 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.85-3.09(2H, m), 3.20-3.50(4H, m), 4.12-4.38(4H, m), 6.08(2H, s), 7.02(2H, d, J = 9.0 Hz), 6.93-7.12(3H, m), 7.28(1H, d, J = 1.5 Hz), 7.49(2H, d, J = 9.0 Hz), 7.83(1H, d, J = 8.5 Hz), 7.97(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.19(1H, dd, J = 8.8 Hz, 2.6 Hz),

8.25(1H, d, J = 2.0 Hz), 8.50(1H, d, J = 2.6 Hz), 8.92(1H, s), 10.63(1H, s).

The following compound was produced in the same manner as in Example 2113.

Example 2114

4-Benzylpiperazine-1-carboxylic acid {4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]phenyl}amide hydrochloride

^{1}H NMR (DMSO-d_6) δ 2.90-3.20(2H, m), 3.22-3.45(4H, m), 4.27(2H, d, J = 13.6 Hz), 4.35(2H, d, J = 5.0 Hz), 7.02(1H, d, J = 8.9 Hz), 7.03(2H, d, J = 8.9 Hz), 7.41-7.52(3H, m), 7.48(2H, d, J = 8.9 Hz), 7.55-7.69(2H, m), 7.84(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.0 Hz), 8.49(1H, d, J = 2.6 Hz), 8.90(1H, s), 10.62(1H, s).

Example 2115

Production of 2-[(4-{5-[(3,4-dichlorobenzylidene)-amino]pyridin-2-yloxy}phenyl)methylamino]-1-(4-piperonylpiperazin-1-yl)ethanone

2-{[(4-(5-aminopyridin-2-yloxy)phenyl]methylamino}-1-(4-piperonylpiperazin-1-yl)ethanone (7.80 g, 16.4 mmol) was dissolved in methanol (400 mL), and to the resulting solution was added 3,4-dichlorobenzaldehyde (2.87 g, 16.4 mmol).

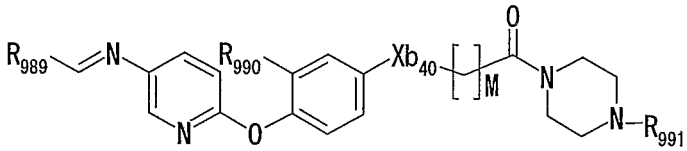
This solution was refluxed for 16 hours. The resulting reaction solution was concentrated under reduced pressure, to thereby yield 10.4 g of the title compound.

Appearance: Brown oil

^{1}H NMR ($CDCl_3$) δ 2.44(4H, brs), 3.03(3H, s), 3.44-3.45(2H, m), 3.50(2H, brs), 3.63(2H, brs), 4.09(2H, s), 5.94(2H, s), 6.65-6.77(4H, m), 6.84-6.88(2H, m), 7.03(2H, d, J = 9.1 Hz), 7.54(1H, d, J = 8.3 Hz), 7.58(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.70(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.00(1H, d, J = 2.0 Hz), 8.10(1H, d, J = 2.8 Hz), 8.39(1H, s).

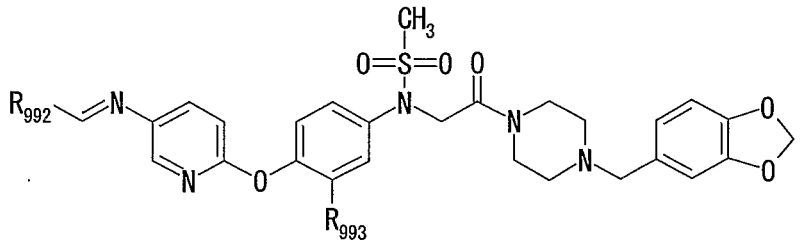
The following compounds were produced in the same manner as in Example 2115.

Table 336



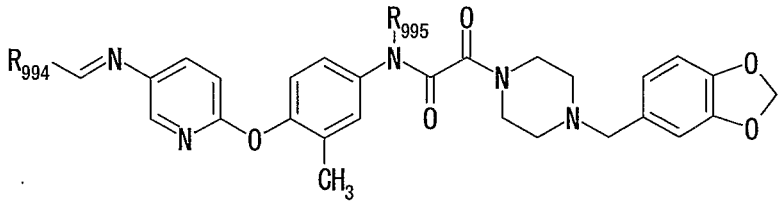
Example No.	R_{989}	R_{990}	R_{991}	Xb_{40}	M	^{1}H NMR (solvent) δppm
2116	3,4-Cl_2Ph-	-H	benzyl	none	0	(DMSO-d_6) 2.41(4H, brs), 3.34-3.51(6H, m), 7.19 (1H, d, J = 8.7 Hz), 7.20(2H, d, J = 7.9 Hz), 7.29-7.33(5H, m), 7.45(2H, d, J = 7.9 Hz), 7.81(1H, d, J = 8.3 Hz), 7.91-7.96(2H, m), 8.15(1H, brs), 8.18 (1H, d, J = 2.6 Hz), 8.75(1H, s).
2117	3,4-Cl_2Ph-	-H	benzyl	none	2	(DMSO-d_6) 2.30(4H, brs), 2.60-2.62 (2H, m), 2.79-2.85(2H, m), 3.44-3.48 (6H, m), 7.05(2H, d, J = 8.4 Hz), 7.09 (1H, d, J = 8.7 Hz), 7.25-7.36 (7H, m), 7.81(1H, d, J = 8.2 Hz), 7.88-7.93(2H, m), 8.13-8.14 (2H, m), 8.74(1H, s).
2118	4-CF_3Ph-	-H	benzyl	none	0	($CDCl_3$) 2.47(4H, brs), 3.55(2H, brs), 3.55(2H, s), 3.79(2H, brs), 7.00(1H, d, J = 8.7 Hz), 7.18(2H, d, J = 8.6 Hz), 7.22-7.40(5H, m), 7.47(2H, d, J = 8.6 Hz), 7.67(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.74(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.14(1H, d, J = 2.6 Hz), 8.54(1H, s).
2119	4-CF_3Ph-	-H	piperonyl	-N(CH_3)-	1	($CDCl_3$) 2.45(4H, brs), 3.04(3H, s), 3.45-3.51(4H, m), 3.65(2H, s), 4.09(2H, s), 5.95(2H, s), 6.71-6.74 (4H, m), 6.86-6.89(2H, m), 7.04(2H, d, J = 9.1 Hz), 7.61(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.73(2H, d, J = 8.3 Hz), 8.01(2H, d, J = 8.4 Hz), 8.14(1H, d, J = 2.6 Hz), 8.53(1H, s).
2120	4-CF_3Ph-	-F	benzyl	none	0	($CDCl_3$) 2.49(4H, brs), 3.43-3.75(6H, m), 7.07(1H, d, J = 8.6 Hz), 7.29-7.34(8H, m), 7.69(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.74(2H, d, J = 8.3 Hz), 8.02(2H, d, J = 8.3 Hz), 8.05(1H, d, J = 2.6 Hz), 8.53(1H, s).
2121	3,4-Cl_2Ph-	-H	piperonyl	-N(CH_3)-	2	($CDCl_3$) 2.34-2.41(4H, m), 2.55-2.61(2H, m), 2.95 (3H, s), 3.41(4H, brs), 3.61-3.65(2H, m), 3.68-3.76 (2H, m), 5.94(2H, s), 6.70-6.77(4H, m), 6.84(1H, d, J = 1.0 Hz), 6.89(1H, dd, J = 8.7 Hz, 0.5 Hz), 7.04(2H, d, J = 9.2 Hz), 7.55(1H, d, J = 8.3 Hz), 7.60(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.71(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.01(1H, d, J = 1.8 Hz), 8.11(1H, dd, J = 2.8 Hz, 0.5 Hz), 8.40(1H, brs).
2122	4-CF_3Ph-	-H	piperonyl	-N(CH_3)-	2	($CDCl_3$) 2.34-2.41(4H, m), 2.55-2.61 (2H, m), 2.95 (3H, s), 3.39-3.42(4H, m), 3.61-3.64(2H, m), 3.68-3.76(2H, m), 5.94(2H, s), 6.70-6.77(4H, m), 6.84(1H, d, J=0.8Hz), 6.90(1H, dd, J=8.7Hz, 0.7Hz), 7.05(2H, d, J = 9.2 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.73(2H, d, J = 8.3 Hz), 8.01(2H, d, J = 8.6 Hz), 8.13(1H, dd, J = 2.8 Hz, 0.7 Hz), 8.53(1H, brs).

Table 337



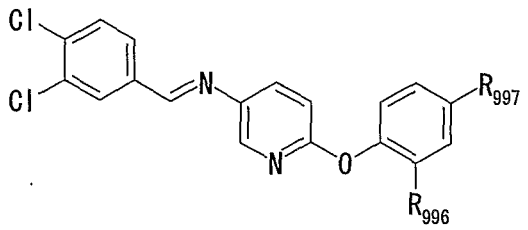
Example No.	R_{992}	R_{993}	^{1}H NMR ($CDCl_3$) δppm
2123	3,4-Cl_2Ph-	-H	2.43(4H, brs), 3.22(3H, s), 3.38(2H, brs), 3.43(2H, s), 3.62(2H, brs), 4.55(2H, s), 5.95(2H, s), 6.74(2H, brs), 6.84(1H, brs), 7.01(1H, d, J = 8.6 Hz), 7.15(2H, d, J = 8.7 Hz), 7.57(1H, d, J = 8.3 Hz), 7.61-7.68(3H, m), 7.72(1H, dd, J = 8.3 Hz, 1.8 Hz), 8.03(1H, d, J = 1.8 Hz), 8.11(1H, d, J = 2.8 Hz), 8.42(1H, brs).
2124	3,4-Cl_2Ph-	-CH_3	2.20(3H, s), 2.42-2.43(4H, m), 3.23(3H, s), 3.38(2H, brs), 3.43(2H, s), 3.62(2H, brs), 4.54(2H, s), 5.94(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 6.97(1H, dd, J = 8.7 Hz, 0.5 Hz), 7.05(1H, d, J = 8.6 Hz), 7.43-7.49(2H, m), 7.55(1H, d, J = 8.2 Hz), 7.62-7.66(1H, m), 7.69-7.74(1H, m), 8.01(1H, d, J = 2.0 Hz), 8.07(1H, d, J = 2.1 Hz), 8.40(1H, brs).
2125	4-CF_3Ph-	-CH_3	2.20(3H, s), 2.41-2.43(4H, m), 3.23(3H, s), 3.38(2H, brs), 3.43(2H, s), 3.60(2H, brs), 4.55(2H, s), 5.95(2H, s), 6.73-6.74(2H, m), 6.84(1H, brs), 6.98(1H, d, J = 8.7 Hz), 7.05(1H, d, J = 8.4 Hz), 7.43-7.49(2H, m), 7.65-7.75(3H, m), 8.00-8.10(3H, m), 8.53(1H, brs).
2126	4-CF_3Ph-	-OCH_3	2.43(4H, brs), 3.24(3H, s), 3.39(2H, brs), 3.43(2H, s), 3.63(2H, brs), 3.77(3H, s), 4.57(2H, s), 5.94(2H, s), 6.73-6.77(2H, m), 6.84(1H, s), 7.02(1H, d, J = 8.6 Hz), 7.13(1H, d, J = 8.4 Hz), 7.22(1H, dd, J = 8.4 Hz, 2.3 Hz), 7.30(1H, d, J = 2.3 Hz), 7.66(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.73(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.08(1H, d, J = 2.5 Hz), 8.53(1H, s).

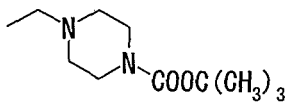
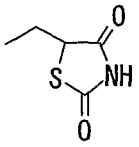
Table 338



Example No.	R_{994}	R_{995}	^{1}H NMR (solvent) δppm
2127	3,4-Cl_2Ph-	-H	($CDCl_3$) 2.20(3H, s), 2.49-2.55(4H, m), 3.45(2H, s), 3.71-3.75(2H, m), 4.25-4.29(2H, m), 5.95(2H, s), 6.75(2H, brs), 6.86(1H, brs), 6.92(1H, d, J = 8.6 Hz), 7.06(1H, d, J = 8.6 Hz), 7.44(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.53-7.65(3H, m), 7.70(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.01(1H, d, J = 1.8 Hz), 8.07(1H, d, J = 2.8 Hz), 8.40(1H, brs), 9.17(1H, brs).
2128	4-CF_3Ph-	-H	($CDCl_3$) 2.20(3H, s), 2.49-2.55(4H, m), 3.45(2H, s), 3.71-3.75(2H, m), 4.25-4.28(2H, m), 5.95(2H, s), 6.75(2H, brs), 6.86(1H, brs), 6.93(1H, d, J = 8.7 Hz), 7.07(1H, d, J = 8.7 Hz), 7.45(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.58(1H, d, J = 2.5 Hz), 7.65(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.73(2H, d, J = 8.2 Hz), 8.01(2H, d, J = 8.1 Hz), 8.10(1H, d, J = 2.8 Hz), 8.53(1H, s), 9.19(1H, brs).
2129	3,4-Cl_2Ph-	-CH_3	a mixture of the rotational isomers (DMSO-d_6) 2.10-2.44(7H, m), 3.16-3.57(9H, m), 5.96-5.99(2H, m), 6.67-6.89(3H, m), 7.09-7.26(3H, m), 7.29-7.38(1H, m), 7.81(1H, d, J = 8.41 Hz), 7.89-7.96(2H, m), 8.10-8.15(2H, m), 8.74(1H, s).
2130	4-CF_3Ph-	-CH_3	a mixture of the rotational isomers (DMSO-d_6) 2.11-2.44(7H, m), 3.18-3.57(9H, m), 5.96-6.00(2H, m), 6.67-6.90(3H, m), 7.09-7.27(3H, m), 7.29-7.38(1H, m), 7.90(2H, d, J = 8.24 Hz), 7.95-8.00(1H, m), 8.11-8.16(3H, m), 8.85(1H, s).

Table 339



Example No.	R_{996}	R_{997}	^{1}H NMR ($CDCl_3$) δppm
2131	-H		1.46(9H, s), 2.41-2.45(4H, m), 3.43-3.47(4H, m), 3.53(2H, s), 6.96(1H, d, J = 8.7 Hz), 7.08-7.14(2H, m), 7.36(2H, d, J = 8.4 Hz), 7.55(1H, d, J = 8.2 Hz), 7.63(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.71(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.01(1H, d, J = 1.8 Hz), 8.11-8.12(1H, m), 8.41(1H, s).
2132	-CH_3		2.19(3H, s), 3.12(1H, dd, J = 14.0 Hz, 9.9 Hz), 3.55(1H, dd, J = 14.0 Hz, 3.8 Hz), 4.54(1H, dd, J = 9.9 Hz, 3.8 Hz), 6.95(1H, d, J = 8.7 Hz), 7.04(1H, d, J = 8.1 Hz), 7.12(1H, dd, J = 8.1 Hz, 2.1 Hz), 7.16(1H, d, J = 2.1 Hz), 7.56(1H, d, J = 8.4 Hz), 7.64(1H, dd, J = 8.7 Hz, 2.3 Hz), 7.71(1H, dd, J = 8.4 Hz, 1.8 Hz), 8.02(1H, d, J = 1.8 Hz), 8.08(1H, d, J = 2.3 Hz), 8.18 (1H, brs), 8.41(1H, s).

Example 2133

Production of 3-({4-[5-(3,4-dichlorobenzylamino)-pyridin-2-yloxy]phenyl}methylamino)-1-(4-piperonylpiperazin-1-yl)propane-1-one

3-[(4-{5-(3,4-dichlorobenzylidene)pyridin-2-yloxy}phenyl)methylamino]-1-(4-piperonylpiperazin-1-yl)propane-1-one (3.88 g, 6.0 mmol) was dissolved in a mixed solvent of methanol (150 mL) and THF (50 mL). To the resulting solution was slowly added sodium borohydride (1.13 g, 30.0 mmol) and that resulting solution was stirred for 13 hours at room temperature. This reaction solution was concentrated under reduced pressure. The resulting residue was diluted with ethyl

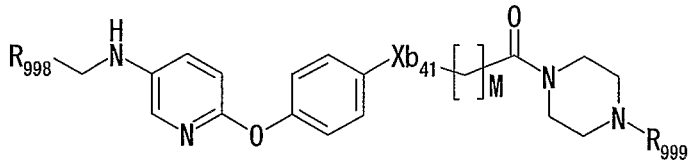
acetate, and washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (dichloromethane : methanol = 40 : 1), to thereby yield 3.60 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.32-2.39(4H, m), 2.52-2.57(2H, m), 2.91(3H, s), 3.36-3.40(4H, m), 3.59-3.63(2H, m), 3.66-3.71(2H, m), 3.97(1H, brs), 4.27(2H, d, J = 5.0 Hz), 5.94(2H, s), 6.65-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.94(1H, dd, J = 8.9 Hz, 3.0 Hz), 6.97(2H, d, J = 9.2 Hz), 7.18(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.40(1H, d, J = 8.4 Hz), 7.45(1H, d, J = 2.0 Hz), 7.56(1H, d, J = 2.5 Hz).; MS 647(M^+).

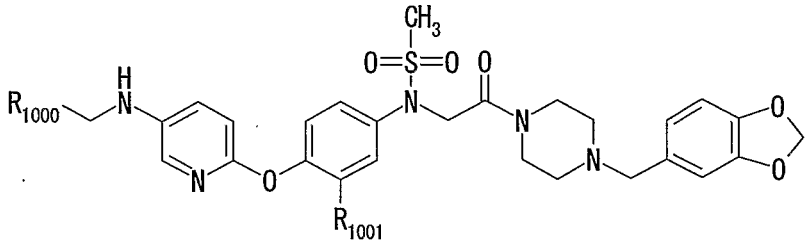
The following compounds were produced in the same manner as in Example 2133.

Table 340



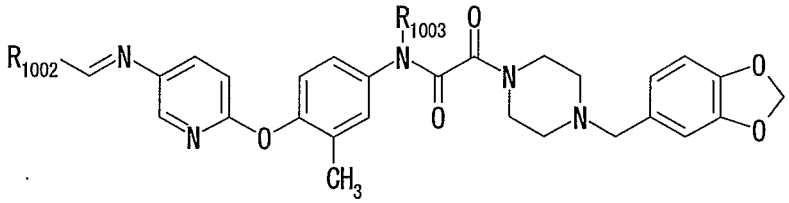
Example No.	R_{998}	R_{999}	Xb_{41}	M	^{1}H NMR (solvent) δppm
2134	4-CF_3Ph-	piperonyl	-N(CH_3)-	1	($CDCl_3$) 2.42(4H, brs), 2.99(3H, s), 3.43-3.49(4H, m), 3.62(2H, brs), 4.04(2H, s), 4.37(2H, s), 5.95(2H, s), 6.67-6.75(5H, m), 6.86(1H, brs), 6.92-6.97(3H, m), 7.47(2H, d, J = 7.9 Hz), 7.58-7.61(3H, m).
2135	4-CF_3Ph-	piperonyl	-N(CH_3)-	2	($CDCl_3$) 2.32-2.39(4H, m), 2.52-2.57(2H, m), 2.91(3H, s), 3.36-3.39(4H, m), 3.59-3.63(2H, m), 3.66-3.71(2H, m), 4.00(1H, brs), 4.37(2H, d, J = 4.3 Hz), 5.94(2H, s), 6.66-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.95(1H, dd, J = 8.9 Hz, 3.0 Hz), 6.97(2H, d, J = 9.1 Hz), 7.46(2H, d, J = 8.1 Hz), 7.57-7.61(3H, m).
2136	3,4-Cl_2Ph-	piperonyl	-N(CH_3)-	1	($CDCl_3$) 2.39-2.43(4H, m), 2.99(3H, s), 3.42(2H, brs), 3.46-3.50(2H, m), 3.60-3.62(2H, m), 3.97(1H, t, J = 5.8 Hz), 4.05(2H, s), 4.26(2H, d, J = 5.8 Hz), 5.95(2H, s), 6.65-6.77(5H, m), 6.85(1H, brs), 6.93(1H, dd, J = 8.6 Hz, 3.1 Hz), 6.96(2H, d, J = 9.1 Hz), 7.18(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.40(1H, d, J = 8.3 Hz), 7.45(1H, d, J = 2.1 Hz), 7.57(1H, d, J = 2.8 Hz)
2137	3,4-Cl_2Ph-	benzyl	none	2	(DMSO-d_6) 2.26-2.28(4H, m), 2.57(2H, t, J = 7.9 Hz), 2.76(2H, t, J = 7.9 Hz), 3.40-3.46(6H, m), 4.28(2H, d, J = 5.9 Hz), 6.36(1H, t, J = 6.1 Hz), 6.77(1H, d, J = 8.7 Hz), 6.85(2H, d, J = 8.3 Hz), 7.09(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17(2H, d, J = 8.4 Hz), 7.24-7.37(6H, m), 7.50(1H, d, J = 3.0 Hz), 7.58(1H, d, J = 8.3 Hz), 7.62 (1H, d, J = 1.8 Hz).
2138	3,4-Cl_2Ph-	benzyl	none	0	(DMSO-d_6) 2.38(4H, brs), 3.33-3.50(6H, m), 4.30(2H, d, J = 6.3 Hz), 6.47(1H, t, J = 6.3 Hz), 6.87(1H, d, J = 8.7 Hz), 6.97(2H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.25-7.39(8H, m), 7.56(1H, d, J = 3.0 Hz), 7.58-7.64(2H, m).
2139	4-CF_3Ph-	benzyl	none	0	($CDCl_3$) 2.45(4H, brs), 3.52(2H, brs), 3.53(2H, s), 3.73 (2H, brs), 4.16(1H, brs), 4.41(2H, s), 6.80(1H, d, J = 8.7 Hz), 6.99(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.03(2H, d, J = 8.5 Hz), 7.20-7.37(5H, m), 7.38(2H, d, J = 8.5 Hz), 7.48(2H, d, J = 8.1 Hz), 7.61(2H, d, J = 8.1 Hz), 7.64 (1H, d, J = 3.0 Hz).

Table 341



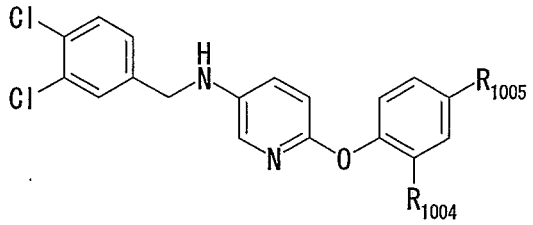
Example No.	R_{1000}	R_{1001}	^{1}H NMR ($CDCl_3$) δppm
2140	3,4-Cl_2Ph-	-H	2.41(4H, brs), 3.19(3H, s), 3.33-3.35(2H, m), 3.42(2H, s), 3.60(2H, brs), 4.08(1H, brs), 4.30(2H, d, J = 5.3 Hz), 4.50(2H, s), 5.95(2H, s), 6.73-6.74(2H, m), 6.80-6.84(2H, m), 6.99(1H, dd, J = 8.6 Hz, 3.1 Hz), 7.02(2H, d, J = 8.7 Hz), 7.20(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.42(1H, d, J = 8.3 Hz), 7.66(1H, d, J = 2.1 Hz), 7.54(2H, d, J = 8.9 Hz), 7.60(1H, d, J = 2.8 Hz).
2141	3,4-Cl_2Ph-	-CH_3	2.19(3H, s), 2.41(4H, brs), 3.19(3H, s), 3.35(2H, brs), 3.41(2H, s), 3.60(2H, brs), 4.07-4.15(1H, m), 4.27(2H, s), 4.50(2H, s), 5.93(2H, s), 6.69-6.78(3H, m), 6.83(1H, brs), 6.88(1H, d, J = 8.6 Hz), 6.98(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17-7.20(1H, m), 7.34-7.44(4H, m), 7.53(1H, d, J = 3.0 Hz).
2142	4-CF_3Ph-	-CH_3	2.20(3H, s), 2.41(4H, brs), 3.19(3H, s), 3.35-3.37(2H, m), 3.41(2H, s), 3.60-3.62(2H, m), 4.15(1H, brs), 4.38(2H, s), 4.50(2H, s), 5.94(2H, s), 6.73(2H, brs), 6.76(1H, d, J = 8.7 Hz), 6.83(1H, brs), 6.88(1H, d, J = 8.6 Hz), 7.00(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.36(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.42(1H, d, J = 2.5 Hz), 7.47(2H, d, J = 8.1 Hz), 7.56(1H, d, J = 2.8 Hz), 7.59(2H, d, J = 8.1 Hz).
2143	4-CF_3Ph-	-OCH_3	2.41(4H, brs), 3.21(3H, s), 3.36(2H, brs), 3.42(2H, s), 3.60(2H, brs), 3.76(3H, s), 4.09(1H, brs), 4.37(2H, s), 4.52(2H, s), 5.94(2H, s), 6.70-6.83(4H, m), 6.97-7.02(2H, m), 7.12-7.16 (1H, m), 7.23-7.26(1H, m), 7.44-7.60(5H, m).

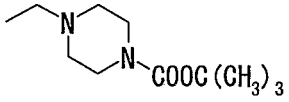
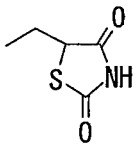
Table 342



Example No.	R_{1002}	R_{1003}	^{1}H NMR (solvent) δppm
2144	3,4-Cl_2Ph-	-H	($CDCl_3$) 2.17(3H, s), 2.48-2.53(4H, m), 3.44(2H, s), 3.69-3.73(2H, m), 3.97(1H, brs), 4.23-4.27(4H, m), 5.95(2H, s), 6.70-6.74(3H, m), 6.85(1H, brs), 6.94(1H, d, J = 8.7 Hz), 6.96(1H, dd, J = 8.7 Hz, 3.1 Hz), 7.18(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.36(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.40(1H, d, J = 8.2 Hz), 7.45(1H, d, J = 2.1 Hz), 7.51(1H, d, J = 2.3 Hz), 7.55(1H, d, J = 3.0 Hz), 9.11(1H, brs).
2145	4-CF_3Ph-	-H	($CDCl_3$) 2.19(3H, s), 2.48-2.53(4H, m), 3.44(2H, s), 3.70-3.73(2H, m), 4.00(1H, brs), 4.23-4.27(2H, m), 4.37(2H, s), 5.95(2H, s), 6.72(1H, d, J = 8.7 Hz), 6.74-6.77(2H, m), 6.85(1H, brs), 6.94(1H, d, J = 8.7 Hz), 6.97(1H, dd, J = 8.7 Hz, 3.1 Hz), 7.37(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.47(2H, d, J = 8.4 Hz), 7.51(1H, d, J = 2.5 Hz), 7.57(1H, d, J = 3.1 Hz), 7.60(2H, d, J = 8.1 Hz), 9.11(1H, brs).
2146	3,4-Cl_2Ph-	-CH_3	a mixture of the rotational isomers ($DMSO-d_6$) 2.25-2.42(7H, m), 3.22-3.55(9H, m), 4.27(2H, d, J = 6.27 Hz), 5.77-5.99(2H, m), 6.38(1H, t, J = 6.27 Hz), 6.65-6.90(5H, m), 7.06-7.14(2H, m), 7.22-7.28(1H, m), 7.32-7.36(1H, m), 7. 46(1H, d, J = 2.80 Hz), 7.56-7.61(2H, m).
2147	4-CF_3Ph-	-CH_3	a mixture of the rotational isomers ($DMSO-d_6$) 2.24-2.41(7H, m), 3.20-3.54(9H, m), 4.34-4.36(2H, m), 5.95-5.98(2H, m), 6.38-6.41(1H, m), 6.65-6.88(5H, m), 7.03-7.13(2H, m), 7.21-7.27(1H, m), 7.45(1H, d, J = 2.64 Hz), 7.55(2H, d, J = 7.75 Hz), 7.67(2H, d, J = 7.75 Hz).

Table 343



Example No.	R_{1004}	R_{1005}	^{1}H NMR ($CDCl_3$) δppm
2148	-H		1.45(9H, s), 2.37-2.40(4H, m), 3.40-3.44(4H, m), 3.47(2H, s), 4.28(2H, s), 6.77(1H, d, J = 8.7 Hz), 6.95-7.01(3H, m), 7.17-7.21(1H, m), 7.26-7.29(2H, m), 7.41(1H, d, J = 8.1 Hz), 7.45(1H, d, J = 1.8 Hz), 7.60(1H, d, J = 3.0 Hz).
2149	-CH_3		2.19(3H, s), 3.05(1H, dd, J = 14.0 Hz, 10.0 Hz), 3.50(1H, dd, J = 14.0 Hz, 3.8 Hz), 4.02(1H, brs), 4.27(2H, s), 4.49(1H, dd, J = 10.0 Hz, 3.8 Hz), 6.73(1H, d, J = 8.7 Hz), 6.99(1H, d, J = 8.2 Hz), 6.97(1H, dd, J = 8.7 Hz, 2.9 Hz), 7.02(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.09(1H, d, J = 2.0 Hz), 7.18(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.41(1H, d, J = 8.2 Hz), 7.45(1H, d, J = 2.0 Hz), 7.55(1H, d, J = 2.9 Hz), 8.61(1H, brs).

Example 2150

Production of 1-(4-benzylpiperazin-1-yl)-3-(4-{5-(piperonylamino)pyridin-2-yloxy}phenyl)propane-1-one

3-[4-(5-aminopyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propane-1-one (1.04 g, 2.5 mmol) was dissolved in methanol (25 mL). To the resulting solution was added piperonal (0.39 g, 2.63 mmol), and this solution was refluxed overnight. The resulting reaction solution was cooled with ice, and then sodium borohydride (0.28 g, 7.50 mmol) was added. The resulting solution was stirred for 2 hours at room temperature. This reaction solution was concentrated under reduced pressure. The residue was diluted with

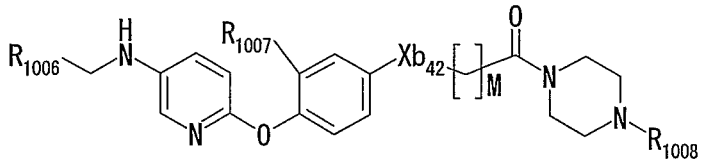
ethyl acetate, and washed with water, saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (ethyl acetate), to thereby yield 0.80 g of the title compound.

Appearance: Yellow oil

^{1}H NMR (DMSO-d_6) δ 2.28(4H, brs), 2.57(2H, t, J = 7.9 Hz), 2.76(2H, t, J = 7.9 Hz), 3.40-3.46(6H, m), 4.15(2H, d, J = 6.1 Hz), 5.97(2H, s), 6.21(1H, t, J = 6.1 Hz), 6.76(1H, d, J = 8.6 Hz), 6.82-6.86(4H, m), 6.92(1H, brs), 7.08(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17(2H, d, J = 8.4 Hz), 7.24-7.32(5H, m), 7.51(1H, d, J = 3.0 Hz).

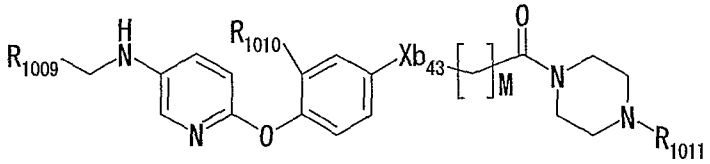
The following compounds were produced in the same manner as in Example 2150.

Table 344



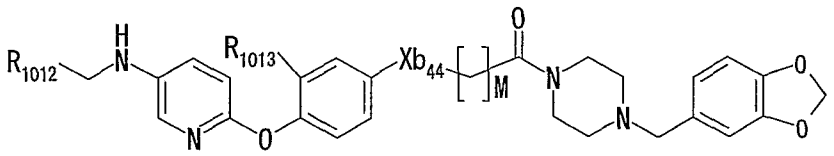
Example No.	R_{1006}	R_{1007}	R_{1008}	Xb_{42}	M	^{1}H NMR (solvent) δppm
2151	4-CF_3Ph-	-CH_3	piperonyl	-N(C_2H_5)-	1	($CDCl_3$) 1.15(3H, t, J = 7.1 Hz), 2.11(3H, s), 2.30-2.50(4H, m), 3.39(2H, q, J = 7.1 Hz), 3.42 (2H, s), 3.42-3.55(2H, m), 3.56-3.70(2H, m), 3.80-4.05(1H, m), 3.99(2H, s), 4.36(2H, s), 5.94 (2H, s), 6.44-6.55(2H, m), 6.58-6.64(1H, m), 6.69-6.78(2H, m), 6.80-6.89(2H, m), 6.94(1H, dd, J = 8.8 Hz, 3.1 Hz), 7.46(2H, d, J = 8.0 Hz), 7.55-7.63(3H, m).
2152	3,4-Cl_2Ph-	-CH_3	piperonyl	-N(C_2H_5)-	1	($CDCl_3$) 1.15(3H, t, J = 7.1 Hz), 2.11(3H, s), 2.32-2.49(4H, m), 3.39(2H, q, J = 7.1 Hz), 3.42 (2H, s), 3.44-3.55(2H, m), 3.56-3.69(2H, m), 3.79-3.94(1H, m), 3.99(2H, s), 4.15-4.30(2H, m), 5.94(2H, s), 6.50(1H, dd, J = 8.5 Hz, 3.0 Hz), 6.54(1H, d, J = 3.0 Hz), 6.58-6.65(1H, m), 6.69-6.78(2H, m), 6.82-6.88(2H, m), 6.92(1H, dd, J = 8.8 Hz, 3.0 Hz), 7.18(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.40(1H, d, J = 8.2 Hz), 7.45(1H, d, J = 2.0 Hz), 7.57(1H, d, J = 3.0 Hz).
2153	4-CF_3Ph-	-H	benzyl	none	2	(DMSO-d_6) 2.28(4H, brs), 2.54-2.60(2H, m), 2.73-2.79(2H, m), 3.42-3.46(6H, m), 4.37(2H, d, J = 5.9 Hz), 6.41(1H, t, J = 6.1 Hz), 6.77(1H, d, J = 8.7 Hz), 6.84(2H, d, J = 8.6 Hz), 7.08(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17(2H, d, J = 8.6 Hz), 7.22-7.35(5H, m), 7.50(1H, d, J = 3.0 Hz), 7.58 (2H, d, J = 7.9 Hz), 7.69(2H, d, J = 7.9 Hz).
2154	4-ClPh-	-H	benzyl	none	2	(DMSO-d_6) 2.28(4H, t, J = 4.8 Hz), 2.57(2H, t, J = 7.3 Hz), 2.76(2H, t, J = 7.3 Hz), 3.38-3.46 (6H, m), 4.25(2H, d, J = 6.1 Hz), 6.32(1H, t, J = 6.1 Hz), 6.76(1H, d, J = 8.6 Hz), 6.84(2H, d, J = 8.6 Hz), 7.07(1H, dd, J = 8.7 Hz, 3.1 Hz), 7.17 (2H, d, J = 8.6 Hz), 7.24-7.32(5H, m), 7.38(4H, brs), 7.50(1H, d, J = 3.1 Hz).
2155	3,4-F_2Ph-	-H	benzyl	none	2	(DMSO-d_6) 2.26-2.28(4H, m), 2.57-2.60(2H, m), 2.73-2.79(2H, m), 3.37-3.46(6H, m), 4.25 (2H, d, J = 5.8 Hz), 6.32(1H, t, J = 5.8 Hz), 6.77 (1H, d, J = 8.6 Hz), 6.84(2H, d, J = 8.3 Hz), 7.08 (1H, dd, J = 8.6 Hz, 3.0 Hz), 7.17(2H, d, J = 8.4 Hz), 7.22-7.43(8H, m), 7.50(1H, d, J = 3.1 Hz).

Table 345



Example No.	R_{1009}	R_{1010}	R_{1011}	Xb_{43}	M	mp (°C) or ^{1}H NMR (solvent) δppm
2156	4-CF_3Ph-	-CH_3	piperonyl	-N(CH_3)-	1	^{1}H NMR ($CDCl_3$) 2.12(3H, s), 2.42(4H, t, J = 5.0 Hz), 2.98(3H, s), 3.41-3.55(4H, m), 3.56-3.67(2H, m), 3.77-3.99(1H, m), 4.04 (2H, s), 4.36(2H, s), 5.94(2H, s), 6.52(1H, dd, J = 8.7 Hz, 3.0 Hz), 6.56(1H, d, J = 3.0 Hz), 6.59-6.64(1H, m), 6.69-6.78(2H, m), 6.85 (1H, s), 6.87(1H, d, J = 8.7 Hz), 6.93(1H, dd, J = 8.8 Hz, 3.0 Hz), 7.46(2H, d, J = 8.0 Hz), 7.54-7.63(3H, m).
2157	3,4-Cl_2Ph-	-CH_3	piperonyl	-N(CH_3)-	1	mp 132-134
2158	4-CF_3Ph-	-CH_3	piperonyl	-N(Ac)-	1	^{1}H NMR ($CDCl_3$) 1.94(3H, s), 2.09(3H, s), 2.30-2.50(4H, m), 3.29-3.51(4H, m), 3.52-3.69(2H, m), 3.92-4.17(1H, m), 4.29-4.51(4H, m), 5.94(2H, s), 6.69-6.77 (2H, m), 6.78(1H, d, J = 8.7 Hz), 6.81-6.86 (1H, m), 6.91(1H, d, J = 8.5 Hz), 7.01(1H, dd, J = 8.7 Hz, 3.1 Hz), 7.18(1H, dd, J = 8.5 Hz, 2.5 Hz), 7.28(1H, d, J = 2.5 Hz), 7.48(2H, d, J = 8.1 Hz), 7.56-7.64(3H, m).
2159	3,4-Cl_2Ph-	-CH_3	piperonyl	-N(Ac)-	1	^{1}H NMR ($CDCl_3$) 1.95(3H, s), 2.07(3H, s), 2.30-2.51(4H, m), 3.29-3.50(4H, m), 3.51-3.71(2H, m), 3.92-4.18(1H, m), 4.29 (2H, s), 4.42(2H, s), 5.94(2H, s), 6.69-6.78 (3H, m), 6.82-6.87(1H, m), 6.91(1H, d, J = 8.5 Hz), 7.00(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.14-7.23(2H, m), 7.26-7.31(1H, m), 7.41 (1H, d, J = 8.2 Hz), 7.46(1H, d, J = 2.0 Hz), 7.57(1H, d, J = 3.0 Hz).
2160	Ph-	-H	benzyl	none	2	^{1}H NMR (DMSO-d_6) 2.27(4H, brs), 2.54-2.60(2H, m), 2.73-2.79(2H, m), 3.40-3.46(6H, m), 4.25(2H, d, J = 5.9 Hz), 6.28(1H, t, J = 5.9 Hz), 6.76(1H, d, J = 8.7 Hz), 6.84(2H, d, J = 8.4 Hz), 7.09 (1H, dd, J = 8.7 Hz, 3.0 Hz), 7.17 (2H, d, J = 8.7 Hz), 7.23-7.38 (10H, m), 7.52(1H, d, J = 3.0 Hz).
2161	4-CF_3Ph-	-OCH_3	piperonyl	-N(CH_3)-	1	mp 102-103
2162	3,4-Cl_2Ph-	-OCH_3	piperonyl	-N(CH_3)-	1	mp 145-146
2163	4-CF_3Ph-	-OCH_3	piperonyl	-N(C_2H_5)-	1	mp 160.0-160.5
2164	3,4-Cl_2Ph-	-OCH_3	piperonyl	-N(C_2H_5)-	1	mp 133-134
2165	3,4-Cl_2Ph-	-F	piperonyl	-N(CH_3)-	1	mp 134-137

Table 346



Example No.	R_{1012}	R_{1013}	Xb_{44}	M	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2166	4-CF_3Ph-	-OCH_3	none	2	^{1}H NMR 2.38-2.44(4H, m), 2.56-2.67(2H, m), 2.88-2.99(2H, m), 3.31-3.45(2H, m), 3.40(2H, s), 3.57-3.69(2H, m), 3.76(3H, s), 3.80-4.06(1H, m), 4.37(2H, s), 5.94(2H, s), 6.68-6.81(4H, m), 6.83-6.87(2H, m), 6.96 (1H, d, J = 8.0 Hz), 6.98(1H, dd, J = 8.7 Hz, 3.0 Hz), 7.46(2H, d, J = 8.0 Hz), 7.54(1H, d, J = 2.6 Hz), 7.59(2H, d, J = 8.0 Hz).
2167	4-CF_3Ph-	-F	-N(C_2H_5)-	1	mp 106-107
2168	4-CF_3Ph-	-F	-N(CH_3)-	1	mp 163-164
2169	3,4-Cl_2Ph-	-F	-N(C_2H_5)-	1	mp 107.5-109.0
2170	4-CF_3Ph-	-H	-N(SO_2CH_3)-	1	^{1}H NMR 2.41(4H, brs), 3.18(3H, s), 3.35(2H, brs), 3.42(2H, s), 3.62(2H, brs), 4.14(1H, brs), 4.41(2H, brs), 4.50(2H, s), 5.94(2H, s), 6.70-6.76(2H, m), 6.80-6.83(2H, m), 6.98-7.04(3H, m), 7.47-7.56(4H, m), 7.60-7.63(3H, m).

Example 2171

Production of 1-(4-benzylpiperazin-1-yl)-3-[4-(5-dibenzylaminopyridin-2-yloxy)phenyl]propane-1-one

3-[4-(5-aminopyridin-2-yloxy)phenyl]-1-(4-benzylpiperazin-1-yl)propane-1-one (1.0 g, 2.4 mmol) was dissolved in DMF (30 mL). To this solution were added potassium carbonate (0.73 g, 5.28 mmol), sodium iodide (0.76 g, 5.04 mmol) and benzyl bromide (0.60 mL, 5.04 mmol), and the resulting solution was stirred at room temperature overnight. This reaction solution was concentrated under reduced pressure. The residue was diluted with chloroform, and washed with water,

saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (chloroform : methanol = 80 : 1), to thereby yield 0.67 g of the title compound.

Appearance: Yellow oil

^{1}H NMR (DMSO-d_6) δ 2.27(4H, brs), 2.50-2.59(2H, m), 2.73-2.78(2H, m), 3.37-3.45(6H, m), 4.68(4H, s), 6.78(1H, d, J = 8.9 Hz), 6.85(2H, d, J = 8.4 Hz), 7.17(2H, d, J = 8.6 Hz), 7.20-7.36(16H, m), 7.54(1H, d, J = 3.1 Hz).

Example 2172

Production of 2-[(4-{5-[(3,4-dichlorobenzyl)-ethylamino]pyridin-2-yloxy}phenyl)methylamino]-1-(4-piperonylpiperazin-1-yl)ethanone

2-({4-[5-(3,4-dichlorobenzylamino)pyridin-2-yloxy]phenyl}methylamino)-1-(4-piperonylpiperazin-1-yl)ethanone (1.59 g, 2.5 mmol) was dissolved in dichloroethane (80 mL). To this solution were added acetoaldehyde (1.40 mL, 25.0 mmol) and sodium triacetyloxy borohydride (1.59 mL, 7.5 mmol) under ice cooling. To the resulting solution was added dropwise acetic acid (0.43 mL, 7.5 mmol), and this solution was stirred at room temperature for 16 hours. The resulting reaction solution was washed with a saturated sodium bicarbonate solution and brine. The organic

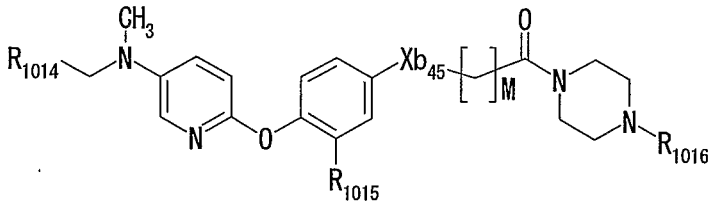
layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (chloroform : methanol = 50 : 1). The obtained solid was recrystallized from ethanol, to thereby yield 0.65 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.17(3H, t, J = 7.1 Hz), 2.41(4H, brs), 2.99(3H, s), 3.36-3.44(4H, m), 3.48(2H, brs), 3.62(2H, brs), 4.04(2H, s), 4.35(2H, s), 5.95(2H, s), 6.67-6.77(5H, m), 6.85(1H, brs), 6.97(2H, d, J = 9.1 Hz), 7.01(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.07(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.32(1H, d, J = 2.0 Hz), 7.37(1H, d, J = 8.3 Hz), 7.63(1H, d, J = 3.0 Hz).; MS 661(M^+).

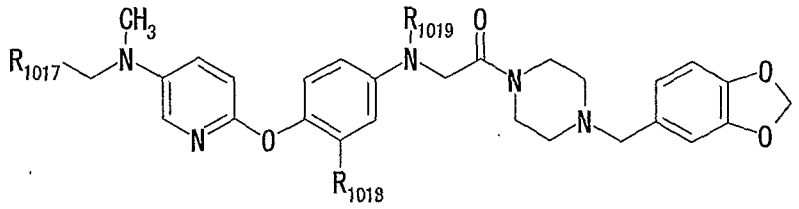
The following compounds were produced in the same manner as in Example 2172.

Table 347



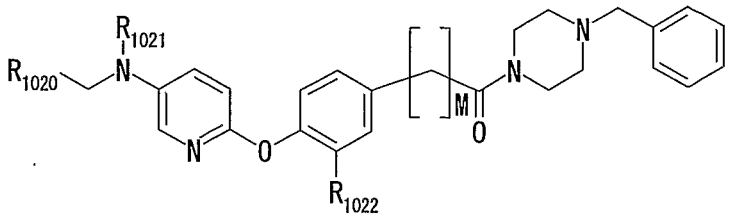
Example No.	R_{1014}	R_{1015}	R_{1016}	Xb_{45}	M	^{1}H NMR ($CDCl_3$) δppm
2173	4-CF_3Ph-	-H	piperonyl	-N(CH_3)-	1	2.44(4H, brs), 2.99(6H, s), 3.39-3.62(6H, m), 4.04(2H, s), 4.48(2H, s), 5.95(2H, s), 6.62-6.78 (5H, m), 6.86(1H, brs), 6.97(2H, d, J = 9.1 Hz), 7.08(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.34(2H, d, J = 7.9 Hz), 7.57(2H, d, J = 8.1 Hz), 7.69(1H, d, J = 3.1 Hz).
2174	3,4-Cl_2Ph-	-H	piperonyl	-N(CH_3)-	2	2.32-2.40(4H, m), 2.53-2.58(2H, m), 2.92(3H, s), 2.97(3H, s), 3.37-3.40(4H, m), 3.59-3.63 (2H, m), 3.66-3.72(2H, m), 4.37(2H, s), 5.94 (2H, s), 6.66-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.98(2H, d, J = 9.1 Hz), 7.04-7.11(2H, m), 7.32(1H, d, J = 2.0 Hz), 7.38(1H, d, J = 8.3 Hz), 7.67(1H, d, J = 3.1 Hz).
2175	4-CF_3Ph-	-H	piperonyl	-N(CH_3)-	2	2.32-2.39(4H, m), 2.52-2.57(2H, m), 2.92(3H, s), 2.99(3H, s), 3.36-3.40(4H, m), 3.59-3.63 (2H, m), 3.66-3.72(2H, m), 4.48(2H, s), 5.94 (2H, s), 6.67-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.98(2H, d, J = 9.2 Hz), 7.09(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.34(2H, d, J = 7.9 Hz), 7.57 (2H, d, J = 8.1 Hz), 7.68(1H, d, J = 2.8 Hz).
2176	3,4-Cl_2Ph-	-H	piperonyl	-N(CH_3)-	1	2.40-2.44(4H, m), 2.96(3H, s), 3.00(3H, s), 3.43 (2H, brs), 3.49(2H, brs), 3.62(2H, brs), 4.05(2H, s), 4.36(2H, s), 5.95(2H, s), 6.67-6.77(5H, m), 6.85(1H, brs), 6.97(2H, d, J = 9.1 Hz), 7.06(1H, dd, J = 8.3 Hz, 1.7 Hz), 7.07(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.32(1H, d, J = 2.0 Hz), 7.38(1H, d, J = 8.3 Hz), 7.69(1H, d, J = 3.1 Hz).
2177	4-CF_3Ph-	-F	benzyl	none	0	2.46(4H, brs), 3.02(3H, s), 3.54(6H, brs), 4.52 (2H, s), 6.89(1H, d, J = 8.9 Hz), 7.14(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.17-7.21(2H, m), 7.28-7.35 (8H, m), 7.58(2H, d, J = 8.1 Hz), 7.62(1H, d, J = 2.8 Hz).
2178	3,4-Cl_2Ph-	-F	benzyl	none	0	2.47(4H, brs), 3.00(3H, s), 3.55-3.73(6H, m), 4.40(2H, s), 6.89(1H, d, J = 8.9 Hz), 7.06(1H, dd, J = 8.2 Hz, 1.7 Hz), 7.14(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.17-7.22(3H, m), 7.28-7.33(6H, m), 7.39(1H, d, J = 8.3 Hz), 7.61(1H, d, J = 3.3 Hz).

Table 348



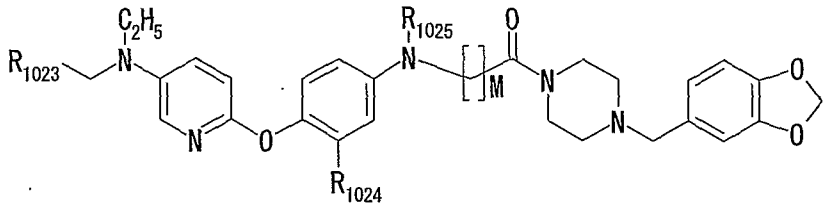
Example No.	R_{1017}	R_{1018}	R_{1019}	Form	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
2179	4-CF_3Ph-	-CH_3	-C_2H_5	fumarate	mp 157-159 dec
2180	3,4-Cl_2Ph-	-CH_3	-C_2H_5	fumarate	mp 148-151 dec
2181	4-CF_3Ph-	-CH_3	-CH_3	fumarate	mp 151-154
2182	3,4-Cl_2Ph-	-CH_3	-CH_3	hydrochloride	mp 139-142
2183	4-CF_3Ph-	-CH_3	-Ac	hydrochloride	mp 199.5-201.5
2184	3,4-Cl_2Ph-	-CH_3	-Ac	hydrochloride	mp 188.5-190.0
2185	4-CF_3Ph-	-OCH_3	-CH_3	oxalate	^{1}H NMR 2.48-2.81(4H, m), 2.93(3H, s), 2.94(3H, s), 3.36-3.85(9H, m), 4.25(2H, s), 4.56 (2H, s), 6.01(2H, s), 6.12(1H, dd, J = 8.8 Hz, 2.8 Hz), 6.29(1H, d, J = 2.8 Hz), 6.66(1H, d, J = 9.0 Hz), 6.77(1H, d, J = 8.8 Hz), 6.79-6.98(3H, m), 7.22(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.42(2H, d, J = 8.1 Hz), 7.52(1H, d, J = 3.2 Hz), 7.67(2H, d, J = 8.1 Hz).
2186	3,4-Cl_2Ph-	-OCH_3	-CH_3	hydrochloride	^{1}H NMR 2.75-3.18(8H, m), 3.21-3.42(2H, m), 3.63(3H, s), 3.83-4.52(10H, m), 6.06 (2H, s), 6.16(1H, dd, J = 8.8 Hz, 2.7 Hz), 6.34(1H, d, J = 2.7 Hz), 6.68(1H, d, J = 9.0 Hz), 6.79(1H, d, J = 8.8 Hz), 6.94-7.06(2H, m), 7.16-7.24(2H, m), 7.27(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.47(1H, d, J = 2.0 Hz), 7.53 (1H, d, J = 3.2 Hz), 7.56(1H, d, J = 8.2 Hz), 10.91-11.26(1H, m).
2187	4-CF_3Ph-	-OCH_3	-C_2H_5	fumarate	mp 159-162
2188	3,4-Cl_2Ph-	-OCH_3	-C_2H_5	fumarate	mp 154-157
2189	4-CF_3Ph-	-F	-CH_3	hydrobromide	mp 211-212
2190	3,4-Cl_2Ph-	-F	-CH_3	hydrobromide	mp 206.5-207.0
2191	4-CF_3Ph-	-F	-C_2H_5	hydrobromide	mp 151.0-152.5
2192	3,4-Cl_2Ph-	-F	-C_2H_5	hydrobromide	mp 172.5-174.5

Table 349



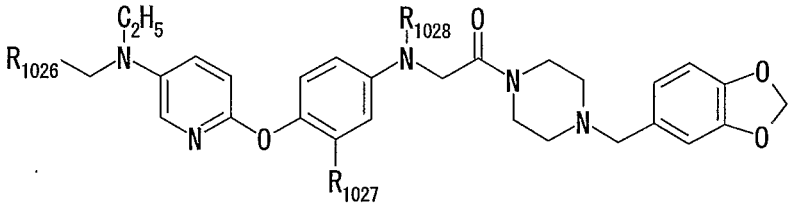
Example No.	R_{1020}	R_{1021}	R_{1022}	M	Form	^{1}H NMR (DMSO-d_6) δppm
2193	Ph-	-CH_3	-H	2	dihydro-chloride	2.50-3.07(10H, m), 3.22-3.31(2H, m), 3.45-3.50(1H, m), 4.03-4.08(1H, m), 4.30(2H, d, J = 3.8 Hz), 4.42-4.55(3H, m), 6.85-6.92(3H, m), 7.19-7.26(5H, m), 7.30-7.35(3H, m), 7.45-7.47(3H, m), 7.58-7.60(2H, m), 7.66(1H, d, J = 2.8 Hz), 11.33(2H, brs).
2194	3,4-Cl_2Ph-	-CH_3	-H	0	dihydro-chloride	2.50-2.51(2H, m), 3.03(3H, s), 3.13-3.48(6H, m), 4.34-4.37(2H, m), 4.58(2H, s), 6.97(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 8.4 Hz), 7.23(1H, dd, J = 8.4 Hz, 1.5 Hz), 7.34(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.44-7.47(5H, m), 7.51(1H, d, J = 1.5 Hz), 7.58-7.61(3H, m), 7.70(1H, d, J = 3.3 Hz), 11.52(2H, brs).
2195	4-CF_3Ph-	-CH_3	-H	0	dihydro-chloride	3.06(3H, s), 3.00-3.20(2H, m), 3.20-3.40(2H, m), 3.45 (2H, brs), 4.20-4.50(2H, m), 4.34(2H, s), 4.69(2H, s), 6.97(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 8.8 Hz), 7.33 (1H, dd, J = 8.9 Hz, 3.1 Hz), 7.41-7.49(7H, m), 7.55-7.68(2H, m), 7.70(1H, d, J = 3.1 Hz), 7.71(2H, d, J = 8.0 Hz).
2196	3,4-Cl_2Ph-	-CH_3	-H	2	dihydro-chloride	2.49-3.07(10H, m), 3.23-3.27(2H, m), 3.45-3.55(1H, m), 4.03-4.08(1H, m), 4.30(2H, d, J = 4.3 Hz), 4.42-4.47(1H, m), 4.54(2H, s), 6.87(1H, d, J = 9.1 Hz), 6.90(2H, d, J = 8.6 Hz), 7.19-7.23(3H, m), 7.32(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.45-7.50(4H, m), 7.57-7.64(4H, m), 11.33(2H, brs).
2197	4-CF_3Ph-	-C_2H_5	-F	0	hydro-chloride	1.21(3H, t, J = 6.9 Hz), 2.50-2.51(2H, m), 3.14-3.38 (6H, m), 3.49(2H, q, J = 6.9 Hz), 4.34(2H, brs), 4.61 (2H, brs), 6.98(1H, d, J = 8.9 Hz), 7.25-7.29(3H, m), 7.42-7.50(7H, m), 7.58(2H, brs), 7.69(2H, d, J = 8.1 Hz), 11.12(1H, brs).
2198	3,4-Cl_2Ph-	-C_2H_5	-F	0	hydro-chloride	1.10(3H, t, J = 7.0 Hz), 2.49-2.52(2H, m), 3.13(2H, brs), 3.32-3.58(6H, m), 4.33(2H, brs), 4.50(2H, brs), 6.99(1H, d, J = 9.1 Hz), 7.20-7.31(4H, m), 7.42-7.57 (6H, m), 7.58-7.60(3H, m), 11.14(1H, brs).

Table 350



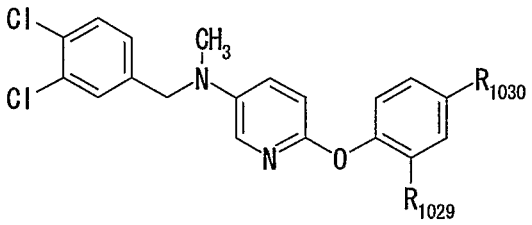
Example No.	R_{1023}	R_{1024}	R_{1025}	M	Form	mp (°C) or ^{1}H NMR (solvent) δppm
2199	3,4-Cl_2Ph-	-H	-CH_3	2	free	^{1}H NMR ($CDCl_3$) 1.17(3H, t, J = 7.1 Hz), 2.32-2.39(4H, m), 2.52-2.57(2H, m), 2.91 (3H, s), 3.36-3.44(6H, m), 3.59-3.63(2H, m), 3.66-3.71(2H, m), 4.35(2H, s), 5.95 (2H, s), 6.67-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.98(2H, d, J = 9.1 Hz), 7.03(1H, dd, J = 9.1 Hz, 3.3 Hz), 7.07(1H, dd, J = 8.9 Hz, 2.1 Hz), 7.32(1H, d, J = 2.0 Hz), 7.47(1H, d, J = 8.3 Hz), 7.62(1H, d, J = 3.1 Hz).
2200	4-CF_3Ph-	-H	-CH_3	2	free	^{1}H NMR ($CDCl_3$) 1.19(3H, t, J = 7.1 Hz), 2.32-2.38(4H, m), 2.52-2.57(2H, m), 2.91 (3H, s), 3.36-3.47(6H, m), 3.59-3.63(2H, m), 3.66-3.71(2H, m), 4.47(2H, s), 5.94 (2H, s), 6.67-6.76(5H, m), 6.83(1H, d, J = 1.0 Hz), 6.97(2H, d, J = 9.2 Hz), 7.03(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.35(2H, d, J = 7.9 Hz), 7.56(2H, d, J = 7.9 Hz), 7.63(1H, d, J = 2.8 Hz).
2201	3,4-Cl_2Ph-	-CH_3	-CH_3	1	hydrochloride	mp 167-170 dec
2202	4-CF_3Ph-	-CH_3	-Ac	1	hydrochloride	mp 186-189
2203	3,4-Cl_2Ph-	-CH_3	-Ac	1	hydrochloride	mp 188.5 - 191.0
2204	4-CF_3Ph-	-OCH_3	-CH_3	1	oxalate	^{1}H NMR (DMSO-d_6) 1.08(3H, t, J = 7.0 Hz), 2.50-2.81(4H, m), 2.93(3H, s), 3.41 (2H, q, J = 7.0 Hz), 3.33-3.72(7H, m), 3.77 (2H, s), 4.25(2H, s), 4.52(2H, s), 6.01(2H, s), 6.12(1H, dd, J = 8.8 Hz, 2.7 Hz), 6.28 (1H, d, J = 2.7 Hz), 6.64(1H, d, J = 9.0 Hz), 6.76(1H, d, J = 8.7 Hz), 6.80-6.94 (2H, m), 6.97(1H, brs), 7.15(1H, dd, J = 9.0 Hz, 3.2 Hz), 7.34-7.50(3H, m), 7.66 (2H, d, J = 8.1 Hz).
2205	3,4-Cl_2Ph-	-OCH_3	-CH_3	1	hydrochloride	^{1}H NMR (DMSO-d_6) 1.06(3H, t, J = 6.9 Hz), 2.75-3.16(5H, m), 3.21-3.48(4H, m), 3.62(3H, s), 3.71-4.52(10H, m), 6.06(2H, s), 6.16(1H, dd, J = 8.8 Hz, 2.7 Hz), 6.34 (1H, d, J = 2.7 Hz), 6.67(1H, d, J = 8.9 Hz), 6.78(1H, d, J = 8.8 Hz), 6.94-7.06 (2H, m), 7.13-7.28(3H, m), 7.41-7.52(2H, m), 7.56(1H, d, J = 8.3 Hz), 10.83-11.19 (1H, m).

Table 351



Example No.	R_{1026}	R_{1027}	R_{1028}	Form	mp (°C)
2206	4-CF_3Ph-	-CH_3	-C_2H_5	oxalate	126-128
2207	3,4-Cl_2Ph-	-CH_3	-C_2H_5	oxalate	111-113
2208	4-CF_3Ph-	-CH_3	-C_2H_5	oxalate	120-123
2209	4-CF_3Ph-	-OCH_3	-CH_3	hydrobromide	205-208
2210	3,4-Cl_2Ph-	-OCH_3	-C_2H_5	hydrobromide	133-135
2211	4-CF_3Ph-	-F	-CH_3	hydrobromide	203-205
2212	3,4-Cl_2Ph-	-F	-CH_3	hydrobromide	185-188
2213	4-CF_3Ph-	-F	-C_2H_5	oxalate	121.0-122.5
2214	3,4-Cl_2Ph-	-F	-C_2H_5	hydrobromide	165.0-166.5

Table 352



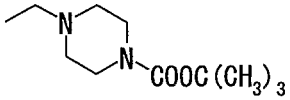
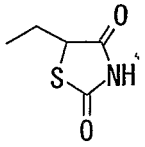
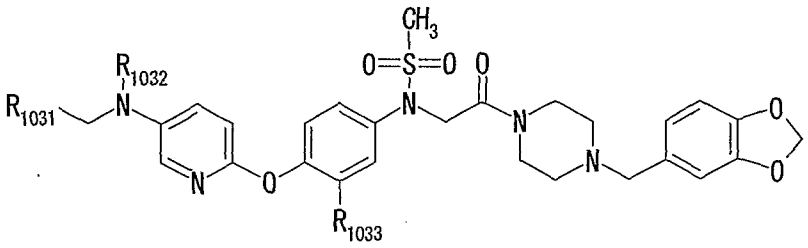
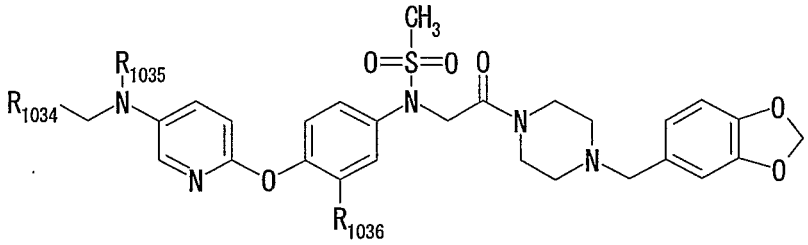
Example No.	R_{1029}	R_{1030}	^{1}H NMR ($CDCl_3$) δppm
2215	-H		1.45(9H, s), 2.39-2.43(4H, m), 3.01(3H, s), 3.41-3.44(4H, m), 3.50(2H, s), 4.41(2H, s), 6.82(1H, d, J = 8.9 Hz), 7.01(2H, d, J = 8.4 Hz), 7.08-7.13(2H, m), 7.27-7.41(4H, m), 7.70(1H, d, J = 8.6 Hz).
2216	-CH_3		2.20(3H, s), 2.98(3H, s), 3.06(1H, dd, J = 14.0 Hz, 10.1 Hz), 3.52(1H, dd, J = 14.0 Hz, 3.8 Hz), 4.38(2H, s), 4.50(1H, dd, J = 10.1 Hz, 3.8 Hz), 6.77(1H, d, J = 8.9 Hz), 6.91(1H, d, J = 8.3 Hz), 7.03(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.05-7.16(3H, m), 7.32 (1H, d, J = 2.1 Hz), 7.39(1H, d, J = 8.3 Hz), 7.67(1H, d, J = 3.1 Hz).

Table 353



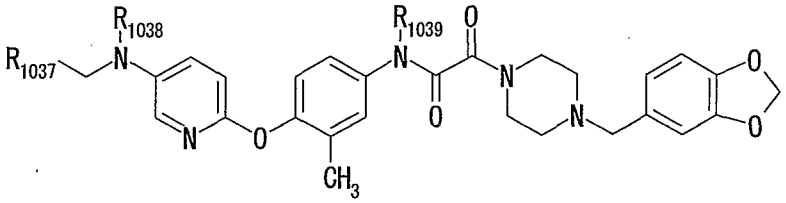
Example No.	R_{1031}	R_{1032}	R_{1033}	^{1}H NMR ($CDCl_3$) δppm
2217	3,4-Cl_2Ph-	-CH_3	-H	2.41(4H, brs), 3.02(3H, s), 3.19(3H, s), 3.36(2H, brs), 3.42(2H, s), 3.60(2H, brs), 4.41(2H, s), 4.51(2H, s), 5.95(2H, s), 6.73-6.77(2H, m), 6.84-6.87(2H, m), 7.03(2H, d, J = 8.9 Hz), 7.07(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.12(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.33(1H, d, J = 2.0 Hz), 7.40(1H, d, J = 8.3 Hz), 7.59(2H, d, J = 8.9 Hz), 7.69(1H, d, J = 3.1 Hz).
2218	3,4-Cl_2Ph-	-C_2H_5	-H	1.21(3H, t, J = 7.1 Hz), 2.41(4H, brs), 3.18(3H, s), 3.36(2H, brs), 3.42(2H, s), 3.46(2H, q, J = 7.1 Hz), 3.60(2H, brs), 4.40(2H, s), 4.50(2H, s), 5.94(2H, s), 6.73-6.77(2H, m), 6.81-6.84(2H, m), 7.01-7.10(4H, m), 7.33(1H, d, J = 2.0 Hz), 7.39(1H, d, J = 8.3 Hz), 7.54(2H, d, J = 9.1 Hz), 7.64(1H, d, J = 3.0 Hz).
2219	4-CF_3Ph-	-CH_3	-H	2.41(4H, brs), 3.05(3H, s), 3.19(3H, s), 3.34-3.36(2H, m), 3.42(2H, s), 3.60(2H, brs), 4.50(2H, s), 4.54(2H, s), 5.95(2H, s), 6.73-6.74(2H, m), 6.83(1H, brs), 6.85(1H, d, J = 8.9 Hz), 7.03(2H, d, J = 8.9 Hz), 7.13(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.34(2H, d, J = 7.9 Hz), 7.54(2H, d, J = 8.9 Hz), 7.59(2H, d, J = 8.1 Hz), 7.70(1H, d, J = 3.1 Hz).
2220	4-CF_3Ph-	-C_2H_5	-H	1.22(3H, t, J = 7.1 Hz), 2.41(4H, brs), 3.19(3H, s), 3.35(2H, brs), 3.42(2H, s), 3.48(2H, q, J = 7.1 Hz), 3.60(2H, brs), 4.50(2H, s), 4.52(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.82 (1H, d, J = 8.7 Hz), 6.84(1H, brs), 7.02(2H, d, J = 8.9 Hz), 7.07(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.36(2H, d, J = 7.9 Hz), 7.54(2H, d, J = 8.9 Hz), 7.58(2H, d, J = 8.1 Hz), 7.65(1H, d, J = 3.0 Hz).
2221	3,4-Cl_2Ph-	-CH_3	-CH_3	2.21(3H, s), 2.42(4H, brs), 3.00(3H, s), 3.21(3H, s), 3.34-3.38(2H, m), 3.42(2H, s), 3.59-3.62(2H, m), 4.39(2H, s), 4.51(2H, s), 5.95(2H, s), 6.73-6.77(2H, m), 6.80-6.83(2H, m), 6.91 (1H, d, J = 8.6 Hz), 7.06(1H, dd, J = 8.2 Hz, 2.1 Hz), 7.12(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.32-7.44(4H, m), 7.65(1H, d, J = 3.1 Hz).
2222	4-CF_3Ph-	-CH_3	-CH_3	2.21(3H, s), 2.42(4H, brs), 3.02(3H, s), 3.20(3H, s), 3.34-3.38(2H, m), 3.42(2H, s), 3.58-3.62(2H, m), 4.51(4H, brs), 5.94(2H, s), 6.70-6.76(2H, m), 6.79-6.83(2H, m), 6.90(1H, d, J = 8.6 Hz), 7.12(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.32-7.39(3H, m), 7.43(1H, d, J = 2.5 Hz), 7.58(2H, d, J = 8.1 Hz), 7.66(1H, d, J = 3.0 Hz).

Table 354



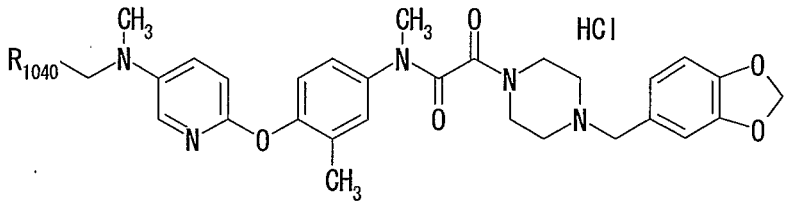
Example No.	R_{1034}	R_{1035}	R_{1036}	^{1}H NMR ($CDCl_3$) δppm
2223	3,4-Cl_2Ph-	-C_2H_5	-CH_3	1.19(3H, t, J = 7.1 Hz), 2.21(3H, s), 2.41(4H, brs), 3.20(3H, s), 3.34-3.37(2H, m), 3.42(2H, s), 3.43(2H, q, J = 7.1 Hz), 3.58-3.62(2H, m), 4.38(2H, s), 4.50(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.79(1H, d, J = 8.9 Hz), 6.83(1H, d, J = 0.8 Hz), 6.91(1H, d, J = 8.6 Hz), 7.04-7.09(2H, m), 7.32-7.43(4H, m), 7.60(1H, d, J = 3.0 Hz).
2224	4-CF_3Ph-	-C_2H_5	-CH_3	1.21(3H, t, J = 7.1 Hz), 2.21(3H, s), 2.41(4H, brs), 3.20(3H, s), 3.34-3.37(2H, m), 3.42(2H, s), 3.46(2H, q, J = 7.1 Hz), 3.58-3.62(2H, m), 4.50(4H, brs), 5.94(2H, s), 6.70-6.74(2H, m), 6.78(1H, d, J = 9.2 Hz), 6.83(1H, brs), 6.90(1H, d, J = 8.6 Hz), 7.04-7.08(1H, m), 7.34-7.43(4H, m), 7.57(2H, d, J = 8.1 Hz), 7.60(1H, d, J = 3.0 Hz).
2225	4-CF_3Ph-	-CH_3	-OCH_3	2.42(4H, brs), 3.01(3H, s), 3.21(3H, s), 3.37(2H, brs), 3.42(2H, s), 3.61(2H, brs), 3.78(3H, s), 4.27(2H, s), 4.53(2H, s), 5.94(2H, s), 6.72-6.76(2H, m), 6.84(2H, d, J = 8.4 Hz), 7.00 (1H, d, J = 8.4 Hz), 7.10-7.16(2H, m), 7.24-7.26(1H, m), 7.33(2H, d, J = 8.1 Hz), 7.57(2H, d, J = 7.9 Hz), 7.62(1H, d, J = 3.0 Hz).
2226	4-CF_3Ph-	-C_2H_5	-OCH_3	1.20(3H, t, J = 6.9 Hz), 2.42(4H, brs), 3.21(3H, s), 3.36(2H, brs), 3.40-3.48(4H, m), 3.61(2H, brs), 3.77(3H, s), 4.48(2H, s), 4.52(2H, s), 5.94(2H, s), 6.73-6.76(2H, m), 6.81-6.85(2H, m), 6.99(1H, d, J = 8.6 Hz), 7.07(1H, dd, J = 9.1 Hz, 3.3 Hz), 7.14(1H, dd, J = 8.4 Hz, 2.3 Hz), 7.24(1H, d, J = 2.5 Hz), 7.34(2H, d, J = 8.1 Hz), 7.54-7.57(3H, m).

Table 355



Example No.	R_{1037}	R_{1038}	R_{1039}	^{1}H NMR (solvent) δppm
2227	3,4-Cl_2Ph-	-CH_3	-H	($CDCl_3$) 2.20(3H, s), 2.48-2.54(4H, m), 2.97(3H, s), 3.44(2H, s), 3.70-3.73(2H, m), 4.23-4.27(2H, m), 4.37(2H, s), 5.95(2H, s), 6.73-6.77(3H, m), 6.85(1H, brs), 6.95(1H, d, J = 8.6 Hz), 7.06(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.10(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.32(1H, d, J = 2.0 Hz), 7.37(1H, dd, J = 8.6 Hz, 2.6 Hz), 7.38(1H, d, J = 8.2 Hz), 7.52(1H, d, J = 2.5 Hz), 7.66(1H, d, J = 2.8 Hz), 9.12(1H, brs).
2228	4-CF_3Ph-	-CH_3	-H	($CDCl_3$) 2.20(3H, s), 2.48-2.54(4H, m), 3.00(3H, s), 3.44(2H, s), 3.72(2H, t, J = 5.0 Hz), 4.23-4.27(2H, m), 4.49(2H, s), 5.95(2H, s), 6.73-6.77(3H, m), 6.85(1H, brs), 6.95(1H, d, J = 8.7 Hz), 7.10(1H, dd, J = 8.9 Hz, 3.3 Hz), 7.32-7.39(3H, m), 7.52(1H, d, J = 2.5 Hz), 7.57(2H, d, J = 8.1 Hz), 7.67(1H, d, J = 3.3 Hz), 9.12(1H, brs).
2229	3,4-Cl_2Ph-	-C_2H_5	-H	($CDCl_3$) 1.18(3H, t, J = 7.1 Hz), 2.20(3H, s), 2.48-2.53(4H, m), 3.41(2H, q, J = 7.1 Hz), 3.44(2H, s), 3.70-3.73(2H, m), 4.23-4.27(2H, m), 4.36(2H, s), 5.95(2H, s), 6.72-6.77(3H, m), 6.85(1H, brs), 6.95(1H, d, J = 8.6 Hz), 7.02-7.09(2H, m), 7.32-7.39(3H, m), 7.51(1H, d, J = 2.6 Hz), 7.60(1H, d, J = 3.1 Hz), 9.12(1H, brs).
2230	4-CF_3Ph-	-C_2H_5	-H	($CDCl_3$) 1.19(3H, t, J = 7.1 Hz), 2.20(3H, s), 2.48-2.53(4H, m), 3.43(2H, q, J = 7.1 Hz), 3.44(2H, s), 3.70-3.73(2H, m), 4.23-4.27(2H, m), 4.48(2H, s), 5.95(2H, s), 6.71-6.77(3H, m), 6.85(1H, brs), 6.95(1H, d, J = 8.7 Hz), 7.04(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.32-7.38(3H, m), 7.51(1H, d, J = 2.5 Hz), 7.56(2H, d, J = 8.1 Hz), 7.61(1H, d, J = 3.1 Hz), 9.11(1H, brs).
2231	3,4-Cl_2Ph-	-C_2H_5	-CH_3	a mixture of the rotational isomers ($DMSO-d_6$) 1.09(3H, t, J = 6.93 Hz), 2.29-2.42(7H, m), 3.22-3.54(11H, m), 4.48(2H, s), 5.97-5.99(2H, m), 6.64-6.94(5H, m), 7.07-7.27(4H, m), 7.46-7.59(3H, m).
2232	4-CF_3Ph-	-C_2H_5	-CH_3	a mixture of the rotational isomers ($DMSO-d_6$) 1.12(3H, t, J = 6.93 Hz), 2.07-2.42(7H, m), 3.22-3.55(11H, m), 4.59(2H, s), 5.97-5.99(2H, m), 6.65-6.94(5H, m), 7.07-7.18(1H, m), 7.23-7.29(2H, m), 7.44(2H, d, J = 8.08 Hz), 7.53(1H, d, J = 3.13 Hz), 7.67(2H, d, J = 8.41 Hz).

Table 356



Example No.	R_{1040}	^{1}H NMR (DMSO-d_6) δppm
2233	3,4-Cl_2Ph-	a mixture of the rotational isomers 2.09-2.12(3H, m), 2.66-4.53(18H, m), 6.05-6.08(2H, m), 6.88-6.93(2H, m), 6.96-7.11(3H, m), 7.19-7.25(3H, m), 7.32-7.36(1H, m), 7.48(1H, d, J = 2.1 Hz), 7.55-7.60(2H, m), 11.35(1H, brs).
2234	4-CF_3Ph-	a mixture of the rotational isomers 2.10-2.12(3H, m), 2.66-4.64(18H, m), 6.05-6.08(2H, m), 6.87-6.92(2H, m), 6.96-7.11(3H, m), 7.18-7.25(2H, m), 7.30-7.35(1H, m), 7.43(2H, d, J = 8.1 Hz), 7.60-7.61(1H, m), 7.68(2H, d, J = 8.2 Hz), 11.27(1H, brs).

Example 2235

Production of (4-{5-[benzyl-(3,4-dichlorobenzyl)-amino]pyridin-2-yloxy}(4-benzylpiperazin-1-yl)methanone

(4-benzylpiperazin-1-yl){4-[5-(3,4-dichlorobenzylamino)pyridin-2-yloxy]phenyl}methanone (1.09 g, 2.0 mmol) was dissolved in DMF (30 mL). To this solution were added potassium carbonate (0.28 g, 2.0 mmol) and benzyl bromide (0.24 mL, 2.0 mmol), and the resulting solution was stirred at room temperature for 2 hours, then subsequently stirred for 1 hour at 70°C. To the resulting solution were further added potassium carbonate (0.03 g, 0.2 mmol) and benzyl bromide (0.02 mL, 0.2 mmol), and this solution was stirred for 3 hours at 70°C. To the resulting solution were again added potassium carbonate (0.03 g, 0.2 mmol), benzyl bromide (0.02 mL, 0.2 mmol) and sodium

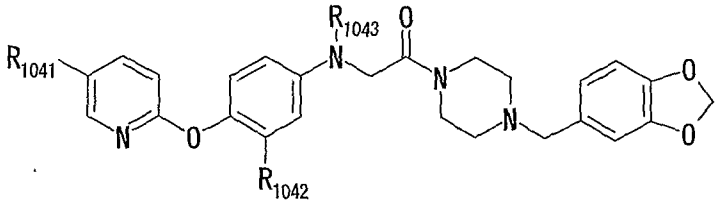
iodide (0.15 g, 1.0 mmol), and this solution was stirred for overnight at 70°C. The resulting reaction solution was concentrated under reduced pressure. The residue was diluted with chloroform, and this solution was washed with water, saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (ethyl acetate), to thereby yield 0.64 g of the title compound.

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 2.37(4H, brs), 3.28-3.50(6H, m), 4.71(2H, s), 4.73(2H, s), 6.90(1H, d, J = 8.9 Hz), 6.99(2H, d, J = 8.6 Hz), 7.22-7.37(14H, m), 7.52(1H, d, J = 2.0 Hz), 7.58-7.61(2H, m).

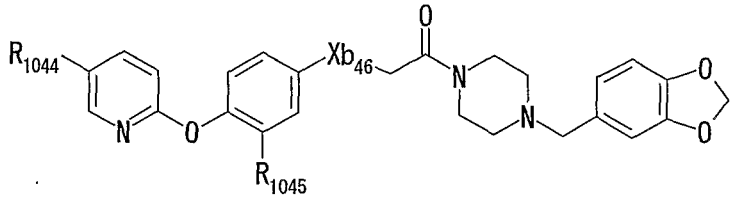
The following compounds were produced in the same manner as in Example 2235.

Table 357



Example No.	R_{1041}	R_{1042}	R_{1043}	^{1}H NMR ($CDCl_3$) δppm
2236	3,4-Cl_2PhCON(CH_3)-	-OCH_3	-C_2H_5	1.19(3H, t, J = 7.1 Hz), 2.42(4H, t, J = 4.8 Hz), 3.30-3.55(4H, m), 3.43(2H, s), 3.44(3H, s), 3.58-3.70(2H, m), 3.67(3H, s), 4.03(2H, s), 5.95 (2H, s), 6.19(1H, dd, J = 8.8 Hz, 2.8 Hz), 6.30(1H, d, J = 2.8 Hz), 6.70-6.75(2H, m), 6.79(1H, d, J = 8.9 Hz), 6.85(1H, s), 6.92(1H, d, J = 8.8 Hz), 7.05 (1H, dd, J = 8.1 Hz, 2.0 Hz), 7.27(1H, d, J = 8.1 Hz), 7.35(1H, dd, J = 8.9 Hz, 2.6 Hz), 7.41(1H, d, J = 2.0 Hz), 7.80(1H, d, J = 2.6 Hz).
2237	4-CF_3PhCON(CH_3)-	-CH_3	-CH_3	1.97(3H, s), 2.43(4H, t, J = 5.0 Hz), 3.00(3H, s), 3.44(2H, s), 3.47(3H, s), 3.42-3.57(2H, m), 3.63 (2H, brs), 4.06(2H, s), 5.95(2H, s), 6.44-6.55(2H, m), 6.67-6.79(3H, m), 6.82-6.90(2H, m), 7.40-7.47(1H, m), 7.37(2H, d, J = 8.1 Hz), 7.48 (2H, d, J = 8.1 Hz), 7.81(1H, brs).
2238	4-CF_3PhCON(CH_3)-	-OCH_3	-C_2H_5	1.18(3H, t, J = 7.1 Hz), 2.41(4H, t, J = 4.9 Hz), 3.40(2H, q, J = 7.1 Hz), 3.42(2H, t, J = 3.5 Hz), 3.47(3H, s), 3.42-3.59(2H, m), 3.63(5H, s), 4.02 (2H, s), 5.95(2H, s), 6.18(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.28(1H, d, J = 2.8 Hz), 6.69-6.78(2H, m), 6.77(1H, d, J = 8.8 Hz), 6.85(1H, s), 6.90(1H, d, J = 8.7 Hz), 7.35(1H, d, J = 8.8 Hz), 7.38(2H, d, J = 8.4 Hz), 7.48(2H, d, J = 8.4 Hz), 7.79(1H, brs).
2239	3,4-Cl_2PhN(CH_3)CO-	-OCH_3	-C_2H_5	1.18(3H, t, J = 7.1 Hz), 2.42(4H, t, J = 5.0 Hz), 3.42(2H, s), 3.43(2H, q, J = 7.1 Hz), 3.45(3H, s), 3.55(2H, brs), 3.65(5H, brs), 4.02(2H, s), 5.95(2H, s), 6.19(1H, dd, J = 8.7 Hz, 2.8 Hz), 6.29(1H, d, J = 2.8 Hz), 6.71-6.74(3H, m), 6.85(1H, brs), 6.87 (1H, dd, J = 8.6 Hz, 2.5 Hz), 6.92(1H, d, J = 8.7 Hz), 7.20(1H, d, J = 2.5 Hz), 7.32(1H, d, J = 8.4 Hz), 7.64(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.05(1H, d, J = 1.8 Hz).
2240	3,4-Cl_2PhSO_2N(CH_3)-	-F	-CH_3	2.44(2H, brs), 3.03(3H, s), 3.19(3H, s), 3.44(2H, brs), 3.47(2H, brs), 3.62(2H, brs), 4.08(2H, brs), 4.08(2H, s), 5.95(2H, s), 6.41(1H, dd, J = 8.2 Hz, 3.1 Hz), 6.42-6.50(1H, m), 6.70-6.79(2H, m), 6.85(1H, brs), 6.90(1H, d, J = 8.7 Hz), 7.04(1H, t, J = 7.8 Hz), 7.34(1H, dd, J = 8.4 Hz, 2.2 Hz), 7.50(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.56(1H, d, J = 8.4 Hz), 7.72(1H, d, J = 2.2 Hz), 7. 77(1H, d, J = 2.8 Hz).

Table 358



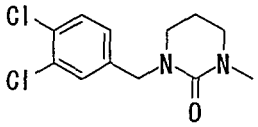
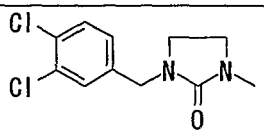
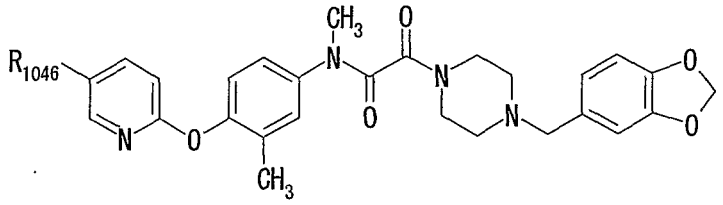
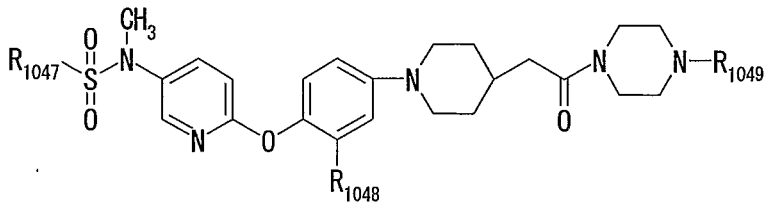
Example No.	R_{1044}	R_{1045}	Xb_{46}	Form	mp (°C) or ^{1}H NMR
2241	4-CF_3PhCON(CH_3)-	-CH_3	-N(SO_2CH_3)-	free	^{1}H NMR ($CDCl_3$) δ 2.05(3H, s), 2.42(4H, brs), 3.20(3H, s), 3.34-3.37(2H, m), 3.42(2H, s), 3.48(3H, s), 3.59-3.61(2H, m), 4.52(2H, s), 5.95(2H, s), 6.70-6.77(2H, m), 6.84(1H, brs), 6.86(1H, d, J = 8.7 Hz), 6.97(1H, d, J = 8.1 Hz), 7.37-7.51(7H, m), 7.79(1H, brs).
2242	3,4-Cl_2PhCON(CH_3)-	-CH_3	-N(SO_2CH_3)-	free	^{1}H NMR ($CDCl_3$) δ 2.09(3H, s), 2.42(4H, brs), 3.21(3H, s), 3.37(2H, brs), 3.43(2H, s), 3.46(3H, s), 3.61(2H, brs), 4.52(2H, s), 5.95(2H, s), 6.70-6.80(2H, m), 6.84(1H, brs), 6.89(1H, d, J = 8.7 Hz), 6.99(1H, d, J = 8.4 Hz), 7.09(1H, dd, J = 8.2 Hz, 1.8 Hz), 7.29(1H, d, J = 8.2 Hz), 7.38(1H, d, J = 2.0 Hz), 7.42-7.46(3H, m), 7.80(1H, d, J = 2.5 Hz).
2243		-H	-CH_2-	free	mp 133.0 - 134.0
2244		-H	-CH_2-	free	mp 117.0 - 118.0
2245	4-CF_3PhN(CH_3)SO_2-	-H	-CH_2-	free	^{1}H NMR ($CDCl_3$) δ2.33-2.41(4H, m), 2.63(2H, t, J = 7.3 Hz), 2.99(2H, t, J = 7.3 Hz), 3.22(3H, s), 3.40(4H, brs), 3.61-3.64(2H, m), 5.93(2H, s), 6.69-6.76(2H, m), 6.84(1H, s), 6.94(1H, d, J = 8.7 Hz), 7.06(2H, d, J = 8.6 Hz), 7.27-7.31(4H, m), 7.59(2H, d, J = 8.4 Hz), 7.71(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.37(1H, d, J = 2.6 Hz).
2246	F_3CCH=CHCON(CH_3)-	-CH_3	-N(CH_3)-	hydro-chloride	mp 161.0 - 164.0

Table 359



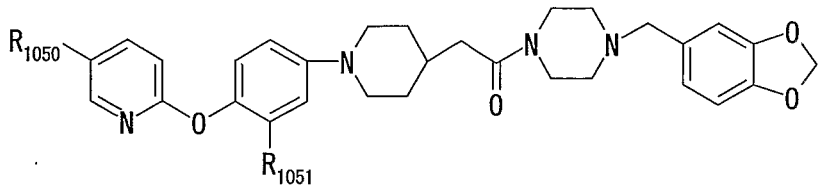
Example No.	R_{1046}	^{1}H NMR (solvent) δppm
2247	3,4-Cl_2PhCON(CH_3)-	a mixture of the rotational isomers (DMSO-d_6) 1.93(3H, brs), 2.08-2.42(4H, m), 3.21-3.56(12H, m), 5.97-5.99(2H, m), 6.66-6.89(3H, m), 6.90-7.07(2H, m), 7.13-7.32(3H, m), 7.48-7.54(2H, m), 7.85-7.89(2H, m).
2248	4-CF_3PhCON(CH_3)-	a mixture of the rotational isomers (DMSO-d_6) 1.87(3H, brs), 2.07-2.41(4H, m), 3.20-3.55(12H, m), 5.97-5.99(2H, m), 6.66-6.89(3H, m), 6.98-7.04(2H, m), 7.12-7.21(1H, m), 7.24-7.30(1H, m), 7.47(2H, brs), 7.61-7.64(2H, m), 7.86-7.89(2H, m).
2249	3,4-Cl_2PhSO_2N(CH_3)-	($CDCl_3$) 2.17(3H, s), 2.23-2.53(4H, m), 3.21(3H, brs), 3.32-3.82(9H, m), 5.93-5.95(2H, m), 6.65-6.78(3H, m), 6.85-6.95(1H, m), 7.02-7.06(1H, m), 7.07-7.18(2H, m), 7.38-7.42(1H, m), 7.53-7.58(2H, m), 7.67-7.68(1H, m), 7.78-7.80(1H, m).
2250	4-CF_3PhSO_2N(CH_3)-	a mixture of the rotational isomers (DMSO-d_6) 2.07-2.43(7H, m), 3.16-3.56(12H, m), 6.67-6.70(2H, m), 6.76-6.89(3H, m), 7.05-7.36(4H, m), 7.61-7.66(1H, m), 7.77-7.80(2H, m), 7.91-7.80(3H, m).
2251	4-CF_3PhSO_2N(C_2H_5)-	($CDCl_3$) 1.13(3H, t, J = 7.1 Hz), 2.18(3H, s), 2.23-2.52(4H, m), 3.32-3.66(11H, m), 5.93-5.95(2H, m), 6.66-6.95(4H, m), 7.04-7.19(3H, m), 7.46(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.73-7.80(5H, m).

Table 360



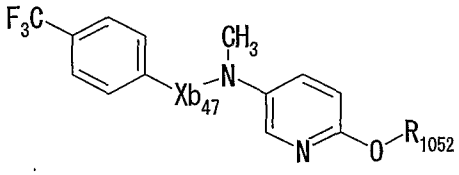
Example No.	R_{1047}	R_{1048}	R_{1049}	^{1}H NMR ($CDCl_3$) δppm
2252	4-CF_3Ph-	-H	benzyl	1.34-1.46(2H, m), 1.85-2.03(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.43(4H, brs), 2.73(2H, t, J = 12.0 Hz), 3.19(3H, s), 3.47-3.65(8H, m), 6.83(1H, d, J = 8.7 Hz), 6.92-7.03(4H, m), 7.26-7.33 (5H, m), 7.48(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.70-7.78(5H, m).
2253	3,4-Cl_2Ph-	-H	piperonyl	1.33-1.46(2H, m), 1.85-2.04(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.39-2.42(4H, m), 2.74(2H, t, J = 12.2 Hz), 3.19(3H, s), 3.43(2H, s), 3.46-3.64(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.83(2H, d, J = 8.9 Hz), 6.92-7.03(4H, m), 7.38(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.49(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.56(1H, d, J = 8.4 Hz), 7.70(1H, d, J = 2.1 Hz), 7.81(1H, d, J = 2.3 Hz).
2254	4-CF_3Ph-	-H	piperonyl	1.34-1.46(2H, m), 1.85-2.02(3H, m), 2.28(2H, d, J = 6.8 Hz), 2.39-2.42(4H, m), 2.74(2H, t, J = 12.0 Hz), 3.20(3H, s), 3.43(2H, s), 3.46-3.64(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.81-7.03(6H, m), 7.49(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.71-7.78(5H, m).
2255	4-CF_3Ph-	-OCH_3	benzyl	1.31-1.42(2H, m), 1.86-2.00(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.42-2.45(4H, m), 2.76(2H, t, J = 12.0 Hz), 3.19(3H, s), 3.49-3.69(8H, m), 3.75(3H, s), 6.51(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.59(1H, d, J = 2.5 Hz), 6.83(1H, d, J = 8.7 Hz), 6.98(1H, d, J = 8.7 Hz), 7.26-7.33(5H, m), 7.47(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.69-7.75(5H, m).
2256	3,4-Cl_2Ph-	-H	benzyl	1.39-1.42(2H, m), 1.84-2.02(3H, m), 2.28(2H, d, J = 6.8 Hz), 2.41-2.45(4H, m), 2.73(2H, t, J = 12.2 Hz), 3.19(3H, s), 3.48-3.95(8H, m), 6.83(1H, d, J = 8.7 Hz), 6.92-7.03(4H, m), 7.27-7.39(6H, m), 7.48(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.55(1H, d, J = 8.4 Hz), 7.70(1H, d, J = 2.1 Hz), 7.81(1H, d, J = 2.3 Hz).
2257	3,4-Cl_2Ph-	-OCH_3	benzyl	1.34-1.42(2H, m), 1.82-2.00(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.41-2.45(4H, m), 2.76(2H, t, J = 12.2 Hz), 3.19(3H, s), 3.49-3.65(8H, m), 3.75(3H, s), 6.51(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.58(1H, d, J = 2.6 Hz), 6.84(1H, d, J = 8.7 Hz), 6.98(1H, d, J = 8.6 Hz), 7.26-7.39(6H, m), 7.46(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.54(1H, d, J = 8.4 Hz), 7.69(1H, d, J = 2.0 Hz), 7.78(1H, d, J = 2.5 Hz).

Table 361



Example No.	R_{1050}	R_{1051}	^{1}H NMR ($CDCl_3$) δppm
2258	4-$CF_3PhN(CH_3)SO_2$-	-H	1.34-1.46(2H, m), 1.85-2.00(3H, m), 2.28(2H, d, J = 6.8 Hz), 2.39-2.43(4H, m), 2.75(2H, t, J = 12.2 Hz), 3.21(3H, s), 3.43(2H, s), 3.46-3.64(6H, m), 5.94(2H, s), 6.70-6.77(2H, m), 6.85-7.02(6H, m), 7.26-7.31(2H, m), 7.59(2H, d, J = 8.6 Hz), 7.67(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.39(1H, d, J = 2.1 Hz).
2259	4-$CF_3PhSO_2N(C_2H_5)$-	-OCH_3	1.11(3H, t, J = 7.1 Hz), 1.30-1.42(2H, m), 1.85-2.00(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.39-2.44(4H, m), 2.76(2H, t, J = 12.2 Hz), 3.40-3.70(10H, m), 3.75(3H, s), 5.94(2H, s), 6.51(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.59(1H, d, J = 2.6 Hz), 6.74-6.87(4H, m), 6.99(1H, d, J = 8.7 Hz), 7.37-7.48(2H, m), 7.54(1H, d, J = 8.4 Hz), 7.73-7.75(2H, m).
2260	4-$CF_3PhSO_2N(C_2H_5)$-	-H	1.11(3H, t, J = 7.1 Hz), 1.35-1.47(2H, m), 1.85-2.00(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.40-2.42(4H, m), 2.74(2H, t, J = 12.0 Hz), 3.42-3.48(4H, m), 3.57-3.64(6H, m), 5.94(2H, s), 6.74-6.77(2H, m), 6.82-7.04(6H, m), 7.41(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.72-7.94(5H, m).
2261	4-$CF_3PhSO_2N(CH_3)$-	-OCH_3	1.39-1.47(2H, m), 1.86-2.00(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.41(4H, brs), 2.76(2H, t, J = 12.0 Hz), 3.19(3H, s), 3.43(2H, s), 3.48(2H, brs), 3.60(4H, brs), 3.64(3H, s), 5.93(2H, s), 6.51(1H, dd, J = 8.7 Hz, 2.5 Hz), 6.59(1H, d, J = 2.5 Hz), 6.74-6.84(4H, m), 6.98(1H, d, J = 8.6 Hz), 7.46(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.69-7.76(5H, m).
2262	4-$CF_3PhN(CH_3)SO_2$-	-CH_3	1.34-1.45(2H, m), 1.85-2.01(3H, m), 2.07(3H, s), 2.29(2H, d, J = 6.8 Hz), 2.41-2.43(4H, m), 2.73(2H, t, J = 12.0 Hz), 3.22(3H, s), 3.43(2H, s), 3.46-3.77(6H, m), 5.94(2H, s), 6.74-6.94(7H, m), 7.29(2H, d, J = 8.2 Hz), 7.58(2H, d, J = 8.4 Hz), 7.68(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.38(1H, d, J = 2.5 Hz).
2263	3,4-$Cl_2PhSO_2N(CH_3)$-	-CH_3	1.38-1.41(2H, m), 1.84-1.98(3H, m), 2.11(3H, s), 2.29(2H, d, J = 6.8 Hz), 2.41(4H, brs), 2.72(2H, t, J = 12.0 Hz), 3.19(3H, s), 3.43-3.64(8H, m), 5.94(2H, s), 6.74-6.85(6H, m), 6.93(1H, d, J = 8.6 Hz), 7.39(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.49(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.56(1H, d, J = 8.4 Hz), 7.67(1H, d, J = 2.0 Hz), 7.78(1H, d, J = 2.3 Hz).
2264	3,4-$Cl_2PhSO_2N(CH_3)$-	-OCH_3	1.39-1.47(2H, m), 1.85-2.02(3H, m), 2.29(2H, d, J = 6.8 Hz), 2.39-2.44(4H, m), 2.76(2H, t, J = 12.2 Hz), 3.19(3H, s), 3.43(2H, s), 3.49(2H, brs), 3.59-3.73(4H, m), 3.75(3H, s), 5.94(2H, s), 6.51(1H, dd, J = 8.7 Hz, 2.6 Hz), 6.59(1H, d, J = 2.6 Hz), 6.74-6.85(4H, m), 6.98(1H, d, J = 8.6 Hz), 7.38(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.46(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.55(1H, d, J = 8.4 Hz), 7.69(1H, d, J = 2.1 Hz), 7.78(1H, d, J = 2.8 Hz).

Table 362



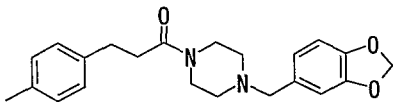
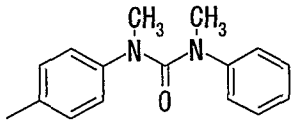
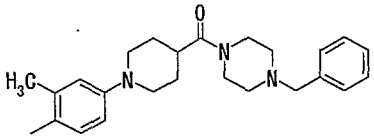
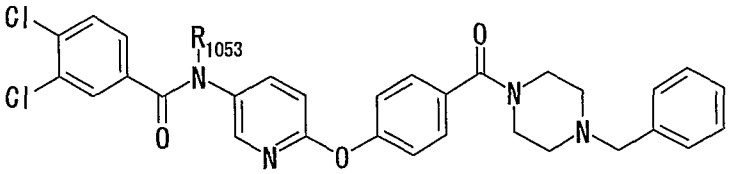
Example No.	Xb_{47}	R_{1052}	^{1}H NMR ($CDCl_3$) δppm
2265	-CO-		2.33(2H, d, J = 5.1 Hz), 2.38(2H, d, J = 5.1 Hz), 2.60(2H, t, J = 5.1 Hz), 2.96(2H, t, J = 8.0 Hz), 3.33-3.46(2H, m), 3.40 (2H, s), 3.47(3H, s), 3.62(2H, t, J = 2.0 Hz), 5.94(2H, s), 6.67-6.79(2H, m), 6.83(1H, d, J = 8.7 Hz), 6.84(1H, s), 6.99 (2H, d, J = 8.4 Hz), 7.22(2H, d, J = 8.4 Hz), 7.34-7.45(1H, m), 7.40(2H, d, J = 8.2 Hz), 7.50(2H, d, J = 8.2 Hz), 7.85(1H, brs).
2266	-CO-		3.17(3H, s), 3.21(3H, s), 3.48(3H, s), 6.70(1H, d, J = 8.7 Hz), 6.72-6.84(6H, m), 6.95(1H, t, J = 7.4 Hz), 7.07(2H, t, J = 7.8 Hz), 7.31-7.45(3H, m), 7.46-7.58(2H, m), 7.79-7.92(1H, m).
2267	$-SO_2-$		1.78-2.04(4H, m), 2.11(3H, s), 2.44 (4H, brs), 2.53-2.76(3H, m), 3.19(3H, s), 3.53(4H, brs), 3.67(4H, brs), 6.76-6.81(3H, m), 6.93(1H, d, J = 8.6 Hz), 7.26-7.33(5H, m), 7.49(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.70-7.79(5H, m).

Table 363



Example No.	R_{1053}	Form	^{1}H NMR (DMSO-d_6) δppm
2268	$-CH_3$	free	2.39(4H, brs), 3.32-3.51(9H, m), 7.08(1H, d, J = 8.7 Hz), 7.09(2H, d, J = 8.4 Hz), 7.25-7.31(6H, m), 7.41(2H, d, J = 8.6 Hz), 7.55-7.58(2H, m), 7.87(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.03(1H, brs).
2269	benzyl	hydro-chloride	3.12-3.43(8H, m), 4.33(2H, s), 5.09(2H, s), 7.02(1H, d, J = 8.7 Hz), 7.07 (2H, d, J = 7.8 Hz), 7.26-7.33(6H, m), 7.45-7.48(5H, m), 7.55-7.58(3H, m), 7.67(1H, brs), 7.77(1H, d, J = 8.7 Hz), 7.85(1H, brs), 11.09(1H, brs).

Example 2270

Production of 1-(*t*-butoxycarbonyl)-4-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}-4-hydroxypiperidine

To a solution of N-[4-(4-bromophenoxy)phenyl]-3,4-dichlorobenzamide (4.94 g, 11.3 mmol) in THF (100 mL) was stirred at -85°C, and added a solution of 2.46 M *n*-butyl lithium hexane (9.65 mL, 23.7 mmol) dropwise over 10 minutes. Upon stirring for 20 minutes at the same temperature, crystals were precipitated. To this reaction solution was added a solution of 1-(*t*-butoxycarbonyl)-4-piperidone (2.48 g, 12.4 mmol) in THF (20 mL). The temperature of the solution was raised over 3 hours to -40°C, and then aqueous saturated ammonium chloride was added to the solution. The resulting reaction solution was extracted with ethyl acetate, and dried over anhydrous magnesium sulfate. The solvent was then evaporated, and the residue was purified by silica gel column chromatography (ethyl acetate : *n*-hexane = 2 : 3 to 1 : 1), to yield 2.30 g of a white powder. These crystals were washed with ether, to thereby yield 1.80 g of the title compound.

Appearance: White powder

Melting point: 208-209°C

Example 2271

Production of 1-(*t*-butoxycarbonyl)-4-(4-{4-[4-(3,4-

dichlorobenzoylamino)phenoxy]phenyl}-1,2,5,6-tetrahydropyridine

To a solution of 1-(*t*-butoxycarbonyl)-4-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}-4-hydroxypiperidine (1.56 g, 2.80 mmol) in toluene (32 mL) was added *p*-toluenesulfonic acid hydrate (53 mg, 0.28 mmol), and the resulting solution was refluxed for 18 hours. The resulting reaction solution was purified by silica gel column chromatography (dichloromethane : methanol = 20 : 1), to thereby yield 1.35 g of the title compound.

Appearance: White powder

Melting point: 173-174°C

Example 2272

Production of 1-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}-4-hydroxypiperidine

To a solution of 1-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}-4-(methoxymethoxy)piperidine (5.50 g, 11.0 mmol) in ethanol (110 mL) was added 2 M hydrochloric acid (55 mL, 110 mmol), and the resulting solution was stirred for 8 hours at 60°C. To the resulting reaction solution was added potassium carbonate (16 g) at room temperature, and the solvent was evaporated under reduced pressure. Water (200 mL) was added to the residue . Precipitated crystals were collected by filtration, to thereby yield 5.0 g of the title

compound.

Appearance: Pale brown powder

Melting point: 178-180°C

Example 2273

Production of 1-(3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionyl)piperazine monohydrochloride

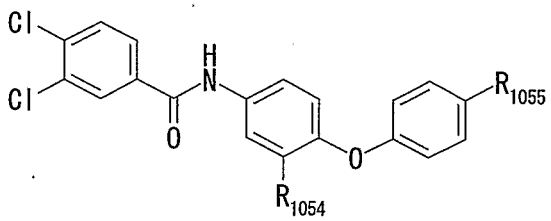
To a solution of 1-(*t*-butoxycarbonyl)-4-(3-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}-propionyl)piperazine (2.40 g, 4.01 mmol) in dichloromethane (24 mL) was added trifluoroacetic acid (12 mL) under ice cooling, and the resulting solution was stirred for 3 hours at the same temperature. The solvent was evaporated. To the residue was added acetone (5 mL), and then added a saturated sodium bicarbonate solution to make the solution basic. The formed solids were collected by filtration and dried, whereby 2.00 g of a white powder free form was obtained. This free form (0.500 g) was dissolved in ethanol (10 mL) and 5 M hydrochloric acid (0.4 mL) by heating. The solvent was then evaporated, and the obtained solid was recrystallized from isopropanol, to thereby yield 0.388 g of the title compound.

Appearance: White powder

Melting point: 127-130°C

The following compounds were produced in the same manner as in Example 2273.

Table 364



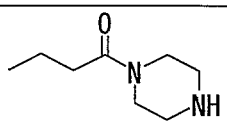
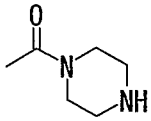
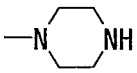
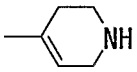
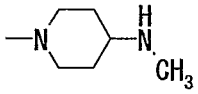
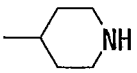
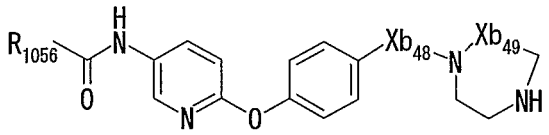
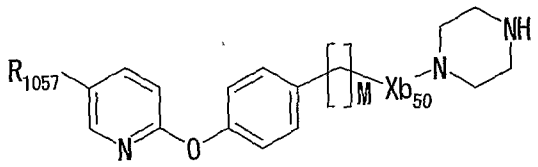
Example No.	R_{1054}	R_{1055}	Form	mp (°C) or ^{1}H NMR (solvent) δppm
2274	-F		hydro-chloride	mp 149-151
2275	-H		free	mp 198-199
2276	-H		free	mp 170-174
2277	-H		free	^{1}H NMR ($CDCl_3$) 2.43-2.46(2H, m), 3.11(2H, t, J = 5.5 Hz), 3.53(2H, q, J = 3 Hz), 6.10(1H, m), 6.97(2H, d, J = 8.5 Hz), 7.04(2H, d, J = 9.0 Hz), 7.36(2H, d, J = 8.5 Hz), 7.56-7.59(3H, m), 7.68-7.69(2H, m), 7.97(1H, d, J = 2.0 Hz).
2278	-H		free	^{1}H NMR (DMSO-d_6) 1.32-1.36(2H, m), 1.85-1.91(2H, m), 2.32(3H, s), 2.45(1H, m), 2.66-2.71(2H, m), 3.54-3.56(2H, m), 4.13(1H, m), 6.89-6.97(6H, m), 7.65-7.71(3H, m), 7.82(1H, d, J = 8.5 Hz), 7.93(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.36(1H, s).
2279	-H		free	^{1}H NMR ($CDCl_3$) 1.63(2H, m), 1.83(2H, brd, J = 14.0 Hz), 2.61(1H, m), 2.75(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.20(2H, brd, J = 12.0 Hz), 6.95(2H, d, J = 8.5 Hz), 7.03(2H, d, J = 9.0 Hz), 7.19(2H, d, J = 8.5 Hz), 7.55(1H, d, J = 8.0 Hz), 7.58(2H, d, J = 8.5 Hz), 7.69(1H, dd, J = 8.0 Hz, 2.0 Hz), 7.69(1H, brs), 7.97(1H, d, J = 2.0 Hz).

Table 365



Example No.	R_{1056}	Xb_{48}	Xb_{49}	Form	^{1}H NMR (solvent) δppm
2280	3,4-Cl_2Ph-	none	-CO-	trifluoro-acetate	(DMSO-d_6) 3.56(2H, brs), 3.87(2H, m), 3.92(2H, brs), 7.14(1H, d, J = 8.8 Hz), 7.20(2H, dd, J = 6.7 Hz, 2.2 Hz), 7.35(2H, dd, J = 6.7 Hz, 2.2 Hz), 7.85(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.22(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.23 (1H, d, J = 2.1 Hz), 8.51(1H, d, J = 2.7 Hz), 9.30 (2H, brs), 10.59(1H, s).
2281	4-CF_3Ph-	none	-CH_2-	free	($CDCl_3$) 3.07(4H, t, J = 5.0 Hz), 3.15(4H, t, J = 5.0 Hz), 6.92(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz), 7.06(2H, d, J = 9.0 Hz), 7.77(1H, brs), 7.78(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.19(1H, brd, J = 9.0 Hz), 8.25(1H, d, J = 2.5 Hz).
2282	3,4-Cl_2Ph-	none	-CH_2-	free	($CDCl_3$) 3.18(4H, dd, J = 5.5 Hz, 2.5 Hz), 3.16 (4H, dd, J = 5.5 Hz, 2.5 Hz), 6.90(1H, d, J = 9.0 Hz), 6.95(2H, d, J = 9.0 Hz), 7.05(2H, d, J = 9.0 Hz), 7.58(1H, d, J = 8.5 Hz), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.88(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).
2283	3,4-Cl_2Ph-	-CH_2-	-CH_2-	free	(DMSO-d_6) 2.45-2.47(4H, m), 2.88-2.92(4H, m), 3.49(2H, s), 7.05-7.09(3H, m), 7.33(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.6 Hz), 7.95-7.99(1H, m), 8.18-8.25(2H, m), 8.51(1H, d, J = 2.6 Hz), 10.62 (1H, s).
2284	3,4-Cl_2Ph-	-CO-	-CH_2-	free	(DMSO-d_6) 2.69(4H, brs), 3.40(4H, brs), 7.12-7.17(3H, m), 7.41-7.44(2H, m), 7.84(1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.21-8.26(2H, m), 8.52(1H, d, J = 2.7 Hz), 10.62 (1H, brs).
2285	4-CF_3Ph-	-CH_2-	-CH_2-	free	(DMSO-d_6) 2.44-2.46(4H, m), 2.89-2.92(4H, m), 3.49(2H, s), 4.79(1H, brs), 7.06-7.09(3H, m), 7.33(2H, d, J = 8.6 Hz), 7.94(2H, d, J = 8.1 Hz), 8.16-8.25(3H, m), 8.52(1H, d, J = 2.7 Hz), 10.65 (1H, s).
2286	3,4-$(CH_3)_2$Ph-	-CO-	-CH_2-	free	(DMSO-d_6) 2.29(3H, s), 2.30(3H, s), 2.73(4H, brs), 3.44(4H, brs), 7.09-7.16(3H, m), 7.29(1H, d, J = 7.9 Hz), 7.40-7.44(2H, m), 7.69-7.72(1H, m), 7.75(1H, brs), 8.22-8.26(1H, m), 8.53(1H, d, J = 2.8 Hz), 10.31(1H, s).

Table 366



Example No.	R_{1057}	Xb_{50}	M	^{1}H NMR (solvent) δppm
2287	3,4-$Cl_2PhCH_2N(CH_3)$-	none	1	(DMSO-d_6) 2.51-2.54(4H, m), 3.00(3H, s), 3.06-3.08(4H, m), 3.50(2H, s), 4.55(2H, s), 6.88(1H, d, J = 8.9 Hz), 6.94 (2H, d, J = 8.4 Hz), 7.19-7.32(4H, m), 7.49(1H, d, J = 1.5 Hz), 7.58(1H, d, J = 8.2 Hz), 7.64(1H, d, J = 3.1 Hz), 8.73 (1H, brs).
2288	4-$CF_3PhCONH$-	none	3	($CDCl_3$) 1.77-1.96(6H, m), 2.35-2.44(6H, m), 2.61-2.66(2H, m), 6.92(1H, d, J = 8.6 Hz), 7.01-7.05(2H, m), 7.17-7.23 (2H, m), 7.74(2H, d, J = 8.4 Hz), 8.00(2H, d, J = 8.4 Hz), 8.21(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.27-8.28(2H, m).
2289	3,4-$Cl_2PhCONH$-	-CO-	2	(DMSO-d_6) 2.59-2.69(6H, m), 2.79-2.85(2H, m), 3.37-3.43 (4H, m), 4.31(1H, brs), 7.00-7.06(3H, m), 7.27(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.16-8.22(2H, m), 8.46(1H, d, J = 2.3 Hz), 10.54(1H, s).
2290	4-$CF_3PhCONH$-	-COCO-	1	($CDCl_3$) 1.69(1H, brs), 2.51(2H, t, J = 5.1 Hz), 2.77(2H, t, J = 5.1 Hz), 3.15(2H, t, J = 5.1 Hz), 3.53(2H, t, 5.1 Hz), 4.05(2H, s), 6.98(1H, d, J = 8.7 Hz), 7.11(2H, d, J = 8.5 Hz), 7.29(2H, d, J = 8.5 Hz), 7.76(2H, d, J = 8.2 Hz), 7.99(2H, d, J = 8.2 Hz), 8.01(1H, brs), 8.21(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.25(1H, d, J = 2.7 Hz).

Example 2291

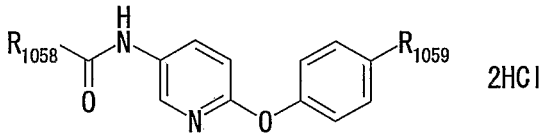
[3-(4-{5-[3-(3,4-Dichlorophenyl)ureido]pyridin-2-yloxy}-3-methylphenyl)-2-oxotetrahydropyrimidin-1-yl]acetic acid

^{1}H NMR (DMSO-d_6) δ 1.87-2.15(5H, m), 3.25-3.47(2H, m), 3.58-3.75(2H, m), 3.95(2H, s), 6.82-7.00(2H, m), 7.01-7.12(1H, m), 7.17(1H, d, J = 2.4 Hz), 7.29-7.32(1H, m), 7.50(1H, d, J = 8.8 Hz), 7.85(1H, d, J = 2.4 Hz), 7.89-

8.02(1H, m), 8.11(1H, d, J = 2.7 Hz), 8.95(1H, s), 9.17(1H, s), 12.50(1H, s).

The following compounds were produced in the same manner as in Reference Example 922.

Table 367



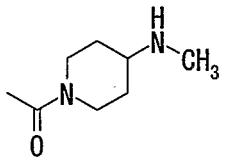
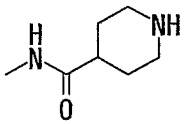
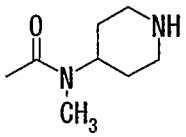
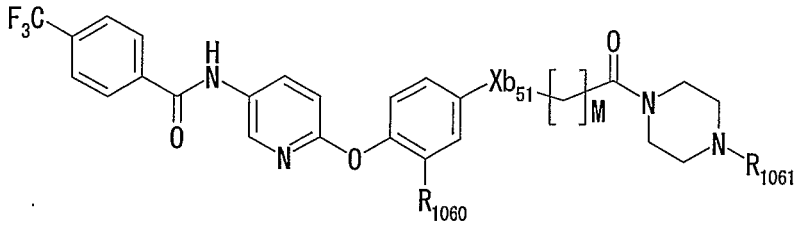
Example No.	R_{1058}	R_{1059}	^{1}H NMR (DMSO-d_6) δppm
2292	3,4-Cl_2Ph-		1.40-1.65(2H, m), 1.95-2.18(2H, m), 2.40-2.65(3H, m), 3.00(2H, brs), 3.25(1H, brs), 3.85(1H, brs), 4.40(1H, brs), 7.15(1H, d, J = 9.0 Hz), 7.19(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.84(1H, d, J = 8.4 Hz), 7.99(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.22-8.30(2H, m), 8.56(1H, d, J = 2.0 Hz), 10.71(1H, s).
2293	3,4-Cl_2Ph-		1.70-2.05(4H, m), 2.60-2.80(1H, m), 2.80-3.05(2H, m), 3.44(2H, d, J = 7.1 Hz), 7.03(1H, d, J = 8.7 Hz), 7.07(2H, d, J = 8.9 Hz), 7.65(2H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.4 Hz), 7.98(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.20(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.26(1H, d, J = 2.0 Hz), 8.50(1H, d, J = 2.7 Hz), 10.22(1H, s), 10.65(1H, s).
2294	4-CF_3Ph-		1.75-1.90(2H, m), 1.95-2.30(2H, m), 2.84(3H, s), 2.70-3.15(2H, m), 3.20-3.42(2H, m), 4.55(1H, brs), 6.51 (1H, brs), 7.16(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.4 Hz), 7.47(2H, d, J = 8.4 Hz), 7.94(2H, d, J = 8.1 Hz), 8.22(2H, d, J = 8.1 Hz), 8.31(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.60(1H, d, J = 2.6 Hz), 10.84(1H, s).

Table 368



Example No.	R_{1060}	R_{1061}	Xb_{51}	M	Form	^{1}H NMR (solvent) δppm
2295	-H	-H	none	0	dihydro-chloride	(DMSO-d_6) 3.16(4H, brs), 3.75(4H, brs), 7.16 (1H, d, J = 8.9 Hz), 7.19(2H, d, J = 8.7 Hz), 7.53 (2H, d, J = 8.7 Hz), 7.93(2H, d, J = 8.1 Hz), 8.21 (2H, d, J = 8.1 Hz), 8.30(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.60(1H, d, J = 2.5 Hz), 10.81(1H, s).
2296	-H	-H	none	2	dihydro-chloride	(DMSO-d_6) 2.68(1H, d, J = 6.5 Hz), 2.71(1H, d, J = 8.4 Hz), 2.82(1H, d, J = 8.4 Hz), 2.84(1H, d, J = 6.5 Hz), 3.04(4H, brs), 3.70(4H, t, J = 5.0 Hz), 7.03(2H, d, J = 8.6 Hz), 7.05(1H, d, J = 8.9 Hz), 7.29(2H, d, J = 8.6 Hz), 7.41(1H, brs), 7.92 (2H, d, J = 8.5 Hz), 8.21(2H, d, J = 8.5 Hz), 8.25 (1H, dd, J = 8.9 Hz, 2.8 Hz), 8.54(1H, d, J = 2.8 Hz), 10.80(1H, s).
2297	-CH_3	-H	-N(CH_3)-	1	free	($CDCl_3$) 2.11(3H, s), 2.74-2.96(4H, m), 3.01(3H, s), 3.39-3.70(4H, m), 4.08(2H, s), 6.54(1H, dd, J = 8.6 Hz, 3.0 Hz), 6.57(1H, d, J = 3.0 Hz), 6.81 (1H, d, J = 8.9 Hz), 6.91(1H, d, J = 8.6 Hz), 7.75 (2H, d, J = 8.2 Hz), 7.93-8.02(3H, m), 8.13(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.24(1H, d, J = 2.7 Hz).
2298	-H	-$CH_2CONHNH_2$	none	0	trihydro-chloride	(DMSO-d_6) 3.42(4H, brs), 3.75(4H, brs), 4.21 (2H, s), 7.17(1H, d, J = 8.8 Hz), 7.21(2H, d, J = 8.6 Hz), 7.53 (2H, d, J = 8.6 Hz), 7.94(2H, d, J = 8.1 Hz), 8.22(2H, d, J = 8.1 Hz), 8.31(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.62(1H, d, J = 2.6 Hz), 10.87 (1H, s).

Example 2299

Production of 1-(3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionyl)-4-piperonylpiperazine monohydrochloride

To a suspension consisting of 1-(3-{4-[4-

(3,4-dichlorobenzoylamino)phenoxy]phenyl}propionyl)-piperazine (0.500 g, 1.00 mmol) and diisopropyl-ethylamine (0.262 mL, 1.50 mmol) in acetonitrile (12 mL) was added piperonyl chloride (0.188 g, 1.10 mmol), and the resulting solution was heated to reflux for 1.5 hours. Water was added to this reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1), to thereby yield 0.486 g of a free form. This free form was dissolved in ethanol (10 mL) and 5 M hydrochloric acid (0.3 mL) by heating. The solvent was then evaporated, and the obtained solid was recrystallized from 90% ethanol (17.5 mL), to thereby yield 0.322 g of the title compound.

Appearance: White powder

Melting point: 221-224°C

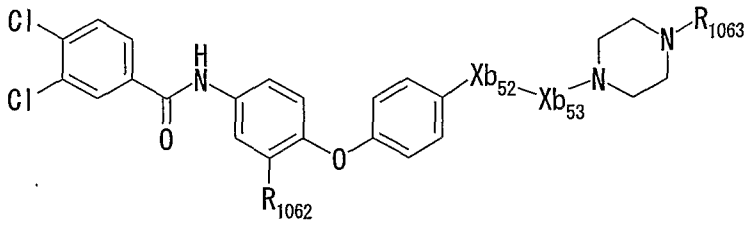
A crude titled product (9.95 g, 14.9 mmol) obtained using the same procedures was recrystallized from 80% ethanol (350 mL), to thereby yield 9.37 g of the title compound.

Appearance: White powder

Melting point: 232-234°C

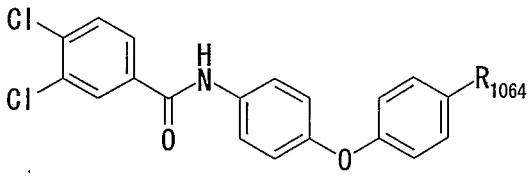
The following compounds were produced in the same manner as in Example 2299.

Table 369



Example No.	R_{1062}	Xb_{52}	Xb_{53}	R_{1063}	Form	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2300	-H	-$(CH_2)_2$-	-CO-	-$(CH_2)_2$Ph	hydro-chloride	mp 205-207
2301	-H	-$(CH_2)_2$-	-CO-	-$(CH_2)_2$OH	hydro-chloride	mp 101-105
2302	-H	-$(CH_2)_2$-	-CO-	-$(CH_2)_3$Ph	1/2 fumarate	mp 156-159
2303	-F	-$(CH_2)_2$-	-CO-	4-CH_3PhCH_2-	free	mp 105-107
2304	-F	-$(CH_2)_2$-	-CO-	4-CH_3OPhCH_2-	free	mp 137-139
2305	-F	-$(CH_2)_2$-	-CO-	2-CF_3PhCH_2-	free	mp 130-132
2306	-F	-$(CH_2)_2$-	-CO-	2-naphthyl-methyl	hydro-chloride	mp 172-175
2307	-H	-$(CH_2)_2$-	-CO-	-$CH_2COOC_2H_5$	free	^{1}H NMR 1.25(3H, t, J = 7.1 Hz), 2.39-2.53(4H, m), 2.58(2H, t, J = 7.8 Hz), 2.90(2H, t, J = 7.8 Hz), 3.19(2H, s), 3.36-3.48(2H, m), 3.58-3.69(2H, m), 4.16(2H, q, J = 7.1 Hz), 6.89(2H, d, J = 8.6 Hz), 6.96(2H, d, J = 8.9 Hz), 7.12 (2H, d, J = 8.6 Hz), 7.47-7.59(3H, m), 7.69(1H, dd, J = 8.3 Hz, 2.1 Hz), 7.96 (1H, d, J = 2.1 Hz), 8.14(1H, brs).
2308	-H	none	-CO-	-$(CH_2)_2$Ph	hydro-chloride	mp 210-218
2309	-H	none	none	-$(CH_2)_2$Ph	free	mp 214-215
2310	-H	none	none	benzyl	free	mp 189-190
2311	-H	none	none	-$(CH_2)_3$Cl	free	^{1}H NMR 2.00(2H, m), 2.56(2H, t, J = 7.0 Hz), 2.62-2.64(4H, m), 3.16-3.18(4H, m), 3.64(2H, t, J = 7.0 Hz), 6.92(2H, d, J = 7.0 Hz), 6.95-6.98(4H, m), 7.52(2H, d, J = 9.0 Hz), 7.57(1H, d, J = 8.0 Hz), 7.69(1H, dd, J = 8.0 Hz, 2.0 Hz), 7.70 (1H, s), 7.96(1H, d, J = 2.0 Hz).
2312	-H	none	none	-$CH_2COOC_2H_5$	free	^{1}H NMR 1.30(3H, t, J = 7.0 Hz), 2.76 (4H, t, J = 5.0 Hz), 3.21(4H, t, J = 5.0 Hz), 3.28(2H, s), 4.21(2H, q, J = 7.0 Hz), 6.91-6.98(6H, m), 7.52(2H, d, J = 9.0 Hz), 7.57(1H, d, J = 8.5 Hz), 7.69 (1H, dd, J = 8.5 Hz, 2.0 Hz), 7.72(1H, brs), 7.96(1H, d, J = 2.0 Hz).

Table 370



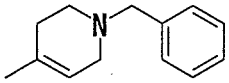
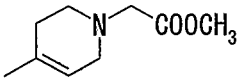
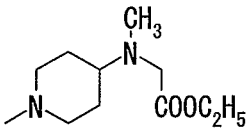
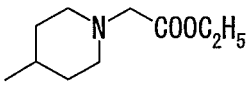
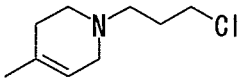
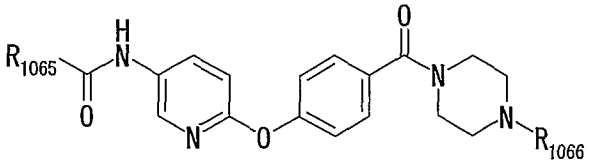
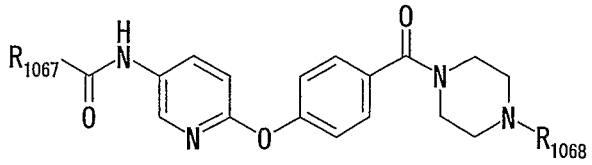
Example No.	R_{1064}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2313		mp 189-195
2314		^{1}H NMR 2.60(2H, brs), 2.85(2H, m), 3.31(2H, m), 3.39(2H, s), 3.76 (3H, s), 6.00(1H, brs), 6.95(2H, d, J = 8.5 Hz), 7.03(2H, d, J = 8.5 Hz), 7.34(2H, d, J = 8.5 Hz), 7.57(2H, d, J = 8.5 Hz), 7.57(1H, brs), 7.70(1H, d, J = 7.0 Hz), 7.75(1H, brs), 7.97(1H, s).
2315		^{1}H NMR 1.28(3H, t, J = 7.0 Hz), 1.60-1.70(2H, m), 1.93-1.96(2H, m), 2.46(3H, s), 2.60-2.72(3H, m), 3.37(2H, s), 3.64-3.66(2H, m), 4.20(2H, q, J = 7.0 Hz), 6.93-6.98(6H, m), 7.52(2H, m), 7.57(1H, d, J = 8.5 Hz), 7.68-7.70(2H, m), 7.96(1H, d, J = 2.0 Hz).
2316		^{1}H NMR 1.29(3H, t, J = 7.0 Hz), 1.81-1.88(4H, m), 2.30(2H, brt, J = 11.0 Hz), 2.49(1H, m), 3.06(2H, brd, J = 11.0 Hz), 4.21(2H, q, J = 7.0 Hz), 6.94(2H, d, J = 8.5 Hz), 7.01(2H, d, J = 9.0 Hz), 7.18(2H, d, J = 8.5 Hz), 7.55-7.68(3H, m), 7.69(1H, d, J = 2.0 Hz), 7.75(1H, brs), 7.97(1H, d, J = 2.0 Hz).
2317		^{1}H NMR 2.04(2H, m), 2.56(2H, brs), 2.62(2H, t, J = 7.0 Hz), 2.72 (2H, t, J = 5.5 Hz), 3.17(2H, brs), 3.64(2H, t, J = 6.5 Hz), 6.02(1H, brs), 6.96(2H, d, J = 9.0 Hz), 7.04(2H, d, J = 9.0 Hz), 7.36(2H, d, J = 9.0 Hz), 7.58(3H, m), 7.70(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.77(1H, brs), 7.98(1H, d, J = 2.0 Hz).

Table 371



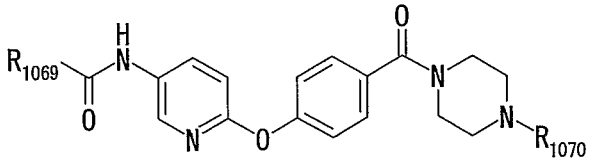
Example No.	R_{1065}	R_{1066}	^{1}H NMR (solvent) δppm
2318	4-CF_3Ph-	-$(CH_2)_2$Ph	($DMSO-d_6$) 2.31-2.60(6H, m), 2.67-2.81(2H, m), 3.51(4H, brs), 7.16(1H, d, J = 8.8 Hz), 7.17(2H, d, J = 8.5 Hz), 7.10-7.33(5H, m), 7.44(2H, d, J = 8.5 Hz), 7.94(2H, d, J = 8.2 Hz), 8.17(2H, d, J = 8.2 Hz), 8.26(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.55(1H, d, J = 2.6 Hz), 10.67(1H, s).
2319	3,4-Cl_2Ph-	4-CNPhCH_2-	($CDCl_3$) 2.46(4H, brs), 3.59(2H, s), 3.75(4H, brs), 6.97(1H, d, J = 8.9 Hz), 7.11-7.14(2H, m), 7.40-7.43(2H, m), 7.46 (2H, d, J = 7.8 Hz), 7.56-7.65(3H, m), 7.72-7.76(1H, m), 8.02(1H, d, J = 2.2 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.27(1H, brs), 8.30(1H, d, J = 2.7 Hz).
2320	3,4-Cl_2Ph-	-CH_2COPh	($CDCl_3$) 2.65(4H, brs), 3.60-3.82(4H, m), 3.89(2H, s), 6.99 (1H, d, J = 8.7 Hz), 7.15(2H, d, J = 8.6 Hz), 7.43-7.50(4H, m), 7.56-7.60(2H, m), 7.72-7.76(1H, m), 7.97-8.02(3H, m), 8.13-8.21(2H, m), 8.30(1H, d, J = 2.5 Hz).
2321	3,4-Cl_2Ph-	3,4-$(CH_3)_2$PhCH_2-	($CDCl_3$) 2.25(3H, s), 2.26(3H, s), 2.44(4H, brs), 3.47(2H, s), 3.73(4H, brs), 6.89(1H, d, J = 8.9 Hz), 7.01-7.10(5H, m), 7.32-7.36(2H, m), 7.51(1H, d, J = 8.4 Hz), 7.74-7.78(1H, m), 8.05(1H, d, J = 8.1 Hz), 8.09(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 9.06(1H, brs).
2322	3,4-Cl_2Ph-	4-$C(CH_3)_3$COPhCH_2-	($CDCl_3$) 1.36(9H, s), 2.48(4H, brs), 3.58(2H, s), 3.70(4H, brs), 6.96(1H, d, J = 8.7 Hz), 7.11-7.14(2H, m), 7.39-7.43 (4H, m), 7.57(1H, d, J = 8.4 Hz), 7.69(2H, d, J = 8.3 Hz), 7.73-7.77(1H, m), 8.03(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.37(1H, brs).
2323	3,4-Cl_2Ph-	4-PhCH_2OPhCH_2-	($CDCl_3$) 2.45(4H, brs), 3.49(2H, s), 3.73(4H, brs), 5.06(2H, s), 6.92-6.98(3H, m), 7.11-7.15(2H, m), 7.23(2H, d, J = 8.6 Hz), 7.32-7.46(7H, m), 7.57(1H, d, J = 8.1 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.03(1H, d, J = 2.2 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.26(1H, brs), 8.29(1H, d, J = 2.7 Hz).
2324	3,4-Cl_2Ph-	4-$C(CH_3)_3$PhCH_2-	($CDCl_3$) 1.32(9H, s), 2.48(4H, brs), 3.53(2H, s), 3.70(4H, brs), 6.98(1H, d, J = 8.4 Hz), 7.13(2H, d, J = 8.6 Hz), 7.21-7.27(2H, m), 7.36(2H, d, J = 8.4 Hz), 7.43(2H, d, J = 8.6 Hz), 7.59(1H, d, J = 8.1 Hz), 7.72-7.76(1H, m), 8.02(1H, d, J = 2.2 Hz), 8.13(1H, brs), 8.16-8.20(1H, m), 8.30(1H, d, J = 2.2 Hz).
2325	3,4-Cl_2Ph-	3-CH_3PhCH_2-	($CDCl_3$) 2.36(3H, s), 2.47(4H, brs), 3.52(2H, s), 3.74(4H, brs), 6.97(1H, d, J = 8.7 Hz), 7.08-7.26(6H, m), 7.41-7.44 (2H, m), 7.58(1H, d, J = 8.4 Hz), 7.76(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.04(1H, d, J = 2.1 Hz), 8.14-8.19(1H, m), 8.26(1H, brs), 8.30(1H, d, J = 2.2 Hz).

Table 372



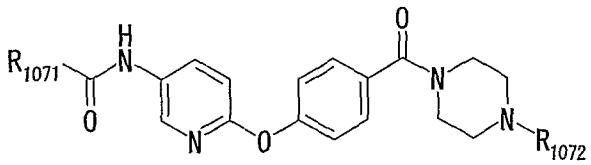
Example No.	R_{1067}	R_{1068}	^{1}H NMR ($CDCl_3$) δppm
2326	3,4-Cl_2Ph-	4-$CH(CH_3)_2PhCH_2$-	1.25(6H, d, J = 7.3 Hz), 2.46(4H, brs), 2.85-2.96(1H, m), 3.52(2H, s), 3.75(4H, brs), 6.95(1H, d, J = 8.9 Hz), 7.10-7.13(2H, m), 7.17-7.26(4H, m), 7.38-7.42(2H, m), 7.57(1H, d, J = 8.1 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.04(1H, d, J = 2.2 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.41(1H, brs).
2327	3,4-Cl_2Ph-	4-CH_3PhCH_2-	2.34(3H, s), 2.45(4H, brs), 3.51(2H, s), 3.73(4H, brs), 6.93 (1H, d, J = 8.7 Hz), 7.07-7.22(6H, m), 7.35-7.38(2H, m), 7.54(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.05(1H, d, J = 2.2 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.82(1H, s).
2328	3,4-Cl_2Ph-	3,4-F_2PhCH_2-	2.45(4H, brs), 3.49-3.73(6H, m), 6.96(1H, d, J = 8.7 Hz), 7.01-7.23(5H, m), 7.39-7.42(2H, m), 7.56(1H, d, J = 8.4 Hz), 7.76(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.03(1H, d, J = 2.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.50(1H, s).
2329	3,4-Cl_2Ph-	4-CH_3OPhCH_2-	2.43(4H, brs), 3.48(2H, s), 3.73(4H, brs), 3.81(3H, s), 6.85-6.93(3H, m), 7.06-7.10(2H, m), 7.21-7.24(2H, m), 7.34-7.37(2H, m), 7.53(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.05(1H, d, J = 2.1 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.90(1H, s).
2330	4-CF_3Ph-	4-CF_3PhCH_2-	2.48(4H, brs), 3.60(2H, s), 3.70(4H, brs), 7.00(1H, d, J = 8.9 Hz), 7.12-7.17(2H, m), 7.41-7.48(4H, m), 7.60(2H, d, J = 7.9 Hz), 7.77(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.14 (1H, brs), 8.19-8.24(1H, m), 8.32(1H, d, J = 2.3 Hz).
2331	4-CF_3Ph-	3,4-$(CH_3)_2PhCH_2$-	2.25(3H, s), 2.26(3H, s), 2.45(4H, brs), 3.47(2H, s), 3.40-3.90(4H, m), 6.98(1H, d, J = 8.7 Hz), 6.97-7.10(3H, m), 7.13(2H, d, J = 8.7 Hz), 7.42(2H, d, J = 8.7 Hz), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.18(1H, brs), 8.20(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.31(1H, d, J = 2.5 Hz).
2332	4-CF_3Ph-	3-CH_3PhCH_2-	2.35(3H, s), 2.46(4H, brs), 3.35-3.90(4H, m), 3.50(2H, s), 6.98(1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.6 Hz), 7.05-7.30 (4H, m), 7.41(2H, d, J = 8.6 Hz), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.28(1H, brs), 8.31(1H, d, J = 2.6 Hz).
2333	4-CF_3Ph-	4-CH_3PhCH_2-	2.34(3H, s), 2.44(4H, brs), 3.50(2H, s), 3.35-3.85(4H, m), 6.97(1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.8 Hz), 7.12(2H, d, J = 8.1 Hz), 7.20(2H, d, J = 8.1 Hz), 7.40(2H, d, J = 8.8 Hz), 7.75(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.32(1H, d, J = 2.5 Hz), 8.38(1H, s).

Table 373



Example No.	R_{1069}	R_{1070}	^{1}H NMR ($CDCl_3$) δppm
2334	3,4-Cl_2Ph-	3-CH_3OPhCH_2-	2.47(4H, brs), 3.46-3.82(6H, m), 3.86(3H, s), 6.80-6.84(1H, m), 6.88-6.92(2H, m), 6.95(1H, d, J = 8.8 Hz), 7.10-7.13(2H, m), 7.23(1H, d, J = 8.1 Hz), 7.38-7.41(2H, m), 7.56(1H, d, J = 8.3 Hz), 7.73-7.77(1H, m), 8.04(1H, d, J = 2.1 Hz), 8.12-8.16(1H, m), 8.29(1H, d, J = 2.7 Hz), 8.44(1H, brs).
2335	3,4-Cl_2Ph-	2-quinolylmethyl	2.58(4H, brs), 3.58-3.76(4H, m), 3.88(2H, s), 6.94(1H, d, J = 8.8 Hz), 7.11(2H, d, J = 8.4 Hz), 7.40(2H, d, J = 8.6 Hz), 7.51-7.57(2H, m), 7.62(1H, d, J = 8.4 Hz), 7.68-7.84(3H, m), 8.04(1H, d, J = 2.1 Hz), 8.07(1H, d, J = 8.6 Hz), 8.12-8.17 (2H, m), 8.29(1H, d, J = 2.5 Hz), 8.65(1H, brs).
2336	3,4-Cl_2Ph-	4-CF_3PhCH_2-	2.47(4H, brs), 3.44-3.85(6H, m), 6.98(1H, d, J = 8.9 Hz), 7.11-7.16(2H, m), 7.39-7.48(4H, m), 7.56-7.61(3H, m), 7.75 (1H, dd, J = 8.4 Hz, 2.1 Hz), 8.02(1H, d, J = 2.1 Hz), 8.14-8.18(1H, m), 8.24(1H, brs), 8.30(1H, d, J = 2.6 Hz).
2337	3,4-Cl_2Ph-	4-CF_3OPhCH_2-	2.46(4H, brs), 3.46-3.84(6H, m), 6.96(1H, d, J = 8.9 Hz), 7.10-7.20(4H, m), 7.34-7.41(4H, m), 7.56(1H, d, J = 8.4 Hz), 7.76(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.03(1H, d, J = 2.1 Hz), 8.11-8.16(1H, m), 8.30(1H, d, J = 2.5 Hz), 8.49(1H, brs).
2338	3,4-Cl_2Ph-	$PhO(CH_2)_2$-	2.60(4H, brs), 2.85(2H, t, J = 5.4 Hz), 3.53-3.75(4H, m), 4.12(2H, t, J = 5.4 Hz), 6.88-6.99(4H, m), 7.06-7.13(2H, m), 7.25-7.37(4H, m), 7.51(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.05(1H, d, J = 2.1 Hz), 8.07-8.12(1H, m), 8.32(1H, d, J = 2.6 Hz), 9.10(1H, brs).
2339	4-CF_3Ph-	4-$CNPhCH_2$-	2.45(4H, brs), 3.58(2H, s), 3.63(4H, brs), 6.98(1H, d, J = 8.8 Hz), 7.13(2H, d, J = 8.7 Hz), 7.41(2H, d, J = 8.7 Hz), 7.46 (2H, d, J = 8.1 Hz), 7.62(2H, d, J = 8.1 Hz), 7.75(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.20(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.28(1H, brs), 8.33(1H, d, J = 2.6 Hz).
2340	4-CF_3Ph-	3,4-F_2PhCH_2-	2.44(4H, brs), 3.48(2H, s), 3.64(4H, brs), 6.98(1H, d, J = 8.9 Hz), 6.97-7.25(3H, m), 7.12(2H, d, J = 8.7 Hz), 7.41(2H, d, J = 8.7 Hz), 7.75(2H, d, J = 8.0 Hz), 8.01(2H, d, J = 8.0 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.3 Hz), 8.30(1H, brs), 8.32(1H, d, J = 2.3 Hz).
2341	4-CF_3Ph-	4-CH_3OPhCH_2-	2.43(4H, brs), 3.48(2H, s), 3.60(4H, brs), 3.80(3H, s), 6.86 (2H, d, J = 8.7 Hz), 6.96(1H, d, J = 8.7 Hz), 7.11(2H, d, J = 8.7 Hz), 7.22(2H, d, J = 8.7 Hz), 7.38(2H, d, J = 8.7 Hz), 7.74 (2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.4 Hz), 8.32(1H, d, J = 2.4 Hz), 8.52(1H, s).

Table 374



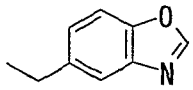
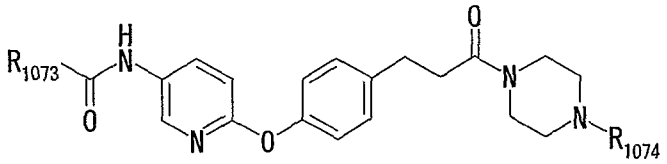
Example No.	R_{1071}	R_{1072}	mp (°C) or ^{1}H NMR ($CDCl_3$) δppm
2342	3,4-$(CH_3)_2$Ph-	4-CNPhCH_2-	^{1}H NMR 2.33(6H, s), 2.45(4H, brs), 3.58(2H, s), 3.64(4H, brs), 6.97(1H, d, J = 8.7 Hz), 7.11-7.16(2H, m), 7.24(1H, d, J = 7.6 Hz), 7.41-7.47(4H, m), 7.58-7.67(4H, m), 7.94 (1H, brs), 8.24(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.31(1H, d, J = 2.7 Hz).
2343	3,4-$(CH_3)_2$Ph-	3,4-F_2PhCH_2-	^{1}H NMR 2.34(6H, s), 2.45(4H, brs), 3.48(2H, s), 3.65(4H, brs), 6.98(1H, d, J = 8.9 Hz), 7.03-7.23(6H, m), 7.41-7.46 (2H, m), 7.59-7.62(1H, m), 7.67(1H, d, J = 1.8 Hz), 7.95 (1H, brs), 8.26(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.31(1H, d, J = 2.7 Hz).
2344	4-CF_3Ph-	3-CH_3OPhCH_2-	mp 118-120
2345	4-CF_3Ph-	2-quinolylmethyl	^{1}H NMR 2.56(4H, brs), 3.43-3.81(4H, m), 3.87(2H, s), 6.94(1H, d, J = 8.9 Hz), 7.08-7.13(2H, m), 7.35-7.40(2H, m), 7.51-7.57(1H, m), 7.61(1H, d, J = 8.4 Hz), 7.68-7.74 (3H, m), 7.81-7.84(1H, m), 8.01-8.20(5H, m), 8.33(1H, d, J = 2.7 Hz), 8.94(1H, s).
2346	4-CF_3Ph-	Ph$O(CH_2)_2$-	mp 161-162
2347	4-CF_3Ph-		^{1}H NMR 2.48(4H, brs), 3.55(2H, brs), 3.66(2H, s), 3.75 (2H, brs), 6.97(1H, d, J = 8.7 Hz), 7.12(2H, d, J = 8.4 Hz), 7.32-7.43(1H, m), 7.41(2H, d, J = 8.4 Hz), 7.55(1H, d, J = 8.4 Hz), 7.70-7.80(1H, m), 7.75(2H, d, J = 8.1 Hz), 8.02 (2H, d, J = 8.1 Hz), 8.10(1H, s), 8.20(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.32(1H, d, J = 2.6 Hz), 8.41(1H, s).

Table 375



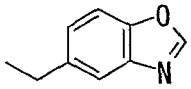
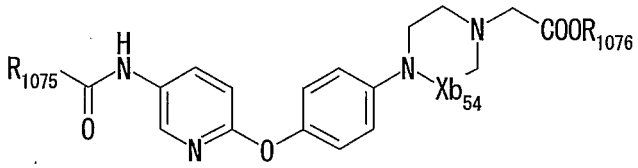
Example No.	R_{1073}	R_{1074}	^{1}H NMR ($CDCl_3$) δppm
2348	3,4-Cl_2Ph-	2,6-F_2PhCH_2-	2.42(4H, brs), 2.54-2.60(2H, m), 2.83-2.88(2H, m), 3.38-3.42(2H, m), 3.55-3.58(2H, m), 3.69(2H, s), 6.85-6.98(5H, m), 7.12(2H, d, J = 8.6 Hz), 7.19-7.31(1H, m), 7.48(1H, d, J = 8.4 Hz), 7.74(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(1H, d, J = 2.1 Hz), 8.14-8.18(1H, m), 8.30(1H, d, J = 2.8 Hz), 9.19(1H, brs).
2349	3,4-Cl_2Ph-	4-CF_3PhCH_2-	2.33-2.41(4H, m), 2.59-2.65(2H, m), 2.92-2.97(2H, m), 3.40-3.44(2H, m), 3.55(2H, s), 3.61-3.64(2H, m), 6.93(1H, d, J = 8.8 Hz), 7.02-7.06(2H, m), 7.20(2H, d, J = 8.6 Hz), 7.44(2H, d, J = 8.4 Hz), 7.54-7.60(3H, m), 7.74(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.01(1H, d, J = 2.2 Hz), 8.17-8.21(1H, m), 8.28(1H, d, J = 2.6 Hz), 8.44(1H, brs).
2350	4-CF_3Ph-		2.28(2H, t, J = 4.9 Hz), 2.43(2H, t, J = 4.9 Hz), 2.61(2H, t, J = 7.5 Hz), 2.96(2H, t, J = 7.5 Hz), 3.30(2H, t, J = 4.9 Hz), 3.59(2H, s), 3.63(2H, t, J = 4.9 Hz), 6.96(1H, d, J = 8.3 Hz), 7.04(2H, d, J = 8.5 Hz), 7.21(2H, d, J = 8.5 Hz), 7.36(1H, dd, J = 8.5 Hz, 1.5 Hz), 7.53(1H, d, J = 8.4 Hz), 7.73(1H, brs), 7.75(2H, d, J = 8.3 Hz), 8.01(1H, s), 8.02 (2H, d, J = 8.3 Hz), 8.25(1H, s), 8.27(1H, dd, J = 8.3 Hz, 2.6 Hz), 8.58(1H, s).
2351	3,4-Cl_2Ph-	3,4-F_2PhCH_2-	2.31-2.40(4H, m), 2.60-2.65(2H, m), 2.93-2.99(2H, m), 3.39-3.45(4H, m), 3.61-3.65(2H, m), 6.95(1H, d, J = 8.8 Hz), 7.03-7.24(7H, m), 7.57(1H, d, J = 8.3 Hz), 7.73(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.00(1H, d, J = 2.1 Hz), 8.10(1H, brs), 8.16-8.20(1H, m), 8.26(1H, d, J = 2.3 Hz).
2352	3,4-Cl_2Ph-	3,5-F_2PhCH_2-	2.32-2.38(4H, m), 2.58-2.64(2H, m), 2.89-2.94(2H, m), 3.40-3.46(4H, m), 3.59-3.62(2H, m), 6.66-6.74(1H, m), 6.85-7.03(5H, m), 7.17(2H, d, J = 8.6 Hz), 7.52(1H, d, J = 8.2 Hz), 7.71-7.75(1H, m), 7.99(1H, d, J = 2.0 Hz), 8.16-8.20(1H, m), 8.28(1H, d, J = 2.6 Hz), 8.77(1H, brs).

Table 376



Example No.	R_{1075}	Xb_{54}	R_{1076}	^{1}H NMR ($CDCl_3$) δppm
2353	3,4-Cl_2Ph-	-CO-	-CH_3	3.03(2H, t, J = 5.2 Hz), 3.39(2H, s), 3.51(2H, s), 3.76(2H, t, J = 5.2 Hz), 3.77(3H, s), 6.98(1H, d, J = 8.9 Hz), 7.15(2H, dd, J = 8.8 Hz, 2.1 Hz), 7.30(2H, dd, J = 8.8 Hz, 2.1 Hz), 7.59(1H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.99(1H, d, J = 2.1 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.29(1H, d, J = 2.7 Hz).
2354	3,4-Cl_2Ph-	-CH_2-	-CH_3	2.75(4H, t, J = 5.0 Hz), 3.23(4H, t, J = 5.0 Hz), 3.30(2H, s), 3.75(3H, s), 6.90(1H, d, J = 9.0 Hz), 6.95(2H, d, J = 9.0 Hz), 7.04(2H, d, J = 9.0 Hz), 7.58(1H, d, J = 8.5 Hz), 7.70(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.76(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.15 (1H, dd, J = 9.0 Hz, 3.0 Hz), 8.23(1H, d, J = 3.0 Hz).
2355	3,4-Cl_2Ph-	-CH_2-	-C_2H_5	1.31(3H, t, J = 7.0 Hz), 2.75(4H, t, J = 5.0 Hz), 3.23(4H, t, J = 5.0 Hz), 3.28(2H, s), 4.21(2H, q, J = 7.0 Hz), 6.90(1H, d, J = 9.0 Hz), 6.95(2H, d, J = 9.0 Hz), 7.04(2H, d, J = 9.0 Hz), 7.57 (1H, d, J = 8.5 Hz), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.88(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).
2356	4-CF_3Ph-	-CH_2-	-CH_3	2.75(4H, t, J = 5.0 Hz), 3.24(4H, t, J = 5.0 Hz), 3.30(2H, s), 3.75(3H, s), 6.92(1H, d, J = 9.0 Hz), 6.96(2H, d, J = 9.0 Hz), 7.06(2H, d, J = 9.0 Hz), 7.74(1H, brs), 7.78(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.19(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25 (1H, d, J = 2.5 Hz).

Example 2357

Production of 3,4-dichloro-N-[6-(4-{4-[(3,4-difluorobenzyl)methylamino]piperidine-1-carbonyl}phenoxy)pyridin-3-yl]benzamide

3,4-dichloro-N-{6-[4-(4-methylamino-piperidine-1-carbonyl)phenoxy]pyridin-3-yl}benzamide dihydrochloride (114 mg, 0.2 mmol) was dissolved in DMF (3 mL). To the resulting solution were added 4-

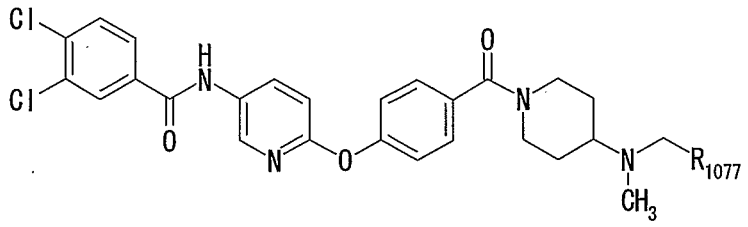
bromomethyl-1,2-difluorobenzene (31 μl, 0.24 mmol) and potassium carbonate (111 mg, 0.8 mmol), and this solution was stirred for 4 hours at room temperature. The resulting reaction solution was concentrated under reduced pressure. The residue was diluted with ethyl acetate and washed with water and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. This residue was purified by silica gel column chromatography (chloroform : methanol = 50 : 1), to thereby yield 60 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.64(4H, brs), 1.84(2H, brs), 2.20(3H, s), 2.65-2.90(3H, m), 3.54(2H, s), 6.95-7.08(4H, m), 7.13(2H, d, J = 9.3 Hz), 7.41(2H, d, J = 9.2 Hz), 7.57(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.03(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.30(1H, brs), 8.31(1H, d, J = 2.2 Hz).

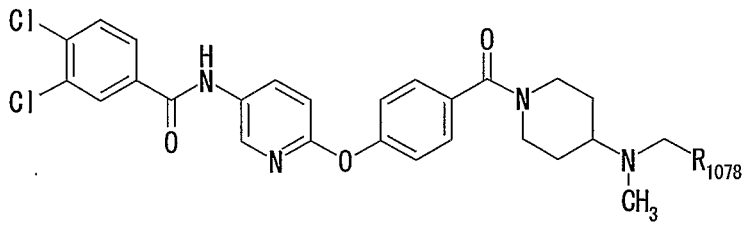
The following compounds were produced in the same manner as in Example 2357.

Table 377



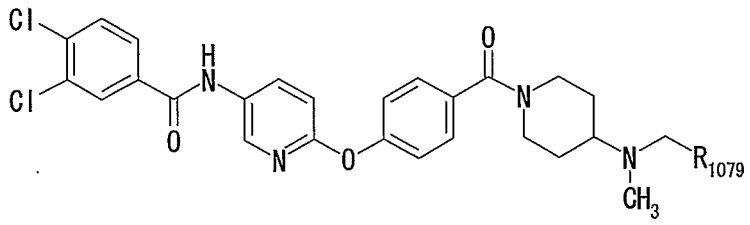
Example No.	R_{1077}	^{1}H NMR ($CDCl_3$) δppm
2358	2,4-F_2Ph-	1.66(4H, brs), 1.91(2H, brs), 2.25(3H, s), 2.73-3.08(3H, m), 3.63(2H, s), 6.75-6.89(3H, m), 6.97(1H, d, J = 8.7 Hz), 7.13(2H, d, J = 9.2 Hz), 7.42(2H, d, J = 9.2 Hz), 7.57(1H, d, J = 8.3 Hz), 7.76(1H, dd, J = 8.3 Hz, 2.1 Hz), 8.04(1H, d, J = 2.1 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.31(1H, d, J = 2.3 Hz), 8.37 (1H, brs).
2359	2,5-F_2Ph-	1.72(4H, brs), 1.88(2H, brs), 2.25(3H, s), 2.67-2.96(3H, m), 3.62(2H, s), 6.85-7.02(3H, m), 7.09-7.23(3H, m), 7.39(2H, d, J = 8.9 Hz), 7.55(1H, d, J = 8.3 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.05(1H, d, J = 2.1 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.31(1H, d, J = 2.6 Hz), 8.66(1H, brs).
2360	4-$CH(CH_3)_2$Ph-	1.25(6H, d, J = 6.9 Hz), 1.57-2.21(7H, m), 2.66-3.07(4H, m), 3.56(2H, s), 3.90 (1H, brs), 4.66(1H, brs), 6.90(1H, d, J = 8.9 Hz), 7.04-7.10(2H, m), 7.16-7.25 (4H, m), 7.31-7.36(2H, m), 7.50(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.06-8.10(2H, m), 8.33(1H, d, J = 2.5 Hz), 9.37(1H, s).
2361	4-$C(CH_3)_3$Ph-	1.32(9H, s), 1.58(2H, brs), 1.89(2H, brs), 2.22(3H, s), 2.62-3.10(3H, m), 3.57 (2H, s), 3.92(1H, brs), 4.69(1H, brs), 6.92(1H, d, J = 8.6 Hz), 7.06-7.11(2H, m), 7.22-7.25(2H, m), 7.32-7.37(4H, m), 7.53(1H, d, J = 8.6 Hz), 7.78(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.07(1H, d, J = 2.2 Hz), 8.11(1H, d, J = 2.7 Hz), 8.32(1H, d, J = 2.7 Hz), 9.07(1H, brs).

Table 378



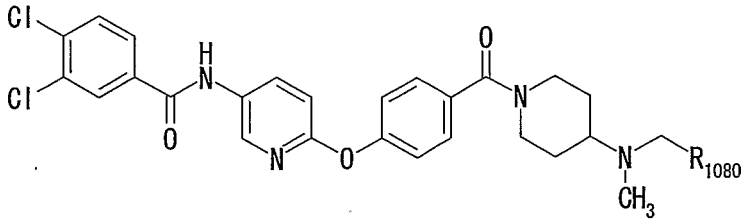
Example No.	R_{1078}	^{1}H NMR ($CDCl_3$) δppm
2362	4-CNPh-	1.54(1H, brs), 1.86(3H, brs), 2.20(3H, s), 2.64-3.04(3H, m), 3.64(2H, s), 3.91(1H, brs), 4.69(1H, brs), 6.91(1H, d, J = 8.9 Hz), 7.05-7.10(2H, m), 7.32-7.37(2H, m), 7.45(2H, d, J = 8.4 Hz), 7.50(1H, d, J = 8.4 Hz), 7.59-7.62(2H, m), 7.75-7.79(1H, m), 8.05(1H, d, J = 2.0 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.35(1H, d, J = 2.7 Hz), 9.31(1H, brs).
2363	Ph-	1.55(2H, brs), 1.87(2H, brs), 2.22(3H, s), 2.61-2.80(2H, m), 2.90(1H, brs), 3.60(2H, s), 3.93(1H, brs), 4.72(1H, brs), 6.98(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.7 Hz), 7.18-7.37(5H, m), 7.43(2H, d, J = 8.7 Hz), 7.58(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.02(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.4 Hz), 8.19(1H, brs), 8.30(1H, d, J = 2.4 Hz).
2364	2-ClPh-	1.50(2H, brs), 1.90(2H, brs), 2.26(3H, s), 2.68-2.85(2H, m), 2.98(1H, brs), 3.70(2H, s), 3.95(1H, brs), 4.75(1H, brs), 6.98(1H, d, J = 8.7 Hz), 7.14(2H, d, J = 8.5 Hz), 7.15-7.30(2H, m), 7.34(1H, dd, J = 7.2 Hz, 2.0 Hz), 7.43(2H, d, J = 8.5 Hz), 7.47 (1H, dd, J = 7.2 Hz, 2.0 Hz), 7.58(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.04(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.31(1H, d, J = 2.8 Hz), 8.32(1H, brs).
2365	3-ClPh-	1.50(2H, brs), 1.87(2H, brs), 2.21(3H, s), 2.55-3.20(3H, m), 3.57(2H, s), 3.95(1H, brs), 4.70(1H, brs), 6.99(1H, d, J = 8.8 Hz), 7.14(2H, d, J = 8.7 Hz), 7.15-7.28(3H, m), 7.33(1H, brs), 7.44(2H, d, J = 8.7 Hz), 7.59(1H, d, J = 8.4 Hz), 7.74(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.02(1H, d, J = 2.0 Hz), 8.09(1H, brs), 8.17(1H, dd, J = 8.8 Hz, 2.8 Hz), 8.30(1H, d, J = 2.8 Hz).
2366	3,4-Cl_2Ph-	1.50(2H, brs), 1.85(2H, brs), 2.20(3H, s), 2.60-3.15(3H, m), 3.54(2H, s), 3.95(1H, brs), 4.70(1H, brs), 6.97(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.6 Hz), 7.10-7.19(1H, m), 7.36(1H, s), 7.41(2H, d, J = 8.6 Hz), 7.35-7.47(1H, m), 7.57(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.03(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.30(1H, d, J = 2.5 Hz), 8.40(1H, s).
2367	2,3-Cl_2Ph-	1.60(2H, brs), 1.90(2H, brs), 2.26(3H, s), 2.65-3.20(3H, m), 3.72(2H, s), 3.90(1H, brs), 4.72(1H, brs), 6.97(1H, d, J = 8.8 Hz), 7.13(2H, d, J = 8.6 Hz), 7.20(1H, d, J = 8.0 Hz), 7.36(1H, dd, J = 8.0 Hz, 1.5 Hz), 7.42(2H, d, J = 8.6 Hz), 7.37-7.46(1H, m), 7.57(1H, d, J = 8.2 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.04(1H, d, J = 2.0 Hz), 8.14(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.30(1H, d, J = 2.7 Hz), 8.38(1H, brs).
2368	2-FPh-	1.55(2H, brs), 1.85(2H, brs), 2.25(3H, s), 2.50-3.20(3H, m), 3.65(2H, s), 3.95(1H, brs), 4.70(1H, brs), 6.97(1H, d, J = 8.8 Hz), 6.95-7.17(2H, m), 7.13(2H, d, J = 8.7 Hz), 7.18-7.29(1H, m), 7.32-7.45(1H, m), 7.42(2H, d, J = 8.7 Hz), 7.57(1H, d, J = 8.2 Hz), 7.75(1H, dd, J = 8.2 Hz, 2.1 Hz), 8.04(1H, d, J = 2.1 Hz), 8.14(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.30(1H, d, J = 2.5 Hz), 8.34(1H, brs).
2369	2-CH_3Ph-	1.67(4H, brs), 1.89(2H, brs), 2.19(3H, s), 2.36(3H, s), 2.67-2.96(3H, m), 3.57(2H, s), 6.96(1H, d, J = 8.7 Hz), 7.07-7.26(6H, m), 7.41(2H, d, J = 8.1 Hz), 7.57(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.05(1H, d, J = 2.0 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.31(1H, d, J = 2.6 Hz), 8.51(1H, brs).

Table 379



Example No.	R_{1079}	Form	^{1}H NMR (solvent) δppm
2370	3,5-$(CH_3O)_2$Ph-	hydro-chloride	(DMSO-d_6) 1.67-1.93(2H, m), 2.08-2.30(2H, m), 2.61(3H, d, J = 4.8 Hz), 2.95(1H, brs), 3.31-3.75(4H, m), 3.77(6H, s), 4.02-4.18(1H, m), 4.31-4.45(1H, m), 6.57(1H, t, J = 2.0 Hz), 6.83(2H, d, J = 2.0 Hz), 7.16(1H, d, J = 8.7 Hz), 7.20(2H, d, J = 8.6 Hz), 7.49(2H, d, J = 8.6 Hz), 7.85(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.24 (1H, d, J = 2.1 Hz), 8.24(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.55(1H, d, J = 2.6 Hz), 10.64(1H, brs).
2371	3-CH_3OPh-	free	($CDCl_3$) 1.60(2H, brs), 1.87(2H, brs), 2.23(3H, s), 2.52-3.20(3H, m), 3.58(2H, s), 3.81(3H, s), 3.95(1H, brs), 4.70(1H, brs), 6.75-6.90(3H, m), 6.97(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.6 Hz), 7.21(1H, d, J = 8.0 Hz), 7.41(2H, d, J = 8.6 Hz), 7.57(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.04(1H, d, J = 2.0 Hz), 8.14(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.30(1H, d, J = 2.6 Hz), 8.36(1H, brs).
2372	3-CH_3Ph-	free	($CDCl_3$) 1.61(4H, brs), 1.88(2H, brs), 2.22(3H, s), 2.35(3H, s), 2.68-3.01(3H, m), 3.56(2H, s), 6.98(1H, d, J = 8.9 Hz), 7.06-7.29 (6H, m), 7.42(2H, d, J = 8.6 Hz), 7.58(1H, d, J = 8.2 Hz), 7.76(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.04(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.31(1H, d, J = 2.3 Hz), 8.38(1H, brs).
2373	3,5-F_2Ph-	free	($CDCl_3$) 1.42-1.96(4H, m), 2.21(3H, s), 2.65-3.10(3H, m), 3.56(2H, s), 3.90(1H, brs), 4.68(1H, brs), 6.64-6.70(1H, m), 6.85-6.92(3H, m), 7.04-7.09(2H, m), 7.31-7.36(2H, m), 7.50(1H, d, J = 8.4 Hz), 7.74-7.79(1H, m), 8.05-8.10(2H, m), 8.33(1H, d, J = 2.5 Hz), 9.30 (1H, brs).
2374	3,4-$(CH_3)_2$Ph-	free	($CDCl_3$) 1.59(4H, brs), 1.90-1.98(2H, m), 2.22(3H, s), 2.25(3H, s), 2.26(3H, s), 2.67-2.97(3H, m), 3.59(2H, s), 6.99(1H, d, J = 8.7 Hz), 7.05-7.10(3H, m), 7.15(2H, d, J = 9.4 Hz), 7.44(2H, d, J = 9.4 Hz), 7.59(1H, d, J = 8.3 Hz), 7.74(1H, dd, J = 8.3 Hz, 2.2 Hz), 8.02(1H, d, J = 2.0 Hz), 8.03(1H, brs), 8.18(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.31(1H, d, J = 2.8 Hz).
2375	3-FPh-	free	($CDCl_3$) 1.59-1.85(6H, m), 2.22(3H, s), 2.67-2.99(3H, m), 3.59(2H, s), 6.94-6.97(2H, m), 7.05-7.13(5H, m), 7.39(2H, d, J = 8.4 Hz), 7.56(1H, d, J = 8.4 Hz), 7.77(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.05(1H, d, J = 2.0 Hz), 8.13(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.31(1H, d, J = 2.5 Hz), 8.63(1H, brs).
2376	2,6-F_2Ph-	free	($CDCl_3$) 1.65(4H, brs), 1.81-1.91(2H, m), 2.28(3H, s), 2.69-3.03(3H, m), 3.69(2H, s), 6.83-6.92(3H, m), 6.99(1H, d, J = 8.9 Hz), 7.15(2H, d, J = 9.2 Hz), 7.44(2H, d, J = 9.2 Hz), 7.59(1H, d, J = 8.4 Hz), 7.75(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.03(1H, d, J = 2.2 Hz), 8.17(1H, brs), 8.18(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.31(1H, d, J = 2.6 Hz).

Table 380



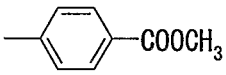
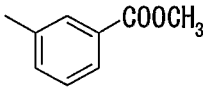
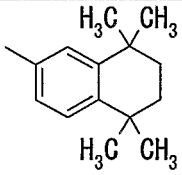
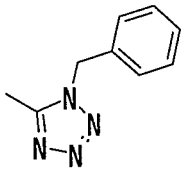
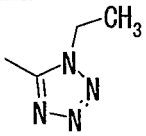
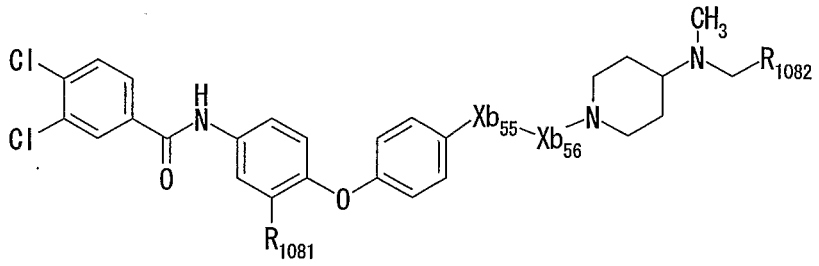
Example No.	R_{1080}	mp (°C) or MS
2377	4-CF_3OPh-	mp 180-181
2378	2-NO_2Ph-	MS 634(M^++H)
2379	3-NO_2Ph-	MS 634(M^++H)
2380	4-NO_2Ph-	MS 634(M^++H)
2381	2-CF_3Ph-	MS 657(M^++H)
2382	3-CF_3Ph-	MS 657(M^++H)
2383	4-CF_3Ph-	MS 657(M^++H)
2384	2-CF_3OPh-	MS 673(M^++H)
2385		MS 647(M^++H)
2386	4-biphenylyl	MS 665(M^++H)
2387		MS 647(M^++H)
2388		MS 699(M^++H)
2389	2-pyridyl	MS 590(M^++H)
2390	2-quinolyl	MS 640(M^++H)
2391		MS 671(M^++H)
2392		MS 609(M^++H)
2393	2,4-Cl_2Ph-	MS 657(M^++H)
2394	2,5-Cl_2Ph-	MS 657(M^++H)
2395	2,6-Cl_2Ph-	MS 657(M^++H)

Table 381



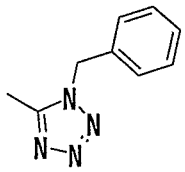
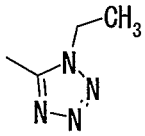
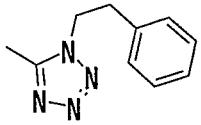
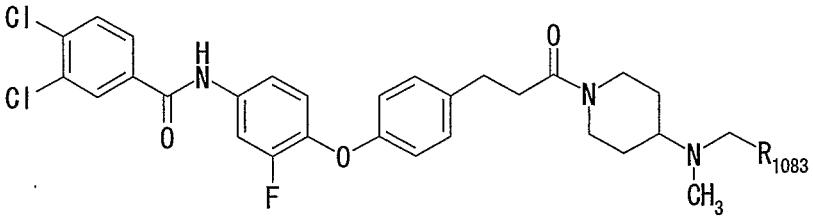
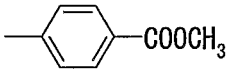
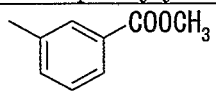
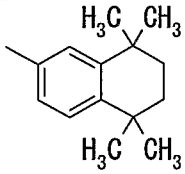
Example No.	R_{1081}	Xb_{55}	Xb_{56}	R_{1082}	mp (°C) or MS
2396	-H	none	none	Ph-	mp 155-158
2397	-F	$-(CH_2)_2-$	-CO-	Ph-	MS 634(M^++H)
2398	-F	$-(CH_2)_2-$	-CO-	2-ClPh-	MS 668(M^++1)
2399	-F	$-(CH_2)_2-$	-CO-	3-ClPh-	MS 668(M^++H)
2400	-F	$-(CH_2)_2-$	-CO-	4-ClPh-	MS 668(M^++H)
2401	-F	$-(CH_2)_2-$	-CO-	2,3-Cl_2Ph-	MS 702(M^++1)
2402	-F	$-(CH_2)_2-$	-CO-	2,4-Cl_2Ph-	MS 701(M^+)
2403	-F	$-(CH_2)_2-$	-CO-	2,5-Cl_2Ph-	MS 702(M^++1)
2404	-F	$-(CH_2)_2-$	-CO-	2,6-Cl_2Ph-	MS 702(M^++H)
2405	-F	$-(CH_2)_2-$	-CO-	3,4-Cl_2Ph-	MS 703(M^+)
2406	-F	$-(CH_2)_2-$	-CO-	3-pyridyl	MS 634(M^+)
2407	-F	$-(CH_2)_2-$	-CO-	2-quinolyl	MS 685(M^++H)
2408	-F	$-(CH_2)_2-$	-CO-		MS 716(M^++H)
2409	-F	$-(CH_2)_2-$	-CO-		MS 654(M^++H)
2410	-F	$-(CH_2)_2-$	-CO-		MS 730(M^++H)
2411	-F	$-(CH_2)_2-$	-CO-	3-CH_3OPh-	MS 662(M^+-1)
2412	-F	$-(CH_2)_2-$	-CO-	3,5-$(CH_3O)_2$Ph-	MS 693(M^+)
2413	-F	$-(CH_2)_2-$	-CO-	2-CH_3Ph-	MS 648(M^++H)
2414	-F	$-(CH_2)_2-$	-CO-	3-CH_3Ph-	MS 648(M^++H)
2415	-F	$-(CH_2)_2-$	-CO-	4-CH_3Ph-	MS 648(M^++H)
2416	-F	$-(CH_2)_2-$	-CO-	3,4-$(CH_3)_2$Ph-	MS 662(M^++1)
2417	-F	$-(CH_2)_2-$	-CO-	2-FPh-	MS 652(M^++H)
2418	-F	$-(CH_2)_2-$	-CO-	3-FPh-	MS 652(M^++H)
2419	-F	$-(CH_2)_2-$	-CO-	4-FPh-	MS 652(M^++1)
2420	-F	$-(CH_2)_2-$	-CO-	2,4-F_2Ph-	MS 670(M^++H)
2421	-F	$-(CH_2)_2-$	-CO-	2,5-F_2Ph-	MS 670(M^++H)
2422	-F	$-(CH_2)_2-$	-CO-	2,6-F_2Ph-	MS 671(M^++2)
2423	-F	$-(CH_2)_2-$	-CO-	3,4-F_2Ph-	MS 670(M^++H)
2424	-F	$-(CH_2)_2-$	-CO-	3,5-F_2Ph-	MS 670(M^++H)

Table 382



Example No.	R_{1083}	MS
2425	2-NO_2Ph-	679(M^++H)
2426	3-NO_2Ph-	678(M^+)
2427	4-NO_2Ph-	679(M^++H)
2428	2-CF_3Ph-	701(M^+)
2429	3-CF_3Ph-	702(M^++H)
2430	4-CF_3Ph-	701(M^+)
2431	4-CNPh-	659(M^++H)
2432	2-CF_3OPh-	718(M^++H)
2433	3-CF_3OPh-	718(M^++H)
2434	4-CF_3OPh-	718(M^++H)
2435		692(M^++H)
2436	4-biphenylyl	710(M^++H)
2437		692(M^++H)
2438	4-C_2H_5Ph-	662(M^++H)
2439	4-$CH(CH_3)_2$Ph-	676(M^++H)
2440	4-$C(CH_3)_3$Ph-	690(M^++H)
2441		744(M^++H)
2442	2-naphthyl	684(M^++H)
2443	2-pyridyl	635(M^++H)

Example 2444

Production of 1-(4-piperonylpiperazin-1-yl)-2-{4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]-phenylamino}ethanone

4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenylamine (4.50 g, 12.5 mmol) was dissolved in DMF (150 mL). To the resulting solution were added

potassium carbonate (2.60 g, 18.8 mmol) and sodium iodide (1.87 g, 12.5 mmol), and then to this solution was added 2-chloro-1-(4-piperonylpiperazin-1-yl)ethanone (4.21 g, 12.5 mmol). The resulting solution was stirred for 11 hours under a nitrogen atmosphere at 80°C. The resulting reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate and washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 80 : 1), to thereby yield 5.2 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.44-2.46(4H, m), 3.43-3.47(4H, m), 3.69(2H, t, J = 5.0 Hz), 3.86(2H, s), 4.91(1H, brs), 5.02(2H, s), 5.94(2H, s), 6.64(2H, d, J = 8.9 Hz), 6.74-6.75(2H, m), 6.85-6.89(2H, m), 6.96-7.03(4H, m), 7.55(2H, d, J = 8.4 Hz), 7.72(1H, dd, J = 8.4 Hz, 2.5 Hz), 8.22(1H, d, J = 2.0 Hz).

Example 2445

Production of N-{6-[4-(4-thiazole-2-ylmethylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-4-trifluoromethyl-benzamide

To a suspension of N-{6-[4-(piperazine-1-carbonyl)phenoxy]pyridin-3-yl}-4-trifluoromethyl-benzamide dihydrochloride (400 mg, 0.74 mmol) in 1,2-

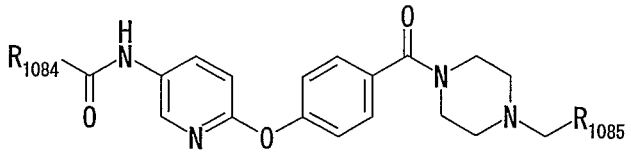
dichloroethane (20 mL) were added 2-formylthiazole (125 mg, 1.10 mmol) and triethylamine (0.21 mL, 1.50 mmol). After the resulting solution was stirred at room temperature for 30 minutes, sodium triacetyloxy borohydride (312 mg, 1.47 mmol) was added under ice cooling. The reaction mixture was stirred at the same temperature for 30 minutes and at room temperature for 1 hour. Acetic acid (0.085 mL, 1.48 mmol) was added to the reaction mixture, and stirred at room temperature for 17 hours. The reaction mixture was poured into ice water, and extracted with chloroform. The chloroform layer was washed with a saturated sodium bicarbonate solution and brine, and dried over anhydrous magnesium sulfate. A significant part of the solvent was evaporated. The white precipitate was then filtered off and washed with ethyl acetate, to thereby yield 293 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.55(4H, brs), 3.55(4H, brs), 3.90(2H, s), 7.15(1H, d, J = 8.7 Hz), 7.16(2H, d, J = 8.6 Hz), 7.45(2H, d, J = 8.6 Hz), 7.68(1H, d, J = 3.2 Hz), 7.73(1H, d, J = 3.2 Hz), 7.94(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.26(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.55(1H, d, J = 2.3 Hz), 10.68(1H, s).

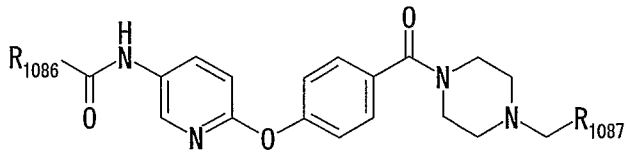
The following compounds were produced in the same manner as in Example 2445.

Table 383



Example No.	R_{1084}	R_{1085}	^{1}H NMR (solvent) δppm
2446	3,4-Cl_2Ph-	3,4-$(CH_3)_2$Ph-	($CDCl_3$) 2.27(3H, s), 2.29(3H, s), 2.42(4H, brs), 3.49(2H, s), 3.70 (4H, brs), 6.90(1H, d, J = 8.9 Hz), 7.05-7.10(5H, m), 7.34-7.36 (2H, m), 7.50(1H, d, J = 8.4 Hz), 7.75-7.79(1H, m), 8.00-8.14(2H, m), 8.33(1H, d, J = 2.7 Hz), 9.30(1H, brs).
2447	4-CF_3Ph-	2-FPh-	($CDCl_3$) 2.50(4H, brs), 3.55(2H, brs), 3.70(2H, brs), 3.62(2H, s), 6.98(1H, d, J = 8.8 Hz), 6.95-7.17(2H, m), 7.12(2H, d, J = 8.7 Hz), 7.20-7.41(2H, m), 7.40(2H, d, J = 8.7 Hz), 7.76(2H, d, J = 8.2 Hz), 8.02(2H, d, J = 8.2 Hz), 8.19(1H, dd, J = 8.8 Hz, 2.8 Hz), 8.31(1H, s), 8.32(1H, d, J = 2.8 Hz).
2448	4-CF_3Ph-	3-pyridyl	($CDCl_3$) 2.46(4H, brs), 3.55(2H, s), 3.58-3.73(4H, m), 6.97(1H, d, J = 8.7 Hz), 7.10-7.15(2H, m), 7.25-7.30(1H, m), 7.38-7.43(2H, m), 7.65-7.69(1H, m), 7.74(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.19-8.23(1H, m), 8.32(1H, d, J = 2.3 Hz), 8.51-8.53(1H, m), 8.54(1H, d, J = 1.5 Hz), 8.62(1H, brs).
2449	4-CF_3Ph-	cyclohexyl	(DMSO-d_6) 0.60-1.90(11H, m), 2.10(2H, d, J = 7.2 Hz), 2.34(4H, brs), 3.50(4H, brs), 7.15(1H, d, J = 8.8 Hz), 7.16(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.94(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.26(1H, dd, J = 8.8 Hz, 2.7 Hz), 8.55(1H, d, J = 2.7 Hz), 10.66(1H, s).
2450	4-CF_3Ph-	3-furyl	($CDCl_3$) 2.46(4H, brs), 3.42(2H, s), 3.40-3.90(4H, m), 6.39(1H, brs), 6.98(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.7 Hz), 7.34(1H, brs), 7.33-7.42(1H, m), 7.41(2H, d, J = 8.7 Hz), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.29(1H, s), 8.32(1H, d, J = 2.5 Hz).
2451	4-CF_3Ph-	4-pyridyl	($CDCl_3$) 2.45(4H, brs), 3.41-3.81(6H, m), 6.95(1H, d, J = 8.9 Hz), 7.08-7.13(2H, m), 7.28(2H, d, J = 5.9 Hz), 7.35-7.40(2H, m), 7.70 (2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.4 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.33(1H, d, J = 2.7 Hz), 8.53-8.55(2H, m), 9.02(1H, s).
2452	4-CF_3Ph-	2-furyl	($CDCl_3$) 2.50(4H, brs), 3.59(2H, s), 3.73(4H, brs), 6.23(1H, d, J = 3.0 Hz), 6.33(1H, dd, J = 3.0 Hz, 2.0 Hz), 6.99(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.8 Hz), 7.41(2H, d, J = 8.8 Hz), 7.35-7.48(1H, m), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.24(1H, brs), 8.32(1H, d, J = 2.5 Hz)
2453	4-CF_3Ph-	4-NO_2Ph-	($CDCl_3$) 2.48(4H, brs), 3.63(2H, s), 3.73(4H, brs), 7.00(1H, d, J = 8.8 Hz), 7.14(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.53(2H, d, J = 8.4 Hz), 7.76(2H, d, J = 8.0 Hz), 8.01(2H, d, J = 8.0 Hz), 8.15(1H, brs), 8.20(2H, d, J = 8.4 Hz), 8.21(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.32(1H, d, J = 2.5 Hz).

Table 384



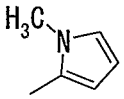
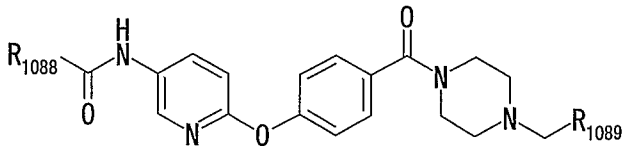
Example No.	R_{1086}	R_{1087}	mp (°C) or ^{1}H NMR (solvent) δppm
2454	4-CF_3Ph-		^{1}H NMR ($CDCl_3$) 2.43(4H, brs), 3.46(2H, s), 3.55(4H, brs), 3.65 (3H, s), 5.95-6.08(2H, m), 6.61(1H, t, J = 2.2 Hz), 6.98(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.8 Hz), 7.41(2H, d, J = 8.8 Hz), 7.76(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.20(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.25(1H, brs), 8.31(1H, d, J = 2.5 Hz).
2455	4-CF_3Ph-	2-pyridyl	mp 175-176
2456	4-CF_3Ph-	4-OHPh-	^{1}H NMR (DMSO-d_6) 2.36(4H, brs), 3.32(2H, s), 3.49(4H, brs), 6.70(2H, d, J = 8.4 Hz), 7.09(2H, d, J = 8.4 Hz), 7.15(1H, d, J = 8.9 Hz), 7.16(2H, d, J = 8.6 Hz), 7.43(2H, d, J = 8.6 Hz), 7.94(2H, d, J = 8.0 Hz), 8.17(2H, d, J = 8.0 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.54(1H, d, J = 2.5 Hz), 9.27(1H, s), 10.66(1H, s).
2457	4-CF_3Ph-	2-OHPh-	^{1}H NMR ($CDCl_3$) 2.59(4H, brs), 3.68(4H, brs), 3.75(2H, s), 6.72-6.88(2H, m), 6.92-7.10(1H, m), 7.01(1H, d, J = 8.8 Hz), 7.15(2H, d, J = 8.8 Hz), 7.10-7.25(1H, m), 7.44(2H, d, J = 8.8 Hz), 7.76(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.12(1H, brs), 8.22(1H, dd, J = 8.8 Hz, 2.3 Hz), 8.31(1H, d, J = 2.3 Hz).
2458	4-CF_3Ph-	4-AcNHPh-	^{1}H NMR (DMSO-d_6) 2.02(3H, s), 2.38(4H, brs), 3.45(2H, s), 3.45 (4H, brs), 7.15(1H, d, J = 8.9 Hz), 7.16(2H, d, J = 8.6 Hz), 7.22(2H, d, J = 8.4 Hz), 7.44(2H, d, J = 8.6 Hz), 7.52(2H, d, J = 8.4 Hz), 7.94(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.54(1H, d, J = 2.6 Hz), 9.90(1H, s), 10.66(1H, s).
2459	4-CF_3Ph-	2,3-$(CH_3)_2$Ph-	^{1}H NMR ($CDCl_3$) 2.25(3H, s), 2.28(3H, s), 2.42(4H, brs), 3.47(2H, s), 3.67(4H, brs), 6.95(1H, d, J = 8.7 Hz), 6.95-7.12(3H, m), 7.10 (2H, d, J = 8.6 Hz), 7.38(2H, d, J = 8.6 Hz), 7.73(2H, d, J = 8.1 Hz), 8.00(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.7 Hz), 8.30 (1H, d, J = 2.7 Hz), 8.43(1H, s).
2460	4-CF_3Ph-	3-thienyl	^{1}H NMR ($CDCl_3$) 2.45(4H, brs), 3.55(2H, brs), 3.56(2H, s), 3.72 (2H, brs), 6.97(1H, d, J = 8.9 Hz), 7.05(1H, dd, J = 5.0 Hz, 1.1 Hz), 7.08-7.17(1H, m), 7.12(2H, d, J = 8.7 Hz), 7.29(1H, dd, J = 5.0 Hz, 3.0 Hz), 7.39(2H, d, J = 8.7 Hz), 7.75(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.32(1H, d, J = 2.8 Hz), 8.41(1H, brs).
2461	3,4-Cl_2Ph-	3-pyridyl	^{1}H NMR ($CDCl_3$) 2.46(4H, brs), 3.46(2H, s), 3.55-3.80(4H, m), 6.96(1H, d, J = 8.9 Hz), 7.12(2H, d, J = 8.4 Hz), 7.26-7.30(1H, m), 7.40(2H, d, J = 8.4 Hz), 7.56(1H, d, J = 8.4 Hz), 7.65-7.78(2H, m), 8.04(1H, d, J = 2.2 Hz), 8.16(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.29(1H, d, J = 2.2 Hz), 8.51-8.56(2H, m), 8.61(1H, brs).

Table 385



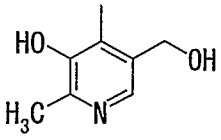
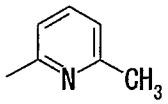
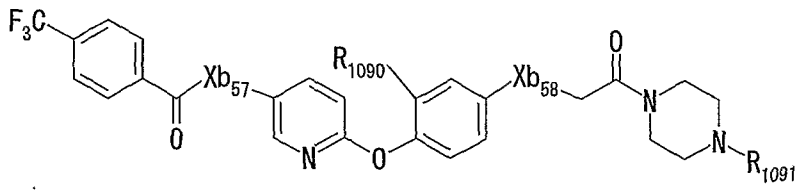
Example No.	R_{1088}	R_{1089}	Form	^{1}H NMR (solvent) δppm
2462	4-CF_3Ph-	cyclopropyl	free	($CDCl_3$) 0.11(2H, dd, J = 10.5 Hz, 4.5 Hz), 0.54(2H, dd, J = 12.5 Hz, 6.5 Hz), 0.77-0.93(1H, m), 2.29(2H, d, J = 6.5 Hz), 2.52(4H, brs), 3.55(2H, brs), 3.75(2H, brs), 6.98(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.7 Hz), 7.42(2H, d, J = 8.7 Hz), 7.76(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.20 (1H, dd, J = 8.9 Hz, 2.5 Hz), 8.33(1H, d, J = 2.5 Hz), 8.36 (1H, brs).
2463	4-CF_3Ph-	3-OHPh-	hydro-chloride	(DMSO-d_6) 2.90-3.70(6H, m), 3.90-4.20(2H, m), 4.24 (2H, d, J = 3.9 Hz), 6.86(1H, dd, J = 8.1 Hz, 1.7 Hz), 6.97 (1H, brs), 7.01(1H, d, J = 7.7 Hz), 7.16(1H, d, J = 8.9 Hz), 7.20(2H, d, J = 8.6 Hz), 7.25(1H, t, J = 7.7 Hz), 7.52 (2H, d, J = 8.6 Hz), 7.94(2H, d, J = 8.1 Hz), 8.20(2H, d, J = 8.1 Hz), 8.29(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.58(1H, d, J = 2.5 Hz), 10.77(1H, s).
2464	4-CF_3Ph-	-$C(CH_3)_3$	free	($CDCl_3$) 0.88(9H, s), 2.09(2H, s), 2.52(4H, brs), 3.49(2H, brs), 3.68(2H, brs), 6.97(1H, d, J = 8.8 Hz), 7.12(2H, d, J = 8.5 Hz), 7.39(2H, d, J = 8.5 Hz), 7.75(2H, d, J = 8.1 Hz), 8.03(2H, d, J = 8.1 Hz), 8.19(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.33(1H, d, J = 2.5 Hz), 8.47(1H, s).
2465	4-CF_3Ph-		free	($CDCl_3$) 2.42(3H, s), 2.59(4H, brs), 3.48-3.76(4H, m), 3.91(2H, s), 4.56(2H, s), 7.00(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.7 Hz), 7.39(2H, d, J = 8.6 Hz), 7.71(2H, d, J = 8.3 Hz), 7.79(1H, s), 8.00(2H, d, J = 8.1 Hz), 8.22-8.29(2H, m), 8.81(1H, brs).
2466	4-CF_3Ph-		free	($CDCl_3$) 2.55(3H, s), 2.35-2.70(4H, m), 3.66(2H, s), 3.40-3.95(4H, m), 6.98(1H, d, J = 8.7 Hz), 7.05(1H, d, J = 7.6 Hz), 7.12(2H, d, J = 8.5 Hz), 7.22(1H, d, J = 7.6 Hz), 7.42(2H, d, J = 8.5 Hz), 7.56(1H, t, J = 7.6 Hz), 7.75 (2H, d, J = 8.2 Hz), 8.02(2H, d, J = 8.2 Hz), 8.21(1H, dd, J = 8.7 Hz, 2.8 Hz), 8.31(1H, d, J = 2.8 Hz), 8.38(1H, s).
2467	3,4-Cl_2Ph-	4-AcNHPh-	free	(DMSO-d_6) 2.02(3H, s), 2.38(4H, brs), 3.44(2H, s), 3.55 (4H, brs), 7.14(1H, d, J = 8.8 Hz), 7.16(2H, d, J = 8.7 Hz), 7.21(2H, d, J = 8.4 Hz), 7.43(2H, d, J = 8.7 Hz), 7.52 (2H, d, J = 8.4 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.22(1H, d, J = 2.0 Hz), 8.23(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.51(1H, d, J = 2.6 Hz), 9.90(1H, s), 10.59(1H, s).

Table 386



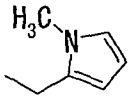
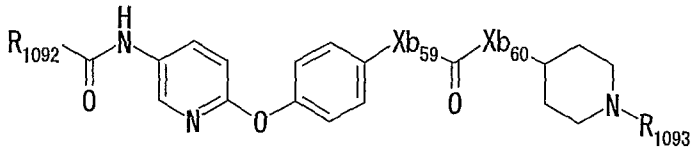
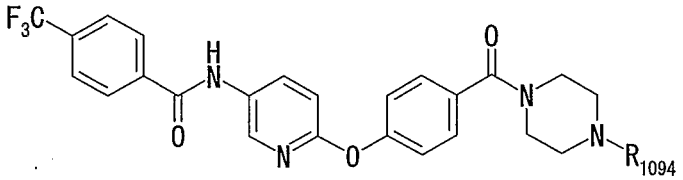
Example No.	Xb_{57}	R_{1090}	R_{1091}	Xb_{58}	Form	^{1}H NMR (solvent) δppm
2468	-NH-	-H		$-CH_2-$	trihydro-chloride	(DMSO-d_6) 2.60-3.20(7H, m), 3.22-3.60(3H, m), 3.71(3H, s), 4.10(1H, d, J = 13.2 Hz), 4.30 (2H, d, J = 4.8 Hz), 4.48(1H, d, J = 13.2 Hz), 6.05(1H, t, J = 2.5 Hz), 6.32(1H, dd, J = 3.6 Hz, 1.9 Hz), 6.87(1H, t, J = 2.5 Hz), 7.04(2H, d, J = 8.4 Hz), 7.06 (1H, d, J = 8.8 Hz), 7.29(2H, d, J = 8.4 Hz), 7.93(2H, d, J = 8.5 Hz), 8.19(2H, d, J = 8.5 Hz), 8.22 (1H, dd, J = 8.8 Hz, 2.6 Hz), 8.51(1H, d, J = 2.6 Hz), 10.70(1H, s).
2469	-NH-	-H	3-furylmethyl	$-CH_2-$	free	($CDCl_3$) 2.25-2.45(4H, m), 2.60(2H, t, J = 7.7 Hz), 2.93(2H, t, J = 7.7 Hz), 3.37 (2H, s), 3.40(2H, t, J = 5.0 Hz), 3.60 (2H, t, J = 5.0 Hz), 6.37 (1H, d, J = 1.5 Hz), 6.93(1H, d, J = 8.8 Hz), 7.02(2H, d, J = 8.6 Hz), 7.19(2H, d, J = 8.6 Hz), 7.33(1H, s), 7.39(1H, t, J = 1.5 Hz), 7.73(2H, d, J = 8.1 Hz), 8.01(2H, d, J = 8.1 Hz), 8.21(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.28(1H, d, J = 2.6 Hz), 8.46(1H, s).
2470	-NH-	-H	furfuryl	$-CH_2-$	free	($CDCl_3$) 2.31-2.52(4H, m), 2.60(2H, t, J = 7.2 Hz), 2.93(2H, t, J = 7.2 Hz), 3.43 (2H, t, J = 5.0 Hz), 3.55(2H, s), 3.63 (2H, t, J = 5.0 Hz), 6.21(1H, d, J = 2.6 Hz), 6.32(1H, d, J = 3.0 Hz), 6.94(1H, d, J = 8.9 Hz), 7.02(2H, d, J = 8.5 Hz), 7.19(2H, d, J = 8.5 Hz), 7.38(1H, d, J = 2.8 Hz), 7.74(2H, d, J = 8.0 Hz), 8.00 (2H, d, J = 8.0 Hz), 8.21(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.28(1H, d, J = 2.5 Hz), 8.35(1H, s).
2471	none	$-CH_3$	piperonyl	$-N(CH_3)-$	free	($CDCl_3$) 2.12(3H, s), 2.42-2.45(4H, m), 3.03(3H, s), 3.44(2H, s), 3.47-3.52(2H, m), 3.62-3.65(2H, m), 4.09(2H, s), 5.95 (2H, s), 6.54-6.59(2H, m), 6.71-6.77 (2H, m), 6.85(1H, s), 6.92-6.96(2H, m), 7.75(2H, d, J = 8.4 Hz), 7.87(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.58(1H, d, J = 2.1 Hz).

Table 387



Example No.	R_{1092}	Xb_{59}	Xb_{60}	R_{1093}	^{1}H NMR (DMSO-d_6) δppm
2472	3,4-Cl_2Ph-	-NH-	none	benzyl	1.55-1.82(4H, m), 1.96(2H, t, J = 10.5 Hz), 2.21-2.40(1H, m), 2.87(2H, d, J = 10.5 Hz), 3.47(2H, s), 7.02(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 9.1 Hz), 7.18-7.42(5H, m), 7.62(2H, d, J = 9.1 Hz), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.46(1H, d, J = 2.6 Hz), 9.89(1H, s), 10.53(1H, s).
2473	3,4-Cl_2Ph-	-NH-	none	3-furylmethyl	1.55-1.85(4H, m), 1.85-2.07(2H, m), 2.18-2.40(1H, m), 2.80-3.00(2H, m), 3.32(2H, s), 6.44(1H, s), 7.02(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.9 Hz), 7.57(1H, s), 7.57-7.66(1H, m), 7.62(2H, d, J = 8.9 Hz), 7.84(1H, d, J = 8.4 Hz), 7.94(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.45(1H, d, J = 2.6 Hz), 9.89(1H, s), 10.54(1H, s).
2474	4-CF_3Ph-	none	-N(CH_3)-	benzyl	1.50-2.30(6H, m), 2.84(5H, brs), 3.44(2H, brs), 4.27(1H, brs), 7.16(3H, d, J = 8.6 Hz), 7.18-7.39(5H, m), 7.41(2H, d, J = 8.5 Hz), 7.95(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.27(1H, dd, J = 8.9 Hz, 2.5 Hz), 8.56 (1H, d, J = 2.5 Hz), 10.68(1H, s).
2475	4-CF_3Ph-	none	-N(CH_3)-	3-furylmethyl	1.50-2.20(6H, m), 2.83(3H, s), 2.72-3.02(2H, m), 3.30(2H, d, J = 3.5 Hz), 4.28(1H, brs), 6.41(1H, s), 7.15(1H, d, J = 8.8 Hz), 7.16(2H, d, J = 8.4 Hz), 7.41(2H, d, J = 8.4 Hz), 7.53 (1H, s), 7.60(1H, s), 7.95(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.27(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.55(1H, d, J = 2.5 Hz), 10.68 (1H, s).

Table 388



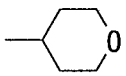
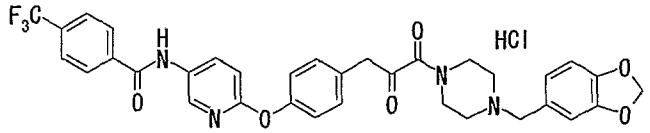
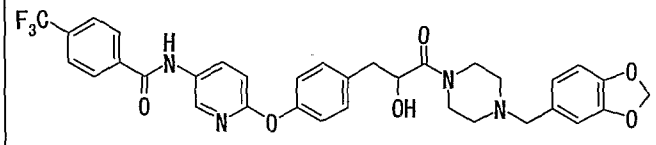
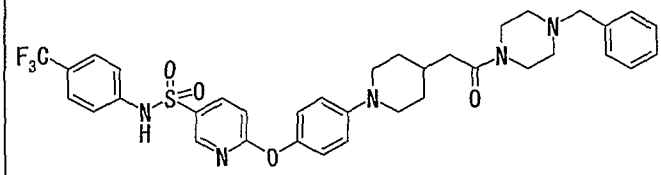
Example No.	R_{1094}	^{1}H NMR ($CDCl_3$) δppm
2476	cyclohexyl	1.00-1.40(5H, m), 1.52-1.70(1H, m), 1.70-1.92(4H, m), 2.21-2.40(1H, m), 2.57 (4H, brs), 3.52(2H, brs), 3.73(2H, brs), 6.98(1H, d, J = 8.9 Hz), 7.13(2H, d, J = 8.8 Hz), 7.41(2H, d, J = 8.8 Hz), 7.76(2H, d, J = 8.2 Hz), 8.03(2H, d, J = 8.2 Hz), 8.19 (1H, dd, J = 8.9 Hz, 2.5 Hz), 8.33(1H, d, J = 2.5 Hz), 8.36(1H, brs).
2477		1.40-1.85(4H, m), 2.38-2.60(1H, m), 2.57(4H, brs), 3.38(2H, t, J = 11.0 Hz), 3.72 (4H, brs), 4.03(2H, dd, J = 11.0 Hz, 3.5 Hz), 7.00(1H, d, J = 8.7 Hz), 7.15(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.77(2H, d, J = 8.5 Hz), 8.02(2H, d, J = 8.5 Hz), 8.16(1H, brs), 8.21(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.32(1H, d, J = 2.5 Hz).
2478	cyclopropyl	0.33-0.58(4H, m), 1.45-1.72(1H, m), 2.62(4H, brs), 3.49(2H, brs), 3.68(2H, brs), 7.00(1H, d, J = 8.9 Hz), 7.15(2H, d, J = 8.4 Hz), 7.43(2H, d, J = 8.4 Hz), 7.77(2H, d, J = 8.4 Hz), 8.02(2H, d, J = 8.4 Hz), 8.21(1H, s), 8.21(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.33(1H, d, J = 2.6 Hz).

Table 389

Example No.	Chemical structure	^{1}H NMR (solvent) δppm
2479		(DMSO-d_6) 2.77-3.10(2H, m), 3.17-3.63(4H, m), 3.71-3.89(1H, m), 4.18(2H, s), 4.24(2H, s), 4.27-4.44(1H, m), 6.07(2H, s), 6.92-7.06(2H, m), 7.09(3H, d, J = 8.6 Hz), 7.22(1H, s), 7.28(2H, d, J = 8.6 Hz), 7.92(2H, d, J = 8.0 Hz), 8.18(2H, d, J = 8.0 Hz), 8.24(1H, dd, J = 8.8 Hz, 2.5 Hz), 8.53(1H, d, J = 2.5 Hz), 10.69(1H, s).
2480		($CDCl_3$) 2.25-2.52(4H, m), 2.77-2.95 (2H, m), 3.12-3.29(1H, m), 3.29-3.46 (1H, m), 3.41(2H, s), 3.43-3.59(1H, m), 3.65-3.84(2H, m), 5.30(1H, brs), 5.92 (2H, s), 6.73(2H, s), 6.84(1H, s), 6.95 (1H, d, J = 9.0 Hz), 7.05(2H, d, J = 8.4 Hz), 7.23(2H, d, J = 8.4 Hz), 7.75(2H, d, J = 8.1 Hz), 7.98(2H, d, J = 8.1 Hz), 8.03(1H, brs), 8.20(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.22(1H, s).
2481		($CDCl_3$) 1.32-1.44(2H, m), 1.83-2.02 (3H, m), 2.30(2H, d, J = 6.8 Hz), 2.42-2.47(4H, m), 2.69(2H, t, J = 12.0 Hz), 3.48-3.66(8H, m), 6.86-6.99(6H, m), 7.25-7.32(7H, m), 7.50(2H, d, J = 8.6 Hz), 7.98(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.59(1H, d, J = 2.0 Hz).

Example 2482

Production of N-(6-{4-[4-((1S, 2S)-2-hydroxy-cyclohexyl)piperazine-1-carbonyl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide

To a solution of N-{6-[4-(piperazine-1-carbonyl)phenoxy]-pyridin-3-yl}-4-trifluoromethyl-benzamide (430 mg, 0.91 mmol) in methanol was added 1,2-epoxycyclohexane (180 mg, 1.83 mmol), and the resulting solution was stirred for 1 day under reflux. The resulting reaction solution was concentrated under reduced pressure. The residue was purified by silica gel column chromatography (chloroform : methanol = 35 : 1), and then ethyl acetate was added. The precipitated white powder was filtered off and washed with ethyl acetate, to thereby yield 284 mg of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 1.03-1.38(4H, m), 1.42-1.88(3H, m), 2.06-2.35(2H, m), 2.31(2H, brs), 2.74(2H, brs), 3.30-4.00(6H, m), 7.00(1H, d, J = 8.9 Hz), 7.15(2H, d, J = 8.7 Hz), 7.43(2H, d, J = 8.7 Hz), 7.77(2H, d, J = 8.1 Hz), 8.02(2H, d, J = 8.1 Hz), 8.21(1H, brs), 8.22(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.33(1H, d, J = 2.7 Hz).

Example 2483

Production of 3,4-dichloro-N-[6-({4-[3-oxo-3-(4-piperonylpiperazin-1-yl)propyl]phenyl}methylamino)-pyridin-3-yl]benzamide dioxalate

To a solution of 3,4-dichloro-N-(6-{4-[3-oxo-

3-(4-piperonylpiperazin-1-yl)propyl]phenylamino}-pyridin-3-yl)benzamide (250 mg, 0.395 mmol) in methanol (3 mL) were added acetic acid (0.500 mL) and 37% aqueous formaldehyde (0.640 mL, 7.89 mmol), and the resulting solution was stirred for 30 minutes at 50°C. To the reaction solution was added sodium cyanoborohydride (0.160 g, 2.55 mmol) at room temperature, and stirred for 8 hours at 50°C. Water was added to the reaction solution and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 10 : 1), to yield a free form. This free form was dissolved in isopropanol (5 mL) and oxalic acid dihydrate (70 mg, 0.555 mmol)by heating. The solvent was evaporated, and the resulting solid was recrystallized from isopropanol, to thereby yield 0.193 g of the title compound.

Appearance: Pale yellow powder

Melting point: 127-129°C

The following compound was produced in the same manner as in Example 2483.

Example 2484

2-(Ethyl{4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenyl}amino)-1-(4-piperonylpiperazin-1-

yl)ethanone

^{1}H NMR ($CDCl_3$) δ 1.18(3H, t, J = 7.1 Hz), 2.41-2.44(4H, m), 3.39-3.47(4H, m), 3.51(2H, brs), 3.64(2H, brs), 4.03(2H, s), 5.03(2H, s), 5.94(2H, s), 6.68(2H, d, J = 9.1 Hz), 6.73-6.74(2H, m), 6.85-6.88(2H, m), 6.99(2H, d, J = 9.1 Hz), 7.01(2H, d, J = 8.4 Hz), 7.55(2H, d, J = 8.7 Hz), 7.71(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.22(1H, d, J = 2.3 Hz).

Example 2485

Production of 3,4-dichloro-N-[6-(4-thiomorpholine-4-ylmethylphenoxy)pyridin-3-yl]benzamide monohydrochloride

3,4-dichloro-N-[6-(4-chloromethylphenoxy)-pyridin-3-yl]benzamide (0.61 g, 1.5 mmol) was dissolved in DMF (5 mL). To the resulting solution were added triethylamine (0.84 mL, 6.0 mmol) and thiomorpholine (0.15 mL, 1.5 mmol), and this solution was stirred overnight at 40°C. The resulting reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate and washed with a saturated sodium bicarbonate solution and brine. The organic layer was dried over anhydrous magnesium sulfate and evaporated. This residue was purified by silica gel column chromatography (chloroform : methanol = 80 : 1). The obtained solid (0.56 g, 1.18 mmol) was dissolved in ethyl acetate (50 mL), and a solution of 4 N hydrogen chloride in ethyl acetate (0.295 mL, 1.18 mmol) was

added, and this solution was stirred for 1 hour at room temperature. The precipitated crystals were collected by suction filtration, and recrystallized from methanol, to thereby yield 0.38 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.80-2.83(2H, m), 3.09-3.17(4H, m), 3.61(2H, m), 4.35(2H, s), 7.14(1H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.3 Hz), 7.60(2H, d, J = 8.3 Hz), 7.85(1H, d, J = 8.6 Hz), 7.96(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.23(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.0 Hz), 8.53(1H, d, J = 2.6 Hz), 10.45(1H, brs), 10.62(1H, brs).

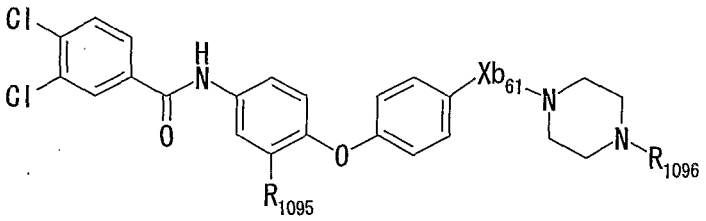
The following compounds were produced in the same manner as in Example 2485.

Example 2486

3,4-Dichloro-N-(4-{4-[1-(3-imidazole-1-ylpropyl)-1,2,3,6-tetrahydropyridine-4-yl]phenoxy}phenyl)-benzamide

Melting point: 169-171°C

Table 390



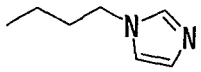
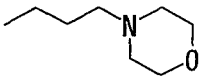
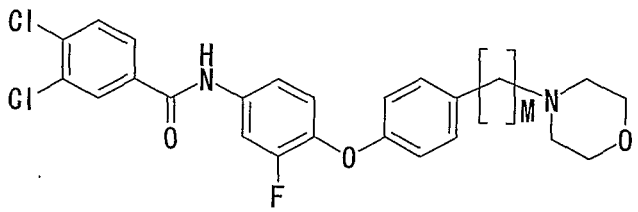
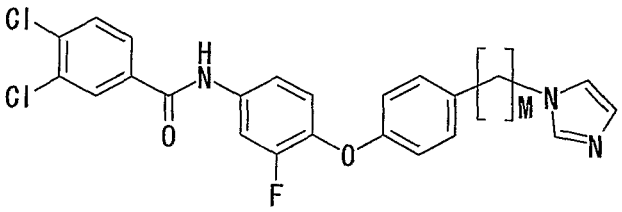
Example No.	R_{1095}	Xb_{61}	R_{1096}	Form	mp (°C)
2487	-F	$-CH_2-$	benzyl	dihydro-chloride	178-179
2488	-F	$-CH_2-$	piperonyl	dihydro-chloride	192-195
2489	-F	$-(CH_2)_2-$	benzyl	dihydro-chloride	208-210
2490	-F	$-(CH_2)_2-$	piperonyl	dihydro-chloride	202-205
2491	-F	$-(CH_2)_3-$	benzyl	dihydro-chloride	260-262
2492	-F	$-(CH_2)_3-$	piperonyl	dihydro-chloride	258-260
2493	-F	$-(CH_2)_4-$	benzyl	dihydro-chloride	245-248
2494	-F	$-(CH_2)_4-$	piperonyl	dihydro-chloride	256-258
2495	-H	none		free	172-173
2496	-H	none		free	131-134

Table 391



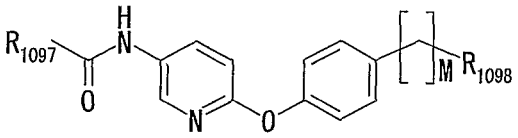
Example No.	M	Form	mp (°C)
2497	1	hydrochloride	165-168
2498	2	free	143-144
2499	3	oxalate	173-175
2500	4	hydrochloride	226-228

Table 392



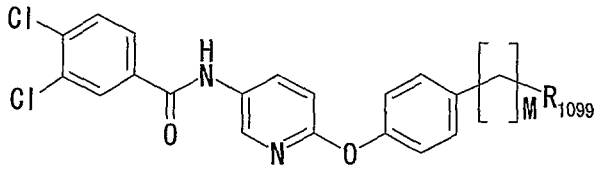
Example No.	M	mp (°C)
2501	1	183-185
2502	4	141-143

Table 393



Example No.	R_{1097}	R_{1098}	M	Form	^{1}H NMR (solvent) δppm
2503	3,4-Cl_2Ph-	piperidino	1	free	($CDCl_3$) 1.42-1.58(6H, m), 2.36-2.38(4H, m), 3.44(2H, s), 6.86(1H, d, J = 8.9 Hz), 6.99(2H, dd, J = 6.6 Hz, 2.0 Hz), 7.26-7.31(2H, m), 7.47(1H, d, J = 8.3 Hz), 7.67(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.94(1H, d, J = 2.3 Hz), 8.10(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.21(1H, d, J = 2.6 Hz), 8.69(1H, brs).
2504	3,4-Cl_2Ph-	piperidino	3	dihydro-chloride	(DMSO-d_6) 1.67-1.77(6H, m), 1.99-2.10 (2H, m), 2.61-3.05 (6H, m), 3.40-3.43(2H, m), 6.01(1H, brs), 7.04-7.08(3H, m), 7.28(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.96-8.00 (1H, m), 8.19-8.23(1H, m), 8.26(1H, d, J = 1.9 Hz), 8.51 (1H, d, J = 2.7 Hz), 10.24(1H, brs), 10.67(1H, s).
2505	3,4-Cl_2Ph-	piperidino	4	free	($CDCl_3$) 1.40-1.50(2H, m), 1.50-1.75(8H, m), 2.25-2.50 (6H, m), 2.63(2H, t, J = 7.0 Hz), 6.93(1H, d, J = 9.0 Hz), 7.03(2H, d, J = 8.5 Hz), 7.19(2H, d, J = 8.5 Hz), 7.58(1H, d, J = 8.5 Hz), 7.71(1H, dd, J = 8.5 Hz, 2.0 Hz), 7.82(1H, s), 7.98(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 9.0 Hz, 3.0 Hz), 8.25(1H, d, J = 3.0 Hz).
2506	3,4-Cl_2Ph-	piperidino	5	free	($CDCl_3$) 1.20-1.80(12H, m), 2.31(2H, t, J = 7.8 Hz), 2.40 (4H, brs), 2.61(2H, t, J = 7.8 Hz), 6.94(1H, d, J = 8.8 Hz), 7.04(2H, d, J = 8.4 Hz), 7.20(2H, d, J = 8.4 Hz), 7.58(1H, d, J = 8.2 Hz), 7.72(1H, s), 7.71(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.98(1H, d, J = 2.3 Hz), 8.16(1H, dd, J = 8.8 Hz, 2.8 Hz), 8.24(1H, d, J = 2.8 Hz).
2507	4-CF_3Ph-	morpholino	1	free	(DMSO-d_6) 2.37(4H, t, J = 4.6 Hz), 3.46 (2H, s), 3.59(4H, t, J = 4.6 Hz), 7.07(3H, d, J = 8.6 Hz), 7.33(2H, d, J = 8.6 Hz), 7.93(2H, d, J = 8.6 Hz), 8.15-8.24(3H, m), 8.51(1H, d, J = 2.6 Hz), 10.63(1H, s).
2508	3,4-Cl_2Ph-	morpholino	1	free	($CDCl_3$) 2.56(4H, t, J = 4.6 Hz), 3.60(2H, s), 3.82(4H, t, J = 4.6 Hz), 7.05(1H, d, J = 8.6 Hz), 7.18(2H, dd, J = 6.6 Hz, 2.0 Hz), 7.45(2H, d, J = 8.6 Hz), 7.67(1H, d, J = 8.6 Hz), 7.80(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.99(1H, brs), 8.07(1H, d, J = 2.0 Hz), 8.25-8.29(1H, m), 8.35(1H, d, J = 2.6 Hz).
2509	3,4-Cl_2Ph-	morpholino	2	free	($CDCl_3$) 2.54-2.85(8H, m), 3.74-3.78(4H, m), 6.95(1H, d, J = 8.9 Hz), 7.04-7.07(2H, m), 7.22-7.26(2H, m), 7.58(1H, d, J = 8.6 Hz), 7.68-7.72(1H, m), 7.79(1H, brs), 7.98(1H, d, J = 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
2510	3,4-Cl_2Ph-	morpholino	3	free	($CDCl_3$) 1.78-1.83(2H, m), 2.34-2.45(6H, m), 2.60-2.66 (2H, m), 3.70-3.73(4H, m), 6.88(1H, d, J = 8.6 Hz), 7.00 (2H, d, J = 8.6 Hz), 7.18(2H, d, J = 8.6 Hz), 7.51(1H, d, J = 8.6 Hz), 7.66-7.70(1H, m), 7.94(1H, d, J = 2.2 Hz), 8.10-8.14(1H, m), 8.22(1H, d, J = 2.7 Hz), 8.40(1H, brs).

Table 394



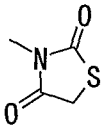
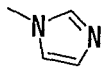
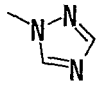
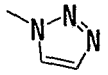
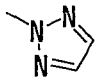
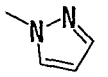
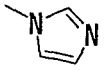
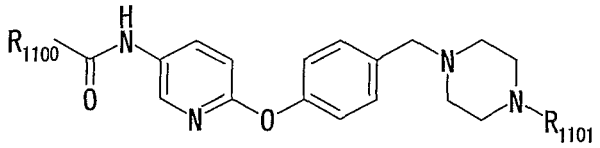
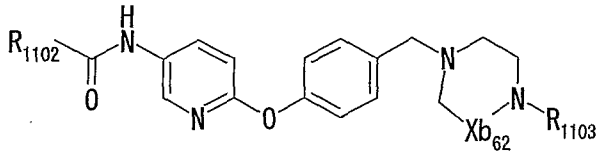
Example No.	R_{1099}	M	Form	^{1}H NMR (solvent) δppm
2511	morpholino	4	dihydro-chloride	(DMSO-d_6) 1.55-1.90(4H, m), 2.63(2H, t, J = 7.2 Hz), 2.90-3.20(4H, m), 3.30-3.50(2H, m), 3.79(2H, t, J = 11.2 Hz), 3.93(2H, s), 7.04(2H, d, J = 8.2 Hz), 7.05(1H, d, J = 9.0 Hz), 7.26(2H, d, J = 8.2 Hz), 7.84(1H, d, J = 8.2 Hz), 7.98(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.20(1H, dd, J = 9.0 Hz, 2.7 Hz), 8.25(1H, d, J = 2.0 Hz), 8.50(1H, d, J = 2.7 Hz), 10.65(1H, s).
2512	morpholino	5	free	($CDCl_3$) 1.30-1.45(2H, m), 1.45-1.75(4H, m), 2.33(2H, t, J = 7.2 Hz), 2.44(4H, t, J = 4.6 Hz), 2.62(2H, t, J = 7.7 Hz), 3.72(4H, t, J = 4.6 Hz), 6.94(1H, d, J = 9.0 Hz), 7.04(2H, d, J = 8.5 Hz), 7.20(2H, d, J = 8.5 Hz), 7.58(1H, d, J = 8.2 Hz), 7.65-7.75(2H, m), 7.98(1H, d, J = 2.0 Hz), 8.16 (1H, dd, J = 9.0 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).
2513		3	free	($CDCl_3$) 1.97-2.03(2H, m), 2.67(2H, t, J = 7.6 Hz), 3.68-3.73(2H, m), 3.88(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.05(2H, d, J = 8.6 Hz), 7.21(2H, d, J = 8.6 Hz), 7.56(1H, d, J = 8.3 Hz), 7.69-7.74(2H, m), 7.98(1H, d, J = 2.3 Hz), 8.14-8.18(1H, m), 8.23(1H, d, J = 3.0 Hz).
2514		1	free	(DMSO-d_6) 5.20(2H, s), 6.91(1H, s), 7.07(1H, d, J = 8.6 Hz), 7.10(2H, d, J = 8.6 Hz), 7.22(1H, s), 7.31(2H, d, J = 8.6 Hz), 7.77(1H, s), 7.84 (1H, d, J = 8.6 Hz), 7.94(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.19(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.22(1H, d, J = 2.0 Hz), 8.46(1H, d, J = 2.3 Hz), 10.57 (1H, s).
2515		1	hydro-chloride	(DMSO-d_6) 5.48(2H, s), 7.09(1H, d, J = 8.5 Hz), 7.12(2H, d, J = 8.6 Hz), 7.38(2H, d, J = 8.6 Hz), 7.83(1H, d, J = 8.5 Hz), 7.98(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.23(1H, dd, J = 8.5 Hz, 2.3 Hz), 8.26(1H, s), 8.26(1H, d, J = 2.0 Hz), 8.51(1H, d, J = 2.3 Hz), 9.05(1H, s), 10.70(1H, s).
2516		1	free	(DMSO-d_6) 5.63(2H, d, J = 8.6 Hz), 7.09(1H, d, J = 8.6 Hz), 7.11(2H, d, J = 8.6 Hz), 7.36(2H, d, J = 8.6 Hz), 7.76(1H, d, J = 1.0 Hz), 7.84(1H, d, J = 8.3 Hz), 7.94(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.20(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.23(2H, s), 8.46(1H, d, J = 2.6 Hz), 10.55(1H, s).
2517		1	hydro-chloride	(DMSO-d_6) 5.66(2H, s), 7.09(1H, d, J = 8.6 Hz), 7.10(2H, d, J = 8.6 Hz), 7.32(2H, d, J = 8.6 Hz), 7.83(2H, s), 7.83(1H, d, J = 8.5 Hz), 7.96 (1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, dd, J = 8.5 Hz, 2.3 Hz), 8.23(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.3 Hz), 10.61(1H, s).
2518		1	hydro-chloride	(DMSO-d_6) 5.34(2H, s), 6.28(1H, t, J = 2.0 Hz), 7.06(1H, d, J = 9.0 Hz), 7.07(2H, d, J = 8.6 Hz), 7.26(2H, d, J = 8.6 Hz), 7.47(1H, d, J = 2.0 Hz), 7.83(1H, d, J = 8.6 Hz), 7.85(1H, d, J = 2.0 Hz), 7.96(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.20(1H, dd, J = 9.0 Hz, 2.6 Hz), 8.23(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.6 Hz), 10.61(1H, s).
2519		2	free	($CDCl_3$) 3.04(2H, t, J = 7.0 Hz), 4.17(2H, t, J = 7.0 Hz), 6.87(1H, t, J = 1.3 Hz), 6.94(1H, d, J = 8.7 Hz), 7.02(1H, brs), 7.05(4H, s), 7.30(1H, brs), 7.56(1H, d, J = 8.3 Hz), 7.75(1H, dd, J = 8.3 Hz, 2.1 Hz), 8.03(1H, d, J = 2.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.23(1H, d, J = 2.3 Hz), 8.61(1H, brs).

Table 395



Example No.	R_{1100}	R_{1101}	^{1}H NMR (solvent) δppm
2520	4-ClPh-	piperonyl	($CDCl_3$) 2.48(8H, brs), 3.42(2H, s), 3.50(2H, s), 5.93(2H, s), 6.74 (2H, s), 6.85(1H, s), 6.94(1H, d, J = 8.6 Hz), 7.07(2H, d, J = 8.6 Hz), 7.33(2H, d, J = 8.6 Hz), 7.49(2H, d, J = 8.6 Hz), 7.73(1H, brs), 7.82(2H, d, J = 8.6 Hz), 8.18-8.24(2H, m).
2521	4-CNPh-	piperonyl	($CDCl_3$) 2.48(8H, brs), 3.42(2H, s), 3.51(2H, s), 5.93(2H, s), 6.73-6.74(2H, m), 6.85(1H, s), 6.96(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.6 Hz), 7.34(2H, d, J = 8.6 Hz), 7.79-7.82(3H, m), 7.99(2H, d, J = 8.2 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.26(1H, d, J = 2.6 Hz).
2522	3,4-Cl_2Ph-	benzyl	($CDCl_3$) 2.51(8H, brs), 3.52(2H, s), 3.53(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.07(2H, d, J = 8.2 Hz), 7.26-7.36(7H, m), 7.59(1H, d, J = 8.6 Hz), 7.69-7.73(2H, m), 7.99(1H, d, J = 2.0 Hz), 8.18(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.6 Hz).
2523	3,4-Cl_2Ph-	-$COOC(CH_3)_3$	($CDCl_3$) 1.46(9H, s), 2.40(4H, t, J = 5.0 Hz), 3.43(4H, t, J = 5.0 Hz), 3.50(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.08(2H, d, J = 8.6 Hz), 7.34 (2H, d, J = 8.6 Hz), 7.57(1H, d, J = 8.3 Hz), 7.70-7.74(1H, m), 8.00 (1H, d, J = 2.0 Hz), 8.07(1H, brs), 8.17-8.21(1H, m), 8.27(1H, d, J = 2.6 Hz).
2524	3,4-Cl_2Ph-	-C_2H_5	($CDCl_3$) 1.08(3H, t, J = 7.3 Hz), 2.38-2.49(10H, m), 3.48(2H, s), 6.88(1H, d, J = 8.9 Hz), 7.01(2H, d, J = 8.3 Hz), 7.30(2H, d, J = 8.6 Hz), 7.49(1H, d, J = 8.3 Hz), 7.66-7.70(1H, m), 7.95(1H, d, J = 2.0 Hz), 8.13(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz), 8.58 (1H, brs).
2525	3,4-Cl_2Ph-	-Ph	($CDCl_3$) 2.64(4H, t, J = 5.0 Hz), 3.22(4H, t, J = 5.0 Hz), 3.57(2H, s), 6.83-6.88(1H, m), 6.92-6.99(3H, m), 7.10(2H, d, J = 8.6 Hz), 7.23-7.29(2H, m), 7.39(2H, d, J = 8.6 Hz), 7.59(1H, d, J = 8.6 Hz), 7.71(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.76(1H, s), 7.99(1H, d, J = 2.0 Hz), 8.19(1H, dd, J = 8.6 Hz, 2.6 Hz), 8.26(1H, d, J = 2.6 Hz).
2526	4-CF_3Ph-	-$COOC(CH_3)_3$	(DMSO-d_6) 1.40(9H, s), 2.32-2.36(4H, m), 3.30-3.35(4H, m), 3.49 (2H, s), 7.06-7.09(3H, m), 7.32-7.36(2H, m), 7.94(2H, d, J = 8.4 Hz), 8.18(2H, d, J = 8.1 Hz), 8.24(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.52 (1H, d, J = 2.7 Hz), 10.64(1H, s).
2527	3,4-Cl_2Ph-	-CH_3	($CDCl_3$) 2.27(3H, s), 2.45(8H, brs), 3.47(2H, s), 6.87(1H, d, J = 8.9 Hz), 6.99-7.03(2H, m), 7.27-7.31(2H, m), 7.48(1H, dd, J = 8.3 Hz, 2.6 Hz), 7.68(1H, dd, J = 8.6 Hz, 2.0 Hz), 7.94(1H, d, J = 2.0 Hz), 8.12(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(1H, d, J = 2.6 Hz), 8.76(1H, brs).
2528	3,4-Cl_2Ph-	piperonyl	($CDCl_3$) 2.47(8H, brs), 3.42(2H, s), 3.49(2H, s), 5.93(2H, s), 6.73 (2H, d, J = 0.7 Hz), 6.84(1H, s), 6.91(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 8.6 Hz), 7.31(2H, d, J = 8.6 Hz), 7.53(1H, d, J = 8.2 Hz), 7.70 (1H, dd, J = 8.3 Hz, 2.0 Hz), 7.97(1H, d, J = 2.3 Hz), 8.13-8.18(1H, m), 8.24(2H, d, J = 2.6 Hz).

Table 396



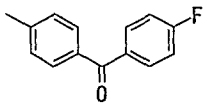
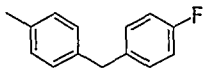
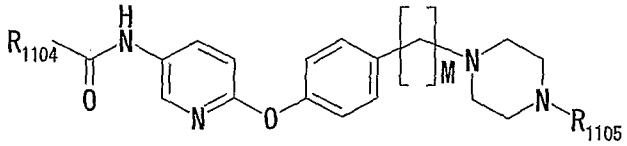
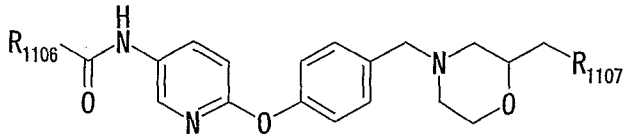
Example No.	R_{1102}	Xb_{62}	R_{1103}	Form	^{1}H NMR (solvent) δppm
2529	3,4-Cl_2Ph-	-$(CH_2)_2$-	piperonyl	free	($CDCl_3$) 1.97-2.01(2H, m), 2.85-2.90(8H, m), 3.68(2H, s), 3.75(2H, s), 5.95(2H, s), 6.74-6.84(2H, m), 6.94-6.97(2H, m), 7.08(2H, d, J = 8.6 Hz), 7.41(2H, d, J = 8.6 Hz), 7.57(1H, d, J = 8.6 Hz), 7.75(1H, dd, J = 8.6 Hz, 2.3 Hz), 8.01-8.02(2H, m), 8.20(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.31(1H, d, J = 2.6 Hz).
2530	3,4-Cl_2Ph-	-$(CH_2)_2$-	benzyl	trihydro-chloride	(DMSO-d_6) 2.25(2H, brs), 3.38 (4H, brs), 3.78(4H, brs), 4.38 (4H, s), 7.12-7.22(3H, m), 7.46-7.48(3H, m), 7.62-7.67 (4H, m), 7.84(1H, d, J = 8.6 Hz), 7.98 (1H, dd, J = 8.6 Hz, 2.0 Hz), 8.22-8.27(2H, m), 8.55 (1H, d, J = 2.6 Hz), 10.68(1H, s).
2531	3,4-Cl_2Ph-	-CO-	benzyl	free	($CDCl_3$) 2.66(2H, t, J = 5.9 Hz), 3.22-3.25(4H, m), 3.55(2H, s), 4.60(2H, s), 6.95(1H, d, J = 8.9 Hz), 7.08(2H, d, J = 8.6 Hz), 7.23-7.35(7H, m), 7.56(1H, d, J = 8.3 Hz), 7.72(1H, dd, J = 2.0 Hz, 8.6 Hz), 8.00(1H, d, J = 2.0 Hz), 8.10(1H, s), 8.18(1H, dd, J = 2.6 Hz, 8.6 Hz), 8.28 (1H, d, J = 2.6 Hz).
2532	4-CF_3Ph-	-CH_2-		free	($CDCl_3$) 2.61(4H, brs), 3.38(4H, brs), 3.55(2H, s), 6.85-6.94(3H, m), 7.06-7.14 (4H, m), 7.36(2H, d, J = 8.3 Hz), 7.64(2H, d, J = 8.3 Hz), 7.70-7.75(4H, m), 7.99 (2H, t, J = 8.3 Hz), 8.24(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.40(1H, d, J = 2.6 Hz), 9.19 (1H, s).
2533	4-CF_3Ph-	-CH_2-		free	($CDCl_3$) 2.58-2.62(4H, m), 3.14-3.17(4H, m), 3.54(2H, s), 3.86(2H, s), 6.83-7.14 (11H, m), 7.36(2H, d, J = 8.4 Hz), 7.71 (2H, d, J = 8.3 Hz), 7.96(2H, d, J = 8.1 Hz), 8.15-8.26(3H, m).

Table 397



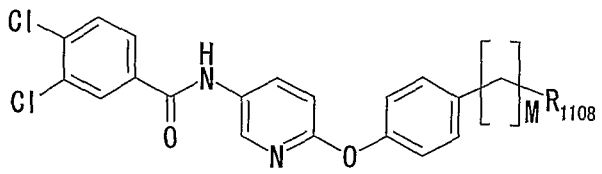
Example No.	R_{1104}	R_{1105}	M	^{1}H NMR ($CDCl_3$) δppm
2534	3,4-Cl_2Ph-	-CH_3	2	2.30(3H, s), 2.50-2.81(12H, m), 6.86(1H, d, J = 8.6 Hz), 6.98 (2H, d, J = 8.6 Hz), 7.18(2H, d, J = 8.3 Hz), 7.47(1H, d, J = 8.3 Hz), 7.67(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.94(1H, d, J = 2.0 Hz), 8.11(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.21(1H, d, J = 2.6 Hz), 8.66 (1H, brs).
2535	3,4-Cl_2Ph-	piperonyl	2	2.51-2.83(12H, m), 3.43(2H, s), 5.93(2H, s), 6.74 (2H, d, J = 1.0 Hz), 6.86-7.03(4H, m), 7.20(2H, d, J = 8.3 Hz), 7.53(1H, d, J = 8.6 Hz), 7.68-7.72(1H, m), 7.97(1H, d, J = 2.0 Hz), 8.15(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.23(2H, d, J = 2.6 Hz).
2536	3,4-Cl_2Ph-	-CH_3	3	1.78-1.84(2H, m), 2.29(3H, s), 2.36-2.48(10H, m), 2.59-2.65 (2H, m), 6.89(1H, d, J = 8.4 Hz), 7.00(2H, d, J = 8.4 Hz), 7.18 (2H, d, J = 8.4 Hz), 7.52(1H, d, J = 8.6 Hz), 7.67-7.71(1H, m), 7.96(1H, d, J = 2.2 Hz), 8.11-8.15(1H, m), 8.23(1H, d, J = 2.7 Hz), 8.31(1H, brs).
2537	3,4-Cl_2Ph-	piperonyl	3	1.78-1.84(2H, m), 2.36-2.47(10H, m), 2.60-2.65 (2H, m), 3.41 (2H, s), 5.93(2H, s), 6.73(2H, d, J = 0.8 Hz), 6.85(1H, s), 6.91 (1H, d, J = 8.9 Hz), 7.02(2H, d, J = 8.4 Hz), 7.19(2H, d, J = 8.6 Hz), 7.55(1H, d, J = 8.1 Hz), 7.68-7.71(1H, m), 7.96-7.97(2H, m), 8.14-8.17(1H, m), 8.23(1H, d, J = 2.7 Hz).
2538	4-CF_3Ph-	-$COOC(CH_3)_3$	3	1.46(9H, s), 1.78-1.89(2H, m), 2.36-2.42(6H, m), 2.62-2.68 (2H, m), 3.42-3.45(4H, m), 6.94(1H, d, J = 8.9 Hz), 7.01-7.06 (2H, m), 7.18-7.23(2H, m), 7.76(2H, d, J = 8.2 Hz), 7.99-8.03 (3H, m), 8.22(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.28(1H, d, J = 2.6 Hz).
2539	3,4-Cl_2Ph-	-CH_3	4	1.50-1.80(4H, m), 2.32(3H, s), 2.38(2H, t, J = 7.3 Hz), 2.30-2.70(8H, m), 2.64(2H, t, J = 7.3 Hz), 6.94(1H, d, J = 8.8 Hz), 7.03(2H, d, J = 8.2 Hz), 7.19(2H, d, J = 8.2 Hz), 7.58(1H, d, J = 8.2 Hz), 7.72(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.84(1H, s), 8.00(1H, d, J = 2.0 Hz), 8.18(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.26 (1H, d, J = 2.6 Hz).
2540	3,4-Cl_2Ph-	benzyl	4	1.45-1.75(4H, m), 2.36(2H, t, J = 7.5 Hz), 2.30-2.65(8H, m), 2.62(2H, t, J = 7.7 Hz), 3.51(2H, s), 6.92(1H, d, J = 8.6 Hz), 7.03(2H, d, J = 8.6 Hz), 7.19(2H, d, J = 8.6 Hz), 7.15-7.40(5H, m), 7.57(1H, d, J = 8.2 Hz), 7.71(1H, dd, J = 8.2 Hz, 2.0 Hz), 7.85(1H, s), 7.98(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.24(1H, d, J = 2.5 Hz).
2541	3,4-Cl_2Ph-	benzyl	5	1.25-1.45(2H, m), 1.45-1.75(4H, m), 2.34(2H, t, J = 7.7 Hz), 2.30-2.70(8H, m), 2.61(2H, t, J = 7.7 Hz), 3.51(2H, s), 6.93(1H, d, J = 8.7 Hz), 7.03(2H, d, J = 8.6 Hz), 7.19(2H, d, J = 8.6 Hz), 7.20-7.40(5H, m), 7.58(1H, d, J = 8.3 Hz), 7.70(1H, dd, J = 8.3 Hz, 2.0 Hz), 7.71(1H, d, J = 2.0 Hz), 7.98(1H, d, J = 2.0 Hz), 8.16(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.24(1H, d, J = 2.6 Hz).

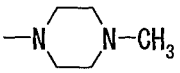
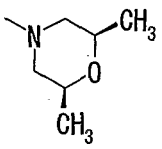
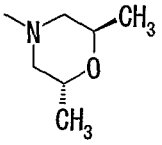
Table 398



Example No.	R_{1106}	R_{1107}	Form	^{1}H NMR (DMSO-d_6) δppm
2542	3,4-Cl_2Ph-	-H	hydro-chloride	1.12(3H, d, J = 6.3 Hz), 2.75-3.03(2H, m), 3.24-3.39(2H, m), 3.78-3.98(3H, m), 4.31(2H, brs), 7.13(1H, d, J = 8.6 Hz), 7.20 (2H, d, J = 8.3 Hz), 7.63(2H, d, J = 8.3 Hz), 7.84(1H, d, J = 8.2 Hz), 7.98(1H, dd, J = 8.2 Hz, 2.6 Hz), 8.24(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.0 Hz), 8.55(1H, d, J = 2.6 Hz), 10.67(1H, brs), 11.10(1H, brs).
2543	3,4-Cl_2Ph-	-O$(CH_2)_3CH_3$	hydro-chloride	0.87(3H, t, J = 7.3 Hz), 1.22-1.36(2H, m), 1.41-1.51(2H, m), 2.90-3.07(2H, m), 3.23-3.50(6H, m), 3.80-3.88(1H, m), 3.99-4.02(2H, m), 4.35(2H, brs), 7.13(1H, d, J = 8.9 Hz), 7.21 (2H, d, J = 8.6 Hz), 7.63(2H, d, J = 8.3 Hz), 7.84(1H, d, J = 8.6 Hz), 7.97(1H, dd, J = 8.3 Hz, 2.0 Hz), 8.24(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.25(1H, d, J = 2.0 Hz), 8.54(1H, d, J = 2.6 Hz), 10.66(1H, brs), 11.17(1H, brs).
2544	3,4-Cl_2Ph-	piperidino	dihydro-chloride	1.38-1.77(6H, m), 2.92-3.10(5H, m), 3.22-3.33(4H, m), 3.47-3.51(1H, m), 3.97-4.06(2H, m), 4.27-4.55(3H, m), 7.13 (1H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.6 Hz), 7.67(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.6 Hz), 7.99(1H, dd, J = 8.2 Hz, 2.0 Hz), 8.26(1H, dd, J = 8.6 Hz, 3.0 Hz), 8.28(1H, d, J = 2.3 Hz), 8.57(1H, d, J = 2.6 Hz), 10.27(1H, brs), 10.74(1H, brs), 11.91 (1H, brs).
2545	4-CF_3Ph-	-H	hydro-chloride	1.12(3H, d, J = 6.1 Hz), 2.68-2.80(1H, m), 2.98-3.06(1H, m), 3.24-3.28(2H, m), 3.80-3.90(3H, m), 4.31(2H, brs), 7.14(1H, d, J = 8.7 Hz), 7.21(2H, d, J = 8.4 Hz), 7.64(2H, d, J = 8.1 Hz), 7.93(2H, d, J = 8.4 Hz), 8.19(2H, d, J = 8.2 Hz), 8.27(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.57(1H, d, J = 2.6 Hz), 10.75(1H, brs), 11.19(1H, brs).
2546	4-CF_3Ph-	-OCH_3	hydro-chloride	2.92-3.12(2H, m), 3.26(3H, s), 3.34-3.47(4H, m), 3.80-4.02 (3H, m), 4.34(2H, brs), 7.14(1H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.6 Hz), 7.63(2H, d, J = 8.2 Hz), 7.94(2H, d, J = 8.4 Hz), 8.18 (2H, d, J = 8.1 Hz), 8.27(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.57(1H, d, J = 2.6 Hz), 10.73(1H, brs), 11.13(1H, brs).
2547	3,4-Cl_2Ph-	-OCH_3	hydro-chloride	2.92-3.11(2H, m), 3.26(3H, s), 3.31-3.52(4H, m), 3.79-3.87 (1H, m), 3.95-4.04(2H, m), 4.34(2H, brs), 7.14(1H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.6 Hz), 7.62(2H, d, J = 8.6 Hz), 7.84(1H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.4 Hz, 2.2 Hz), 8.24-8.26(2H, m), 8.54(1H, d, J = 2.6 Hz), 10.66(1H, brs), 11.02(1H, brs).

Table 399



Example No.	R_{1108}	M	Form	^{1}H NMR (solvent) δppm
2548		5	free	($CDCl_3$) 1.30-1.45(2H, m), 1.45-1.75(4H, m), 2.30(3H, s), 2.25-2.40 (2H, m), 2.49(8H, brs), 2.62(2H, t, J = 7.5 Hz), 6.94(1H, d, J = 8.9 Hz), 7.04(2H, d, J = 8.6 Hz), 7.20(2H, d, J = 8.6 Hz), 7.59(1H, d, J = 8.2 Hz), 7.65-7.75(2H, m), 7.98(1H, d, J = 2.0 Hz), 8.17(1H, dd, J = 8.9 Hz, 3.0 Hz), 8.24(1H, d, J = 3.0 Hz).
2549		1	hydro-chloride	(DMSO-d_6) 1.13(6H, d, J = 6.6 Hz), 2.66-2.76(2H, m), 3.25-3.34 (2H, m), 3.91-3.99(2H, m), 4.30(2H, s), 7.14(1H, d, J = 8.6 Hz), 7.21 (2H, d, J = 8.6 Hz), 7.62(2H, d, J = 8.3 Hz), 7.85(1H, d, J = 8.6 Hz), 7.97(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.24(1H, dd, J = 8.6 Hz, 3.0 Hz), 8.25(1H, d, J = 2.3 Hz), 8.55(1H, d, J = 2.6 Hz), 10.65(1H, brs), 10.96(1H, brs).
2550		1	hydro-chloride	(DMSO-d_6) 1.11(3H, d, J = 6.3 Hz), 1.40(3H, d, J = 6.9 Hz), 2.67-2.75(1H, m), 3.10(2H, m), 3.25-3.33(1H, m), 4.02-4.32(4H, m), 7.14(1H, d, J = 8.9 Hz), 7.21(2H, d, J = 8.3 Hz), 7.65(2H, d, J = 8.6 Hz), 7.85(1H, d, J = 8.2 Hz), 7.97(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.21-8.26(2H, m), 8.54(1H, d, J = 2.3 Hz), 10.46(1H, brs), 10.64(1H, brs).

Example 2551

Production of 1-(3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionyl)-4-[2-(morpholino)acetyl]-piperazine

To a solution of 1-chloroacetyl-4-(3-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}propionyl)-piperazine (0.515 g, 0.896 mmol) and diisopropylethylamine (0.234 mL, 1.34 mmol) in acetonitrile (11 mL) was added morpholine (0.117 mL, 1.34 mmol), and the resulting solution was refluxed for 1 hour. This reaction solution was concentrated under

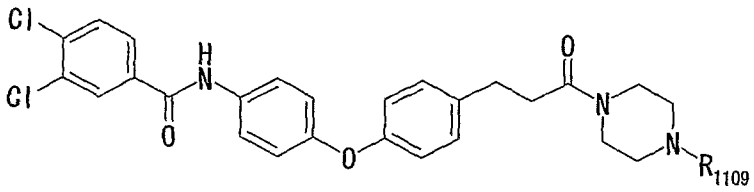
reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with chloroform. The chloroform layer was dried over anhydrous magnesium sulfate, and evaporated. The obtained solid was recrystallized from water-containing acetone, to thereby yield 0.441 g of the title compound.

Appearance: White powder

Melting point: 187-190°C

The following compounds were produced in the same manner as in Example 2551.

Table 400



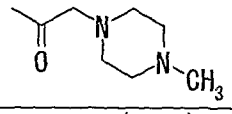
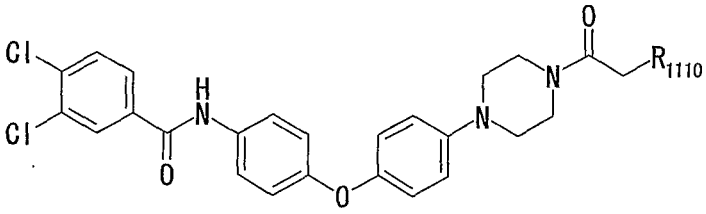
Example No.	R_{1109}	Form	mp (°C) or ^{1}H NMR
2552	$-COCH_2N(C_2H_5)_2$	3/2 oxalate	mp 107-118
2553	$-COCH_2NHCH_2Ph$	hydrochloride	mp 199-202
2554	$-COCH_2N(C_2H_5)CH_2Ph$	fumarate	^{1}H NMR (DMSO-d_6) δ 0.99(3H, t, J = 7.1 Hz), 2.56-2.70(2H, m), 2.73-2.86(2H, m), 3.09-3.50 (12H, m), 3.59(2H, s), 6.61(2H, s), 6.91(2H, d, J = 8.0 Hz), 6.98(2H, d, J = 9.0 Hz), 7.14-7.37(7H, m), 7.74(2H, d, J = 9.0 Hz), 7.81(1H, d, J = 8.4 Hz), 7.92(1H, dd, J = 8.4 Hz, 2.1 Hz), 8.20(1H, d, J = 2.1 Hz), 10.39(1H, s), 13.09(2H, brs).
2555		dihydrochloride	mp 173-176
2556	$-COCH_2N(C_2H_5)Ph$	free	mp 140-143

Table 401



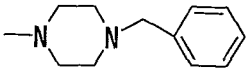
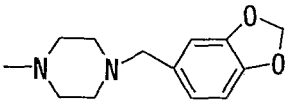
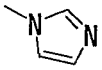
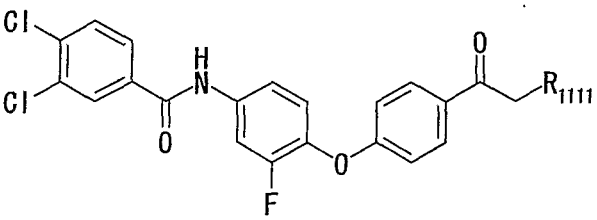
Example No.	R_{1110}	mp (°C)
2557		206-210
2558		154-156
2559	morpholino	177-178
2560		204-206
2561	$-N(CH_3)CH_2Ph$	182-184

Table 402



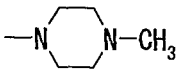
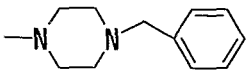
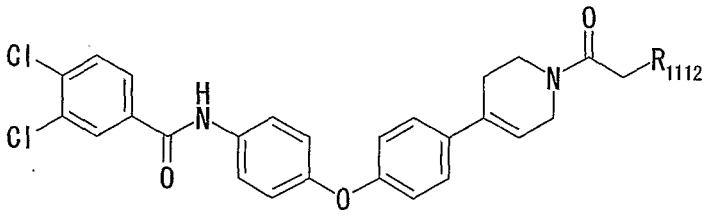
Example No.	R_{1111}	mp (°C)
2562		151-152
2563	morpholino	177-178
2564		146-147

Table 403



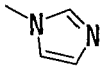
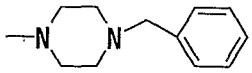
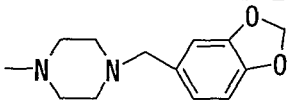
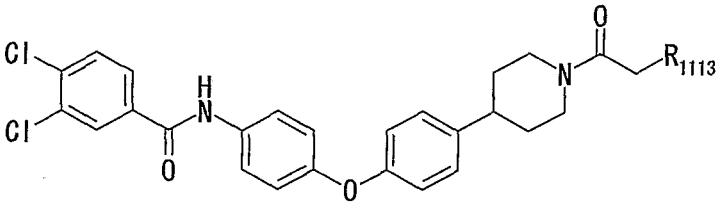
Example No.	R_{1112}	mp (°C)
2565	morpholino	195-197
2566		146-148
2567		173-176
2568		150-153

Table 404



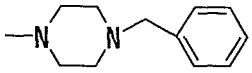
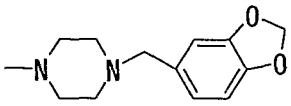
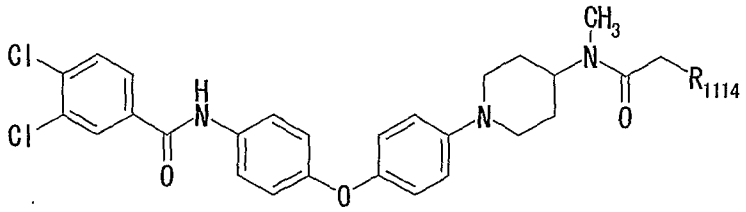
Example No.	R_{1113}	Form	mp (°C)
2569		dihydrochloride	152-155
2570		dihydrochloride	181-185
2571	morpholino	hydrochloride	146-150

Table 405



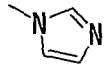
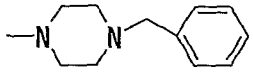
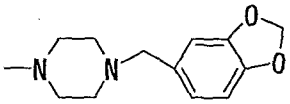
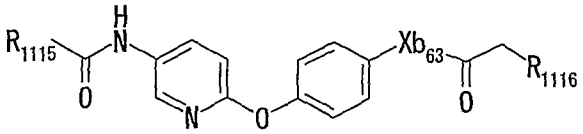
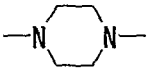
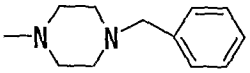
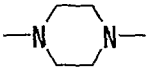
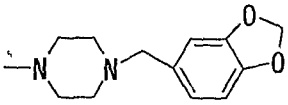
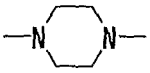
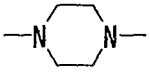
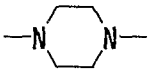
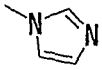
Example No.	R_{1114}	mp (°C)
2572	morpholino	157-160
2573		241-243
2574		193-196
2575		180-182

Table 406



Example No.	R_{1115}	Xb_{63}	R_{1116}	mp (°C) or ^{1}H NMR
2576	3,4-Cl_2Ph-	none	morpholino	^{1}H NMR (DMSO-d_6) δ 2.50-2.53 (4H, m), 3.55-3.61(4H, m), 3.82(2H, s), 7.20(1H, d, J = 8.7 Hz), 7.21(2H, d, J = 8.1 Hz), 7.85(1H, d, J = 8.4 Hz), 7.96 (1H, dd, J = 8.4 Hz, 1.2 Hz), 8.06(2H, d, J = 8.4 Hz), 8.23(1H, d, J = 1.5 Hz), 8.27(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.55 (1H, d, J = 2.8 Hz), 10.61(1H, brs).
2577	4-CF_3Ph-			mp 179-181
2578	4-CF_3Ph-			mp 172-174
2579	4-CF_3Ph-		morpholino	mp 144-146
2580	4-CF_3Ph-		-N(CH_3)CH_2Ph	mp 188-190
2581	4-CF_3Ph-			mp 192-193

The following compound was produced in the same manner as in Reference Example 860.

Example 2582

1-{4-[5-(3,4-Dichlorobenzoylamino)pyridin-2-yloxy]benzyl}piperazine-4-carboxylic acid ethyl ester

Appearance: Pale yellow oil

^{1}H NMR ($CDCl_3$) δ 1.25(3H, t, J = 7.0 Hz), 1.76(2H, m), 1.77(2H, m), 2.03(2H, t, J = 11.5 Hz), 2.28(1H, m), 2.87(2H, brd, J = 11.5 Hz), 3.48(2H, s), 4.13(2H, q, J = 7.0 Hz), 6.94(1H, d, J = 9.0 Hz), 7.06(2H, d, J = 8.5 Hz), 7.33(2H, d, J = 9.0 Hz), 7.57(1H, d, J = 8.5 Hz), 7.70(1H, dd, J = 8.5 Hz, 2.0Hz), 7.88(1H, brs), 7.97(1H, d, J = 2.0 Hz), 8.17(1H, dd, J = 9.0 Hz, 3.0 Hz), 8.24(1H, d, J = 3.0 Hz).

Example 2583

Production of 3,4-dichloro-N-{6-[4-(2,4-dioxo-3,4-dihydro-2H-pyrimidin-1-ylmethyl)phenoxy]pyridin-3-yl}benzamide

To uracil (200 mg, 1.8 mmol) was added hexamethyldisilazane (5 mL), and the resulting solution was stirred for 5.5 hours at 150°C. Insoluble matter was removed by filtration, and the filtrate was concentrated under reduced pressure. The residue was dissolved in a solution of acetonitrile (10 mL)-THF (5 mL), and to this solution were added 3,4-dichloro-N-[6-(4-chloromethylphenoxy)pyridin-3-yl]benzamide (500 mg,

1.2 mmol) and tin tetrachloride (3 drops). The resulting solution was refluxed for 2.5 hours. To this reaction solution was added methanol (1 mL), and the resulting solution was stirred for 30 minutes at room temperature. The resulting reaction solution was concentrated under reduced pressure, and the residue was purified by silica gel column chromatography (methanol : chloroform = 1 : 99 → 3 : 97), to thereby yield 20 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 4.88(2H, s), 5.61(1H, dd, J = 7.9 Hz, 2.3 Hz), 7.07-7.13(3H, m), 7.35(2H, d, J = 8.6 Hz), 7.79-7.85(2H, m), 7.95(1H, dd, J = 8.6 Hz, 2.0 Hz), 8.18(1H, d, J = 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.47(1H, d, J = 2.6 Hz), 10.55(1H, s), 11.33(1H, s).;

MS: m/z 482(M^+).

Example 2584

Production of N-{6-[4-(4-benzyl-2-oxopiperazin-1-ylmethyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide dihydrochloride

To a soluiton of 4-benzylpiperazin-2-one (0.56 g, 2.95 mmol) in DMF (10 mL) was added 60% sodium hydride (0.12 g, 2.95 mmol), and this solution was stirred at room temperature for 30 minutes. 2-(4-chloromethylphenoxy)-5-nitropyridine (0.78 g, 2.95 mmol) was added to the reaction mixture, and the mixture was stirred for 1 hour at room temperature. To

this mixture was added brine (50 mL), and extracted with ethyl acetate (50 mL). The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated under reduced pressure. The remaining oil was dissolved in ethyl acetate (5 mL), and to the resulting solution was added iron powder (0.33 g, 5.89 mmol). This solution was stirred for 2 hours at room temperature. The resulting reaction solution was concentrated under reduced pressure, and a saturated sodium bicarbonate solution (50 mL) was added to the residue. The obtained mixture was extracted with ethyl acetate (50 mL). The ethyl acetate layer was washed with brine, dried over anhydrous sodium sulfate, and evaporated. The remaining oil was dissolved in THF (10 mL). To the resulting solution were added triethylamine (0.21 mL, 1.47 mmol) and 3,4-dichlorobenzoyl chloride (0.31 mL, 1.47 mmol), and this solution was stirred at room temperature for 2 hours. A saturated sodium bicarbonate solution (50 mL) was added to the solution, and extracted with ethyl acetate (50 mL). The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated under reduced pressure. The residue was purified by silica gel column chromatography (chloroform : methanol = 40 : 1). The obtained oil was dissolved in ethyl acetate (5 mL), and to the resulting solution was added a solution of 4 N hydrogen chloride in ethyl acetate (1.5 mL, 6 mmol). The formed white

powder was collected by suction filtration, to thereby yield 0.045 g of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 3.54(4H, m), 3.86(2H, brs), 4.42(2H, s), 4.59(2H, brs), 7.06-7.12(3H, m), 7.34(2H, d, J = 8.6 Hz), 7.48-7.51(3H, m), 7.57-7.60(2H, m), 7.84(1H, d, J = 8.6 Hz), 7.97(1H, dd, J = 2.0 Hz, 8.3 Hz), 8.18-8.24(2H, m), 8.49(1H, d, J = 2.6 Hz), 10.61(1H, s).

The following compound was produced in the same manner as in Reference Example 656.

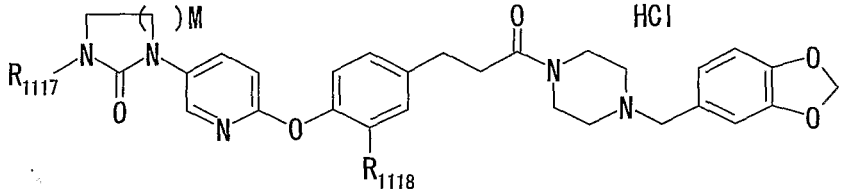
Example 2585

2-({4-[5-(3,4-Dichlorophenylamino)pyridin-2-yloxy]-2-trifluoromethylphenyl}ethylamino)-1-(4-piperonylpiperazin-1-yl)ethanone

^{1}H NMR ($CDCl_3$) δ 1.02(3H, t, J = 7.1 Hz), 2.30-2.45(4H, m), 3.22(2H, q, J = 7.1 Hz), 3.40(2H, s), 3.45-3.65(4H, m), 3.85(2H, s), 5.57(1H, brs), 5.94(2H, s), 6.65-6.80(3H, m), 6.85(1H, s), 6.95(1H, d, J = 8.7 Hz), 7.00(1H, d, J = 2.7 Hz), 7.29-7.31(2H, m), 7.39(1H, d, J = 2.7 Hz), 7.53(1H, dd, J = 8.7 Hz, 2.9 Hz), 7.64(1H, d, J = 8.8 Hz), 7.99(1H, d, J = 2.7 Hz).

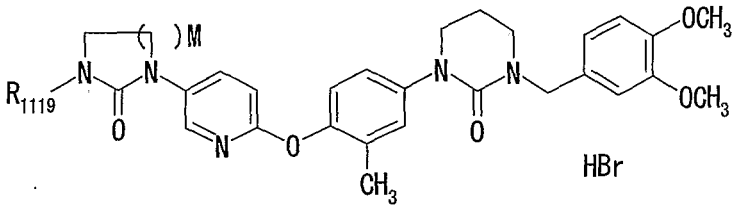
The following compounds were produced in the same manner as in Reference Example 658.

Table 407



Example No.	R_{1117}	R_{1118}	M	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
2586	4-CF_3Ph-	-H	2	^{1}H NMR 2.14-2.30(2H, m), 2.62-3.12(7H, m), 3.20-3.58(3H, m), 3.77(2H, t, J = 5.9 Hz), 3.81-4.15(3H, m), 4.16-4.32(2H, m), 4.49-4.57(1H, m), 6.08(2H, s), 6.96-7.09(5H, m), 7.21(1H, s), 7.29 (2H, d, J = 8.5 Hz), 7.58(2H, d, J = 8.5 Hz), 7.70(2H, d, J = 8.8 Hz), 7.86(1H, dd, J = 2.8 Hz, 8.8 Hz), 8.13(1H, d, J = 2.8 Hz), 10.78-11.01(1H, m).
2587	3,4-Cl_2Ph-	-H	2	mp 182.0 - 183.0
2588	3-CF_3Ph-	-H	1	mp 200.0 - 203.0
2589	4-CF_3Ph-	-OCH_3	1	mp 153.0 - 154.0
2590	3,4-Cl_2Ph-	-OCH_3	1	mp 169.0 - 171.0
2591	4-CF_3Ph-	-OCH_3	2	mp 134.0 - 136.0
2592	3,4-Cl_2Ph-	-OCH_3	2	mp 130.0 - 132.0

Table 408



Example No.	R_{1119}	M	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
2593	4-CF_3Ph-	1	^{1}H NMR 1.90-2.06(2H, m), 2.07(3H, s), 3.18-3.32(2H, m), 3.55-3.70(2H, m), 3.73(3H, s), 3.74(3H, s), 3.91-4.12(4H, m), 4.43(2H, s), 4.49-4.93(1H, m), 6.81(1H, dd, J = 1.8 Hz, 8.1 Hz), 6.88 (1H, d, J = 1.8 Hz), 6.92(1H, d, J = 8.1 Hz), 6.97(1H, d, J = 8.5 Hz), 7.06(1H, d, J = 9.0 Hz), 7.12(1H, dd, J = 2.4 Hz, 8.5 Hz), 7.21(1H, d, J = 2.4 Hz), 7.71(2H, d, J = 8.9 Hz), 7.83(2H, d, J = 8.9 Hz), 8.19(1H, dd, J = 2.9 Hz, 9.0 Hz), 8.27(1H, d, J = 2.9 Hz).
2594	3,4-Cl_2Ph-	1	mp 146.0 - 148.0
2595	3,4-Cl_2Ph-	2	^{1}H NMR 1.91-2.11(5H, m), 2.12-2.24(2H, m), 3.19-3.32(2H, m), 3.58-3.83(10H, m), 3.85-4.22(3H, m), 4.42(2H, s), 6.81(1H, dd, J = 1.8 Hz, 8.1 Hz), 6.87(1H, d, J = 1.8 Hz), 6.91(1H, d, J = 8.1 Hz), 6.94-7.02(2H, m), 7.12(1H, dd, J = 2.5 Hz, 8.6 Hz), 7.21(1H, d, J = 2.5 Hz), 7.35(1H, dd, J = 2.5 Hz, 8.8 Hz), 7.57(1H, d, J = 8.8 Hz), 7.66(1H, d, J = 2.5 Hz), 7.82(1H, dd, J = 2.5 Hz, 8.8 Hz), 8.07(1H, d, J = 2.5 Hz).

Example 2596

Production of 3-(4-{5-[4-(3,4-dichlorophenyl)piperazin-1-yl]pyridin-2-yloxy}phenyl)-1-(4-pipeonylpiperazin-1-yl)propane-1-one

To a solution of 3-[4-(5-bromopyridin-2-yloxy)phenyl]-1-(4-piperonylpiperazin-1-yl)propane-1-one (359 mg, 0.69 mmol) and 1-(3,4-dichlorophenyl)-piperazine (206 mg, 0.89 mmol) in toluene (16 mL) were added with $Pd_2(dba)_3$ (25 mg, 0.027 mmol), Xantphos (32 mg, 0.055 mmol) and sodium *t*-butoxide (99 mg, 1.03 mmol), and the resulting solution was refluxed under an argon atmosphere for 3 hours. The solution was left to cool, water was added to this reaction mixture. The resulting solution was extracted with dichloromethane,

dried over anhydrous magnesium sulfate, and evaporated under reduced pressure. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1), to thereby yield 236 mg of the title compound.

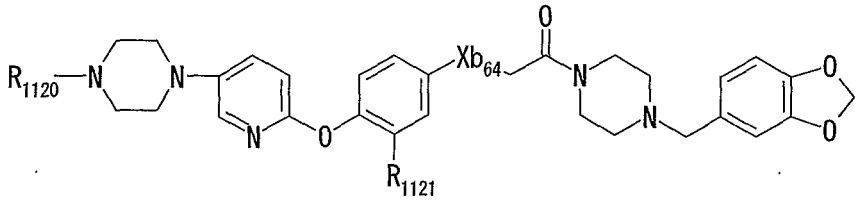
Appearance: Pale yellow powder

^{1}H NMR ($CDCl_3$) δ 2.31-2.40(4H, m), 2.58-2.64(2H, m), 2.92-2.98(2H, m), 3.23-3.38(8H, m), 3.41(4H, brs), 3.63(2H, t, J = 4.9 Hz), 5.94(2H, s), 6.72-6.73(2H, m), 6.78(1H, dd, J = 8.9 Hz, 2.8 Hz), 6.84-6.90(2H, m), 6.99-7.06(3H, m), 7.19-7.24(3H, m), 7.32(1H, dd, J = 9.4 Hz, 3.1 Hz), 7.88(1H, d, J = 3.0 Hz).

Tris(dibenzylideneacetone)dipalladium is abbreviated to $Pd_2(dba)_3$. Hereinafter, the same. 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene is abbreviated to Xantphos. Hereinafter the same.

The following compounds were produced in the same manner as in Example 2596.

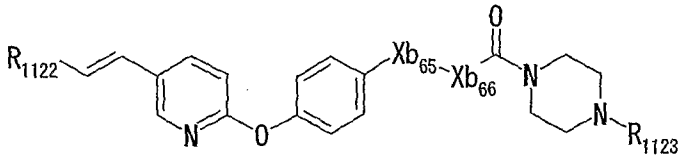
Table 409



Example No.	R_{1120}	R_{1121}	Xb_{64}	^{1}H NMR ($CDCl_3$) δppm
2597	4-CF_3PhCH_2-	-H	-CH_2-	2.31-2.38(4H, m), 2.60-2.64(6H, m), 2.95(2H, t, J = 7.3 Hz), 3.11-3.15(4H, m), 3.40(4H, brs), 3.61(4H, brs), 5.93(2H, s), 6.73(2H, s), 6.83(2H, d, J = 9.1 Hz), 6.99(2H, d, J = 8.4 Hz), 7.19(2H, d, J = 8.4 Hz), 7.29(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.47(2H, d, J = 8.2 Hz), 7.58(2H, d, J = 8.1 Hz), 7.83(1H, d, J = 3.0 Hz).
2598	3,4-Cl_2Ph-	-CH_3	-N(CH_3)-	2.13(3H, s), 2.40-2.44(4H, m), 3.00(3H, s), 3.18-3.38(8H, m), 3.43(2H, s), 3.49(2H, brs), 3.63(2H, brs), 4.06(2H, s), 5.94(2H, s), 6.52-6.57(2H, m), 6.69-6.91(6H, m), 7.00(1H, d, J = 3.0 Hz), 7.26-7.32(2H, m), 7.86(1H, d, J = 2.8 Hz).
2599	4-CF_3Ph-	-CH_3	-N(CH_3)-	2.13(3H, s), 2.41-2.44(4H, m), 3.00(3H, s), 3.20-3.24(4H, m), 3.34-3.43(6H, m), 3.49(2H, brs), 3.63(2H, brs), 4.06(2H, s), 5.94(2H, s), 6.52-6.58(2H, m), 6.70-6.77(3H, m), 6.85-6.98(4H, m), 7.31(1H, dd, J = 9.1 Hz, 3.1 Hz), 7.50(2H, d, J = 8.6 Hz), 7.87(1H, d, J = 2.6 Hz).
2600	4-CF_3Ph-	-H	-CH_2-	2.31-2.40(4H, m), 2.61(2H, t, J = 7.3 Hz), 2.96(2H, t, J = 7.3 Hz), 3.23-3.27(4H, m), 3.38-3.45(8H, m), 3.63(2H, t, J = 4.8 Hz), 5.94(2H, s), 6.70-6.76(2H, m), 6.84-7.06(6H, m), 7.19-7.26(2H, m), 7.36(1H, dd, J = 8.9 Hz, 3.1 Hz), 7.51(2H, d, J = 8.9 Hz), 7.89(1H, d, J = 3.0 Hz).

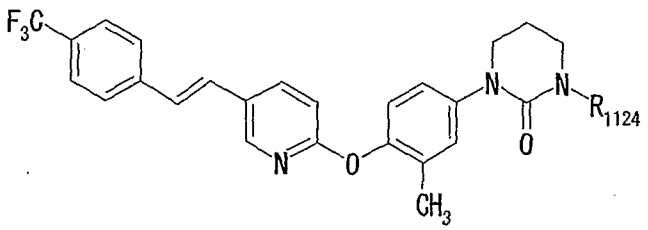
The following compounds were produced in the same manner as in Reference Example 659.

Table 410



Example No.	R_{1122}	Xb_{65}	Xb_{66}	R_{1123}	^{1}H NMR ($CDCl_3$) δppm
2601	4-CF_3Ph-	-N(CH_3)-	-CH_2-	piperonyl	2.41-2.44(4H, m), 3.03(3H, s), 3.43(2H, s), 3.47-3.50(2H, m), 3.61-3.65(2H, m), 4.09(2H, s), 5.93(2H, s), 6.68-6.77(4H, m), 6.83-6.86(2H, m), 6.99(1H, d, J = 16.5 Hz), 7.00-7.06(2H, m), 7.10 (1H, d, J = 16.5 Hz), 7.54-7.61(4H, m), 7.84(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.26(1H, d, J = 2.5 Hz).
2602	3,4-Cl_2Ph-	-N(CH_3)-	-CH_2-	piperonyl	2.42-2.45(4H, m), 3.04(3H, s), 3.44(2H, s), 3.48-3.52(2H, m), 3.62-3.66(2H, m), 4.09(2H, s), 5.95(2H, s), 6.68-6.86(6H, m), 6.94(1H, d, J = 17.3 Hz), 6.99-7.04(3H, m), 7.31(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.42(1H, d, J = 8.4 Hz), 7.57(1H, d, J = 2.0 Hz), 7.82(1H, d, J = 8.4 Hz), 8.24(1H, brs).
2603	4-CF_3Ph-	-CH_2-	-CH_2-	piperonyl	2.32-2.41(4H, m), 2.60-2.66(2H, m), 2.96-3.01 (2H, m), 3.39-3.43(4H, m), 3.62-3.66(2H, m), 5.95 (2H, s), 6.70-6.77(2H, m), 6.84-6.85(1H, m), 6.93 (1H, d, J = 8.6 Hz), 7.00-7.09(3H, m), 7.12(1H, d, J = 16.5 Hz), 7.23-7.27(2H, m), 7.56-7.64(4H, m), 7.90(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.27(1H, d, J = 2.6 Hz).
2604	4-CF_3Ph-	none	none	benzyl	2.47(4H, brs), 3.55-3.77(6H, m), 6.97(1H, d, J = 8.6 Hz), 7.05(1H, d, J = 16.3 Hz), 7.10-7.27(3H, m), 7.28-7.34(5H, m), 7.45-7.50(2H, m), 7.57-7.64(4H, m), 7.93(1H, dd, J = 8.6 Hz, 2.4 Hz), 8.29(1H, d, J = 2.4 Hz).
2605	3,4-Cl_2Ph-	none	none	benzyl	2.52(4H, brs), 3.49-3.90(6H, m), 6.89-6.98(2H, m), 7.03(1H, d, J = 16.5 Hz), 7.15-7.20(2H, m), 7.30-7.50(9H, m), 7.58(1H, d, J = 2.1 Hz), 7.90 (1H, dd, J = 8.7 Hz, 2.5 Hz), 8.26(1H, d, J = 2.5 Hz).

Table 411



Example No.	R_{1124}	Form	^{1}H NMR (solvent) δppm
2606	piperonyl	hydrobromide	(DMSO-d_6) 1.89-2.06(2H, m), 2.06(3H, s), 3.18-3.35(2H, m), 3.57-3.71(2H, m), 4.40(2H, s), 4.42-4.80(1H, m, 5.99(2H, s), 6.77(1H, dd, J = 1.6 Hz, 7.9 Hz), 6.84(1H, d, J = 1.6 Hz), 6.87(1H, d, J = 7.9 Hz), 7.01(1H, d, J = 8.6 Hz), 7.07(1H, d, J = 8.6 Hz), 7.13(1H, dd, J = 2.5 Hz, 8.6 Hz), 7.23(1H, d, J = 2.5 Hz), 7.32(1H, d, J = 16.5 Hz), 7.42(1H, d, J = 16.5 Hz), 7.72(2H, d, J = 8.5 Hz), 7.79(2H, d, J = 8.5 Hz), 8.19(1H, dd, J = 2.4 Hz, 8.6 Hz), 8.30(1H, d, J = 2.4 Hz).
2607	3,4-$(CH_3O)_2PhCH_2$-	free	($CDCl_3$) 1.99-2.14(2H, m), 2.18(3H, s), 3.22-3.38(2H, m), 3.63-3.79(2H, m), 3.89(3H, s), 3.90(3H, s), 4.57(2H, s), 6.76-6.95(4H, m), 6.97-7.20(4H, m), 7.51-7.67(4H, m), 7.88(1H, dd, J = 2.5 Hz, 8.6 Hz), 8.27(1H, d, J = 2.5 Hz).

Example 2608

Production of 1-(3,4-dimethoxybenzyl)-3-{3-methyl-4-[5-(4-trifluoromethylphenylethynyl)pyridin-2-yloxy]phenyl}tetrahydropyrimidin-2-one

To a solution of 1-[4-(5-bromopyridin-2-yloxy)-3-methylphenyl]-3-(3,4-dimethoxybenzyl)tetrahydropyrimidin-2-one (0.3 g, 0.59 mmol) in *N*-methylpyrrolidone (10 mL) were added bis(triphenylphosphine)palladium dichloride (20 mg, 0.03 mmol), copper iodide (11 mg, 0.059 mmol), 4-ethynyl-α,α,α-trifluorotoluene (0.14 mL, 0.88 mmol) and triethylamine (0.14 mL, 10 mmol) under a nitrogen

atmosphere. The resulting solution was stirred for 3 hours at 110 to 120°C. After being left to cool, water was added to the reaction solution. The resulting solution was extracted with ethyl acetate. The ethyl acetate layer was washed with water and dried over anhydrous magnesium sulfate. The solvent was then evaporated, and the residue was purified by silica gel chromatography (*n*-hexane : ethyl acetate = 4 : 1 → 1 : 1), to thereby yield 0.28 g of the title compound.

Appearance: Pale brown amorphous powder

^{1}H NMR ($CDCl_3$) δ 1.97-2.15(2H, m), 2.16(3H, s), 3.31(2H, t, J = 6.0 Hz), 3.72(2H, t, J = 6.0 Hz), 3.88(3H, s), 3.89(3H, s), 4.57(2H, s), 6.72-6.95(5H, m), 7.04(1H, d, J = 8.6 Hz), 7.17(1H, dd, J = 2. 6 Hz, 8.6 Hz), 7.55-7.68(4H, m), 7.78(1H, dd, J = 2.3 Hz, 8.6 Hz), 8.36(1H, d, J = 2.3 Hz).

Example 2609

Production of 3-(3-methyl-4-{5-[2-oxo-2-(4-trifluoromethylphenyl)ethyl]pyridin-2-yloxy}phenyl)-1-piperonyltetrahydropyrimidin-2-one hydrobromide

To a solution of 3-[4-(5-bromopyridin-2-yloxy)-3-methylphenyl]-1-piperonyltetrahydropyrimidin-2-one (0.11 g, 0.22 mmol) in toluene (10 mL) were added $Pd_2(dba)_3$ (10 mg, 0.01 mmol) and Xantphos (15 mg, 0.03 mmol) under a nitrogen atmosphere. The resulting solution was stirred for 5 minutes, and then 4'-(trifluoromethyl)acetophenone (63 mg, 0.33 mmol) and

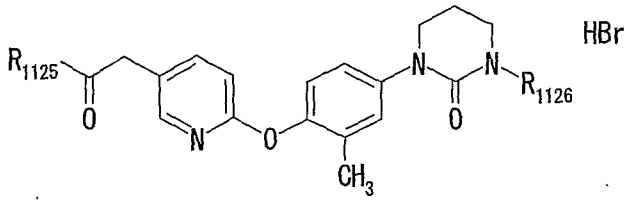
potassium bis(trimethylsilyl)amide (66 mg, 0.33 mmol) were added to the reaction solution. The resulting solution was stirred at 70 to 80°C for 30 minutes, and left to cool. Water was added to the reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 2 : 1 → 1 :1), to yield 50 mg of a free form. To this free form was added an equivalent amount of hydrobromic acid, to thereby yield 50 mg of the title compound.

Appearance: Colorless amorphous powder

^{1}H NMR (DMSO-d_6) δ 1.85-2.10(2H, m), 2.06(3H, s), 3.14-3.47(2H, m), 3.50-3.76(2H, m), 4.40(2H, s), 4.49(2H, s), 4.70-5.40(1H, m), 5.98(2H, s), 6.70-6.80(1H, m), 6.81-6.90(2H, m), 6.90-7.04(2H, m), 7.12(1H, d, J = 2.2 Hz, 8.6 Hz), 7.18-7.26(1H, m), 7.72(1H, dd, J = 2.2 Hz, 8.5 Hz), 7.93(2H, d, J = 8.2 Hz), 7.95-8.02(1H, m), 8.24(2H, d, J = 8.2 Hz).

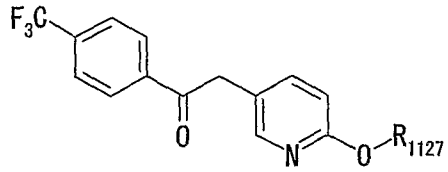
The following compounds were produced in the same manner as in Example 2609.

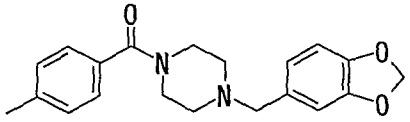
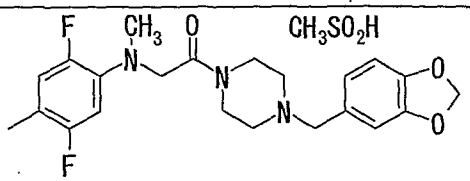
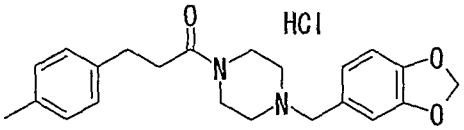
Table 412



Example No.	R_{1125}	R_{1126}	^{1}H NMR ($CDCl_3$) δppm
2610	3,4-Cl_2Ph-	piperonyl	1.82-2.10(2H, m), 2.07(3H, s), 3.12-3.32(2H, m), 3.53-3.72(2H, m), 4.40(2H, s), 4.45(2H, s), 4.80-5.40(1H, m), 5.99(2H, s), 6.71-6.80(1H, m), 6.81-6.90(2H, m), 6.98(2H, dd, J = 2.4 Hz, 8.5 Hz), 7.12(1H, dd, J = 2.4 Hz, 8.5 Hz), 7.21(1H, d, J = 2.4 Hz), 7.70(1H, dd, J = 2.2 Hz, 8.4 Hz), 7.84(1H, d, J = 8.4 Hz), 7.96(1H, d, J = 2.2 Hz), 8.00(1H, dd, J = 2.0 Hz, 8.4 Hz), 8.25(1H, d, J = 2.0 Hz).
2611	4-CF_3Ph-	3,4-$(CH_3O)_2$Ph-	1.87-2.11(5H, m), 3.15-3.32(2H, m), 3.43-3.71(3H, m), 3.74(3H, s), 3.75(3H, s), 4.44(2H, s), 4.51(2H, s), 6.78-6.86(1H, m), 6.87-6.91(1H, m), 6.93(1H, d, J = 8.5 Hz), 6.99(1H, d, J = 8.5 Hz), 7.00(1H, d, J = 8.5 Hz), 7.14(1H, dd, J = 2.4 Hz, 8.5 Hz), 7.19-7.25(1H, m), 7.73(1H, dd J = 2.4 Hz, 8.5 Hz), 7.94(1H, d, J = 8.3 Hz), 7.97-8.01(1H, m), 8.25(1H, d, J = 8.3 Hz).

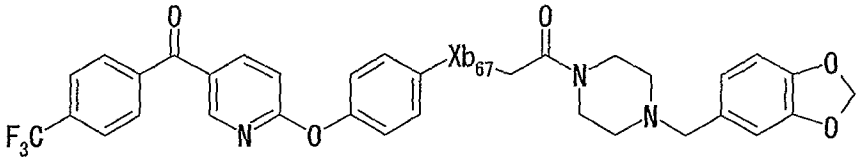
Table 413



Example No.	R_{1127}	mp (°C) or ^{1}H NMR (solvent) δppm
2612		^{1}H NMR ($CDCl_3$) 2.44(4H, brs), 3.44(2H, s), 3.54(2H, brs), 3.73(2H, brs), 4.29(2H, s), 5.94(2H, s), 6.74(2H, s), 6.85(1H, s), 6.94(1H, d, J = 8.4 Hz), 7.16(2H, d, J = 8.6 Hz), 7.45(2H, d, J = 8.6 Hz), 7.63(1H, dd, J = 8.4 Hz, 2.5 Hz), 7.76(2H, d, J = 8.1 Hz), 8.07(1H, d, J = 2.5 Hz), 8.11(2H, d, J = 8.1 Hz).
2613		^{1}H NMR (DMSO-d_6) 2.31(3H, s), 2.76-3.45(9H, m), 3.69-4.57(8H, m), 6.07(2H, s), 6.81-7.22(6H, m), 7.74(1H, dd, J = 2.2 Hz, 8.4 Hz), 7.89-8.00(2H, m), 8.24 (1H, d, J = 8.4 Hz), 9.49-9.79(1H, m).
2614		mp 164.0 - 166.0

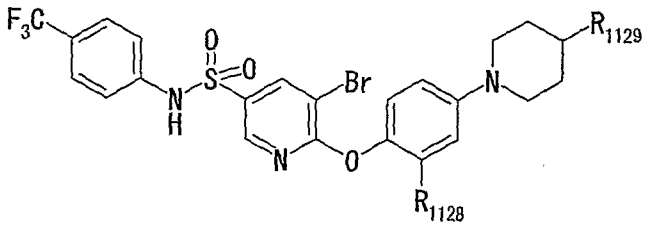
The following compounds were produced in the same manner as in Reference Example 111.

Table 414



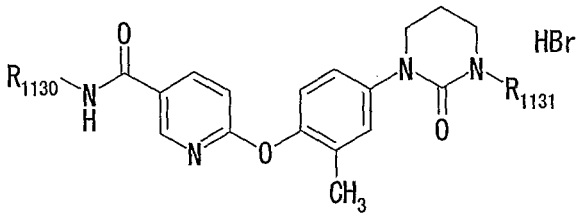
Example No.	Xb_{67}	^{1}H NMR (solvent) δppm
2615	-N(CH$_3$)-	2.42-2.45(4H, m), 3.05(3H, s), 3.44(2H, s), 3.47-3.51(2H, m), 3.62-3.65(2H, m), 4.11 (2H, s), 5.95(2H, s), 6.69-6.77(4H, m), 6.85(1H, s), 6.97(1H, d, J = 8.7 Hz), 7.01-7.07 (2H, m), 7.75(2H, d, J = 8.4 Hz), 7.87(2H, d, J = 8.1 Hz), 8.17(1H, dd, J = 8.7 Hz, 2.3 Hz), 8.58(1H, d, J = 2.3 Hz).
2616	-CH$_2$-	2.32-2.41(4H, m), 2.61-2.67(2H, m), 2.97-3.03(2H, m), 3.41-3.43(4H, m), 3.62-3.66 (2H, m), 5.95(2H, s), 6.70-6.77(2H, m), 6.84(1H, s), 7.03-7.13(3H, m), 7.28-7.32(2H, m), 7.76(2H, d, J = 8.1 Hz), 7.88(2H, d, J = 8.1 Hz), 8.22(1H, dd, J = 8.6 Hz, 2.4 Hz), 8.58(1H, d, J = 2.4 Hz).

Table 415



Example No.	R_{1128}	R_{1129}	^{1}H NMR (CDCl$_3$) δppm
2617	-H	-CH$_2$COOC$_2$H$_5$	1.27(3H, t, J = 7.1 Hz), 1.34-1.48(2H, m), 1.81-1.99(3H, m), 2.29(2H, d, J = 6.9 Hz), 2.73(2H, t, J = 12.2 Hz), 3.63(2H, d, J = 12.2 Hz), 4.15(2H, q, J = 7.3 Hz), 6.91-7.01(4H, m), 7.18-7.26(3H, m), 7.54(2H, d, J = 8.9 Hz), 8.26(1H, d, J = 2.3 Hz), 8.43(1H, d, J = 2.3 Hz).
2618	-CH$_3$	-CH$_2$COOC$_2$H$_5$	1.28(3H, t, J = 7.1 Hz), 1.30-1.39(2H, m), 1.80-1.96(3H, m), 2.07(3H, s), 2.29(2H, d, J = 6.9 Hz), 2.70(2H, t, J = 12.0 Hz), 3.61(2H, d, J = 12.4 Hz), 4.17(2H, q, J = 7.3 Hz), 6.74-6.78(2H, m), 6.92(1H, d, J = 8.6 Hz), 7.20-7.26(3H, m), 7.52(2H, d, J = 8.4 Hz), 8.28(1H, d, J = 2.3 Hz), 8.41(1H, d, J = 2.3 Hz).
2619	-H	-COOC$_2$H$_5$	1.27(3H, t, J = 7.1 Hz), 1.92-2.00(2H, m), 2.01-2.05(2H, m), 2.38-2.47(1H, m), 2.74-2.84(2H, m), 3.59-3.63(2H, m), 4.15(2H, q, J = 7.1 Hz), 6.93-7.02(4H, m), 7.17-7.26(3H, m), 7.54(2H, d, J = 8.4 Hz), 8.26(1H, d, J = 2.3 Hz), 8.43(1H, d, J = 2.3 Hz).

Table 416



Example No.	R_{1130}	R_{1131}	mp (°C) or ^{1}H NMR (DMSO-d_6) δppm
2620	4-CF_3Ph-	piperonyl	mp 129.0 - 130.5
2621	4-CF_3Ph-	3,4-$(CH_3O)_2PhCH_2$-	mp 130.0 - 132.0
2622	3,4-Cl_2Ph-	3,4-$(CH_3O)_2PhCH_2$-	^{1}H NMR 1.85-2.14(5H, m), 3.13-3.33(2H, m), 3.58-3.71 (2H, m), 3.73(3H, s), 3.74(3H, s), 4.12-4.78(3H, m), 6.73-6.94(3H, m), 7.04(1H, d, J = 8.6 Hz), 7.11-7.20(2H, m), 7.25(1H, d, J = 2.4 Hz), 7.61(1H, d, J = 8.8 Hz), 7.71(1H, dd, J = 2.4 Hz, 8.8 Hz), 8.11(1H, d, J = 2.4 Hz), 8.34(1H, dd J = 2.4 Hz, 8.8 Hz), 8.66(1H, d, J = 2.4 Hz), 10.53(1H, s).

Example 2623

Production of 2-[4-(3-{4-[4-(3,4-dichlorobenzoylamino)-phenoxy]phenyl}propionyl)piperazin-1-yl]acetic acid hydrochloride

To a solution of ethyl 2-[4-(3-{4-[4-(3,4-dichlorobenzoylamino)phenoxy]phenyl}propionyl)piperazin-1-yl] acetate (0.493 g, 0.843 mmol) in THF (5 mL) and ethanol (5 mL) were added 5 M aqueous sodium hydroxide (0.253 mL, 1.27 mmol) and water (1 mL), and the resulting solution was refluxed for 1 hour. This reaction solution was concentrated under reduced pressure, and the residue was dissolved in 50% aqueous ethanol. To the resulting solution was added 5 M hydrochloric acid (0.253 mL, 1.27 mmol), and the obtained solid was collected by filtration. To this solid was dissolved in ethanol (10 mL) and 5 M hydrochloric acid (0.3 mL)by heating. The solvent was

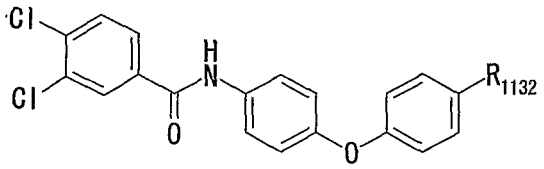
then evaporated, and the obtained solid was recrystallized from ethanol - diethyl ether, to thereby yield 0.381 g of the title compound.

Appearance: White powder

Melting point: 215-218°C

The following compounds were produced in the same manner as in Example 2623.

Table 417



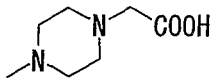
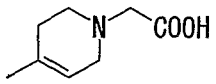
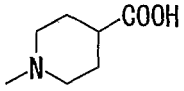
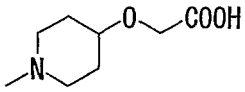
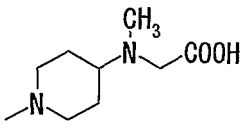
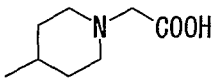
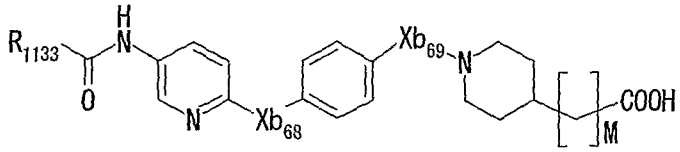
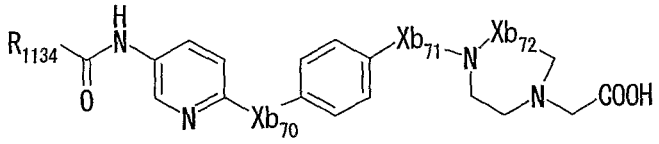
Example No.	R_{1132}	^{1}H NMR (solvent) δppm
2624		(DMSO-d_6) 2.71-2.73(4H, m), 3.12-3.14(4H, m), 3.21(2H, s), 6.91-6.98 (6H, m), 7.71(2H, dd, J = 7.0 Hz, 2.0 Hz), 7.82(1H, d, J = 8.0 Hz), 7.93(1H, dd, J = 8.0 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.38(1H, s).
2625		($CDCl_3$) 2.68(2H, m), 3.05(2H, m), 3.35(2H, s), 3.49(2H, m), 6.00(1H, m), 6.98(2H, d, J = 8.5 Hz), 7.05(2H, d, J = 8.5 Hz), 7.35(2H, d, J = 8.5 Hz), 7.58(2H, d, J = 8.5 Hz), 7.58(1H, brs), 7.77(2H, m), 7.97(1H, s).
2626		(DMSO-d_6) 1.60-1.70(2H, m), 1.85-1.90(2H, m), 2.50(1H, m), 2.65-2.73 (2H, m), 3.55(2H, brd, J = 12.5 Hz), 6.90-6.98(6H, m), 7.71(2H, d, J = 9.0 Hz), 7.81(1H, d, J = 8.5 Hz), 7.93(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.37(1H, s), 12.20(1H, brs).
2627		(DMSO-d_6) 1.51-1.58(2H, m), 1.90-1.95(2H, m), 2.78-2.82(2H, m), 3.43 (2H, m), 3.52(1H, m), 3.92(2H, s), 6.89-6.98(6H, m), 7.70(2H, d, J = 9.0 Hz), 7.82(1H, d, J = 8.5 Hz), 7.93(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.40(1H, s).
2628		(DMSO-d_6) 1.59-1.66(2H, m), 1.94-1.97(2H, m), 2.54(3H, s), 3.62(2H, t, J = 11.0 Hz), 2.98(1H, m), 3.29(2H, s), 3.67-3.70(2H, m), 6.90-6.99(6H, m), 7.71(2H, d, J = 9.0 Hz), 7.82(1H, d, J = 8.5 Hz), 7.93(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.39(1H, s).
2629		($CDCl_3$) 1.80-1.83(4H, m), 2.61-2.65(3H, m), 3.24(2H, s), 3.25(2H, brd, J = 11.0 Hz), 6.94(2H, d, J = 8.5 Hz), 7.03(2H, d, J = 9.0 Hz), 7.25(2H, d, J = 8.5 Hz), 7.76(2H, d, J = 9.0 Hz), 7.83(1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.21(1H, d, J = 2.0 Hz), 10.41(1H, s).

Table 418



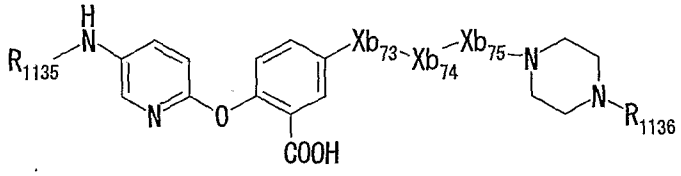
Example No.	R_{1133}	Xb_{68}	Xb_{69}	M	^{1}H NMR (DMSO-d_6) δppm
2630	4-CF_3Ph-	-N(CH_3)-	none	1	1.20-1.45(2H, m), 1.70-1.95(3H, m), 2.20(2H, d, J = 6.6 Hz), 2.67(2H, t, J = 12.4 Hz), 3.32(3H, s), 3.67(2H, d, J = 12.4 Hz), 6.42(1H, d, J = 9.1 Hz), 6.99(2H, d, J = 8.9 Hz), 7.11(2H, d, J = 8.9 Hz), 7.73(1H, dd, J = 9.1 Hz, 2.3 Hz), 7.90(2H, d, J = 8.2 Hz), 8.15(2H, d, J = 8.2 Hz), 8.46(1H, d, J = 2.3 Hz), 10.33(1H, s).
2631	3,4-Cl_2Ph-	-O-	-CH_2-	0	1.57(2H, brs), 1.81(2H, brs), 2.00(2H, brs), 2.23(1H, brs), 2.77(2H, brs), 3.44(2H, brs), 7.05(1H, d, J = 9.0 Hz), 7.07(2H, d, J = 8.5 Hz), 7.35(2H, d, J = 8.5 Hz), 7.84(1H, d, J = 8.5 Hz), 7.95(1H, d, J = 8.5 Hz), 8.20 (1H, dd, J = 9.0 Hz, 3.0 Hz), 8.22(1H, d, J = 2.0 Hz), 8.49(1H, d, J = 3.0 Hz), 10.56(1H, s), 12.15(1H, brs).
2632	3,4-Cl_2Ph-	-O-	-CO-	0	1.52(2H, m), 1.86(2H, brs), 2.52(1H, m), 3.10(2H, brs), 3.65(1H, brs), 4.31(1H, brs), 7.15(1H, d, J = 9.0 Hz), 7.16(2H, d, J = 8.5 Hz), 7.43(2H, d, J = 8.5 Hz), 7.84 (2H, d, J = 8.5 Hz), 7.95(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.23(1H, d, J = 2.0 Hz), 8.24(1H, dd, J = 9.0 Hz, 3.0 Hz), 8.52(1H, d, J = 3.0 Hz), 10.60(1H, s).
2633	4-CF_3Ph-	-O-	-CO-	0	1.52(2H, m), 1.86(2H, brs), 2.54(1H, m), 3.05(2H, brs), 3.63(1H, brs), 4.31(1H, brs), 7.15(1H, d, J = 9.0 Hz), 7.16(2H, d, J = 8.5 Hz), 7.44(2H, d, J = 8.5 Hz), 7.94 (2H, d, J = 8.5 Hz), 8.17(2H, d, J = 8.5 Hz), 8.27(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.55(1H, d, J = 2.5 Hz), 10.67(1H, s).
2634	3,4-Cl_2Ph-	-O-	none	0	1.63-1.71(2H, m), 1.92(2H, brd, J = 10.0 Hz), 2.74(2H, t, J = 11.5 Hz), 3.58(2H, brd, J = 12.5 Hz), 6.96(1H, d, J = 9.0 Hz), 6.98(4H, s), 7.83(1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.14(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.21(1H, d, J = 2.0 Hz), 8.44(1H, d, J = 2.5 Hz), 10.50 (1H, s), 12.20(1H, brs).
2635	3,4-Cl_2Ph-	-O-	none	1	1.31-1.34(2H, m), 1.77(2H, brd, J = 11.5 Hz), 2.20(2H, t, J = 6.5 Hz), 2.64(2H, brt, J = 10.5 Hz), 3.61(2H, brd, J = 12.5 Hz), 6.96(1H, d, J = 9.0 Hz), 6.96(4H, s), 7.83 (1H, d, J = 8.5 Hz), 7.94(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.14(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.21(1H, d, J = 2.0 Hz), 8.44(1H, d, J = 2.5 Hz), 10.50(1H, s), 12.06(1H, brs).

Table 419



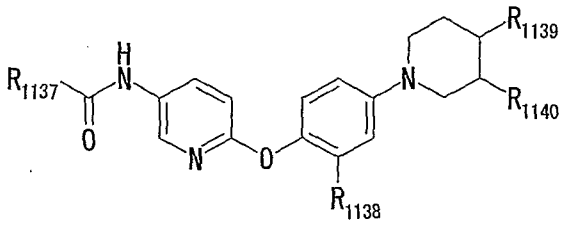
Example No.	R_{1134}	Xb_{70}	Xb_{71}	Xb_{72}	^{1}H NMR (DMSO-d_6) δppm
2636	4-CF_3Ph-	-O-	-CO-	-CH_2-	3.30(4H, brs), 3.77(4H, brs), 3.99(2H, s), 7.17(1H, d, J = 8.8 Hz), 7.21(2H, d, J = 8.6 Hz), 7.51(2H, d, J = 8.6 Hz), 7.94(2H, d, J = 8.0 Hz), 8.20(2H, d, J = 8.0 Hz), 8.29(1H, dd, J = 8.8 Hz, 2.6 Hz), 8.59(1H, d, J = 2.6 Hz), 10.79(1H, s).
2637	3,4-Cl_2Ph-	-O-	none	-CH_2-	2.71(4H, t, J = 5.0 Hz), 3.13(2H, s), 3.14(4H, t, J = 5.0 Hz), 6.96-7.00(5H, m), 7.82(1H, d, J = 8.5 Hz), 7.96(1H, dd, J = 8.5 Hz, 2.0 Hz), 8.16(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.24(1H, d, J = 2.0 Hz), 8.37(1H, s), 8.46(1H, d, J = 2.5 Hz), 10.62(1H, brs).
2638	4-CF_3Ph-	-N(CH_3)-	none	-CH_2-	2.64(4H, brs), 2.95(2H, s), 3.15(4H, brs), 3.33(3H, s), 6.42(1H, d, J = 9.1 Hz), 6.99(2H, d, J = 8.9 Hz), 7.13 (2H, d, J = 8.9 Hz), 7.75(1H, dd, J = 9.1 Hz, 2.5 Hz), 7.89(2H, d, J = 8.2 Hz), 8.17(2H, d, J = 8.2 Hz), 8.49 (1H, d, J = 2.5 Hz), 10.46(1H, s).
2639	4-CF_3Ph-	-O-	none	-CH_2-	2.72(4H, t, J = 5.0 Hz), 3.15(4H, t, J = 5.0 Hz), 3.20 (2H, s), 6.96-7.01(5H, m), 7.93(2H, d, J = 8.5 Hz), 8.16(2H, d, J = 8.5 Hz), 8.18(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.46(1H, d, J = 2.5 Hz), 10.60(1H, s).
2640	3,4-Cl_2Ph-	-O-	none	-CO-	3.13(2H, brs), 3.17(2H, s), 3.48(2H, brs), 3.71(2H, brs), 7.12(1H, d, J = 8.9 Hz), 7.15(2H, dd, J = 6.8 Hz, 2.1 Hz), 7.36(2H, dd, J = 6.8 Hz, 2.1 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J =8.4 Hz, 2.1 Hz), 8.22(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.23(1H, d, J = 2.1 Hz), 8.49 (1H, d, J = 2.7 Hz), 10.58(1H, s).

Table 420



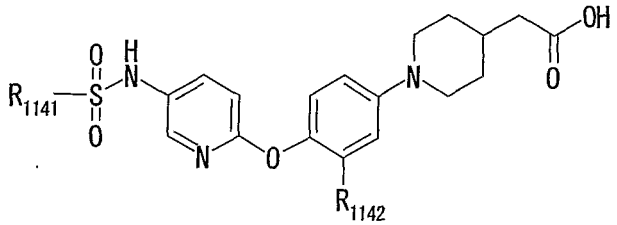
Example No.	R_{1135}	Xb_{73}	Xb_{74}	Xb_{75}	R_{1136}	^{1}H NMR (solvent) δppm
2641	4-CF_3PhCO-	none	none	none	benzyl	(CD_3OD) 3.47(8H, brs), 4.43(2H, s), 6.96 (1H, d, J = 8.9 Hz), 7.14 (1H, d, J = 8.9 Hz), 7.30(1H, dd, J = 8.9 Hz, 3.0 Hz), 7.51-7.59 (6H, m), 7.82(2H, d, J = 8.3 Hz), 8.12-8.18(3H, m), 8.36(1H, d, J = 2.5 Hz).
2642	3,4-Cl_2PhSO_2-	-N(C_2H_5)-	-CH_2-	-CO-	piperonyl	(DMSO-d_6) 1.11(3H, t, J = 7.0 Hz), 2.20-2.45 (4H, m), 3.30-3.55(8H, m), 4.22(2H, s), 5.99 (2H, s), 6.70-7.00(7H, m), 7.40-7.50(1H, m), 7.55-7.60(1H, m), 7.66(1H, d, J = 2.7 Hz), 7.84(1H, d, J = 8.4 Hz), 7.88(1H, d, J = 2.1 Hz), 10.27(1H, brs), 12.51(1H, brs).
2643	3,4-Cl_2PhNHCO-	-N(C_2H_5)-	-CH_2-	-CO-	piperonyl	(DMSO-d_6) 1.13(3H, t, J = 7.0 Hz), 2.20-2.50 (4H, m), 3.30-3.60(8H, m), 4.21(2H, s), 5.99 (2H, s), 6.60-7.05(7H, m), 7.30-7.40(1H, m), 7.47(1H, d, J = 8.8 Hz), 7.65-7.85(1H, m), 7.90(1H, d, J = 2.3 Hz), 8.06(1H, d, J = 2.6 Hz), 9.80(2H, brs), 12.40(1H, brs).

Table 421



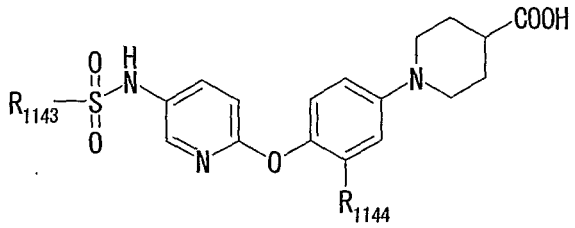
Example No.	R_{1137}	R_{1138}	R_{1139}	R_{1140}	^{1}H NMR (solvent) δppm
2644	3,4-Cl_2Ph-	-H	-H	-COOH	($CDCl_3$) 1.80(1H, m), 1.86-1.94(3H, m), 2.82(1H, m), 3.14(2H, m), 3.32 (2H, m), 6.94(1H, d, J = 9.0 Hz), 7.06(4H, s), 7.57 (1H, d, J = 8.5 Hz), 7.72(1H, d, J = 8.5 Hz), 7.93 (1H, brs), 7.99(1H, s), 8.18(1H, brd, J = 9.0 Hz), 8.26(1H, d, J = 2.5 Hz).
2645	4-CF_3Ph-	-H	-CH_2COOH	-H	($CDCl_3$) 1.44-1.50(2H, m), 1.90(2H, brd, J = 13.5 Hz), 1.94(1H, m), 2.36 (2H, d, J = 7.0 Hz), 2.75(2H, dt, J = 2.5 Hz, 12.0 Hz), 3.63(2H, brd, J = 12.0 Hz), 6.92(1H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.04(2H, d, J = 9.0 Hz), 7.72(1H, s), 7.78(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.19 (1H, dd, J = 9.0 Hz, 2.5 Hz), 8.25(1H, d, J = 2.5 Hz).
2646	3-CF_3Ph-	-H	-CH_2COOH	-H	($CDCl_3$) 1.46-1.49(2H, m), 1.89(2H, brd, J = 15.0 Hz), 1.95(1H, m), 2.36(2H, d, J = 7.0 Hz), 2.74(2H, dt, J = 2.0 Hz, 12.0 Hz), 3.63(2H, brd, J = 12.0 Hz), 6.92(1H, d, J = 9.0 Hz), 6.97(2H, d, J = 9.0 Hz), 7.05 (2H, d, J = 9.0 Hz), 7.66(1H, t, J = 7.5 Hz), 7.73(2H, brs), 7.84(1H, d, J = 7.5 Hz), 8.07 (1H, d, J = 7.5 Hz), 8.14(1H, brs), 8.17(1H, dd, J = 9.0 Hz, 2.5 Hz), 8.27(1H, d, J = 2.5 Hz).
2647	4-CF_3Ph-	-OCH_3	-CH_2COOH	-H	(DMSO-d_6) 1.31-1.36(2H, m), 1.77-1.81(3H, m), 2.21(2H, d, J = 7.4 Hz), 2.68-2.75(2H, m), 3.64(2H, brs), 3.68(3H, s), 6.52(1H, brs), 6.68(1H, brs), 6.89-6.96(2H, m), 7.92(2H, d, J = 8.4 Hz), 8.09-8.17(3H, m), 8.38(1H, d, J = 2.5 Hz), 10.54(1H, s), 12.10(1H, brs).
2648	4-CF_3Ph-	-H	-COOH	-H	($CDCl_3$ + CD_3OD) 1.82-1.96(2H, m), 2.04-2.09 (2H, m), 2.38-2.48(1H, m), 2.74-2.84(2H, m), 3.52-3.61(2H, m), 6.86(1H, dd, J = 8.9 Hz, 0.5 Hz), 6.96-7.05(4H, m), 7.69-7.76(2H, m), 8.06 (2H, d, J =8.1 Hz), 8.16(1H, d, J = 8.1 Hz), 8.23-8.33(2H, m).

Table 422



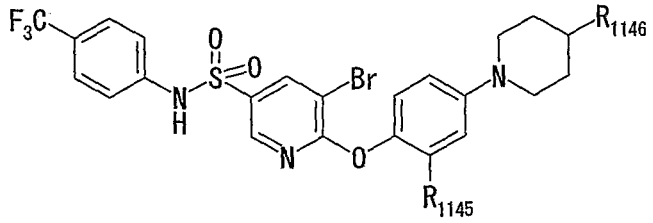
Example No.	R_{1141}	R_{1142}	^{1}H NMR (DMSO-d_6) δppm
2649	4-CF_3Ph-	-CH_3	1.41(2H, brs), 1.84-1.96(3H, m), 1.97(3H, s), 2.22(2H, d, J = 6.6 Hz), 2.55-2.75(2H, m), 3.58(2H, d, J = 11.9 Hz), 6.72-7.11(4H, m), 7.52(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.74(1H, d, J = 2.6 Hz), 7.89-7.99(4H, m), 10.49(1H, s), 12.14(1H, brs).
2650	3,4-Cl_2Ph-	-CH_3	1.38(2H, brs), 1.82-1.96(3H, m), 1.97(3H, s), 2.22(2H, d, J = 6.4 Hz), 2.55-2.75(2H, m), 3.59(2H, d, J = 11.9 Hz), 6.88-6.91(4H, m), 7.51(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.63(1H, dd, J = 8.4 Hz, 2.1 Hz), 7.74(1H, d, J = 2.8 Hz), 7.83-7.87(2H, m), 10.38(1H, s), 12.12(1H, brs).
2651	3,4-Cl_2Ph-	-H	1.30-1.37(2H, m), 1.75-1.91(3H, m), 2.20(2H, d, J = 6.9 Hz), 2.51-2.62(2H, m), 3.60(2H, d, J = 12.0 Hz), 6.87-6.94(5H, m), 7.50(1H, dd, J = 8.7 Hz, 2.8 Hz), 7.62(1H, dd, J = 8.6 Hz, 2.3 Hz), 7.77(1H, d, J = 2.8 Hz), 7.84-7.89(2H, m), 10.39(1H, s), 12.09(1H, brs).
2652	4-CF_3Ph-	-H	1.29-1.33(2H, m), 1.74-1.91(3H, m), 2.19(2H, d, J = 6.8 Hz), 2.63-2.75(2H, m), 3.59(2H, d, J = 12.2 Hz), 6.86-6.93(5H, m), 7.50(1H, dd, J = 8.9 Hz, 2.8 Hz), 7.77(1H, d, J = 2.6 Hz), 7.89-7.99(4H, m), 10.47(1H, s), 12.09(1H, brs).
2653	4-CF_3Ph-	-OCH_3	1.41(2H, brs), 1.81-1.85(3H, m), 2.25(2H, d, J = 6.4 Hz), 2.55-2.79(2H, m), 3.64(3H, s), 3.68(2H, brs), 6.73-6.95(4H, m), 7.51(1H, dd, J = 8.7 Hz, 2.5 Hz), 7.73(1H, d, J = 2.6 Hz), 7.92-8.02(4H, m), 10.45(1H, s), 12.14(1H, brs).
2654	3,4-Cl_2Ph-	-OCH_3	1.42(2H, brs), 1.79-1.91(3H, m), 2.23(2H, d, J = 6.6 Hz), 2.76-2.83(2H, m), 3.63(5H, brs), 6.63-6.98(4H, m), 7.48(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.63(1H, dd, J = 8.4 Hz, 2.0 Hz), 7.71(1H, d, J = 2.8 Hz), 7.85-7.88(2H, m), 10.36(1H, s), 12.33(1H, brs).

Table 423



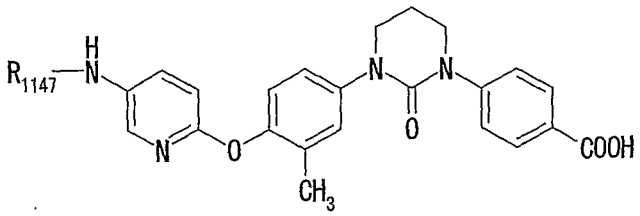
Example No.	R_{1143}	R_{1144}	^{1}H NMR (DMSO-d_6) δppm
2655	4-CF_3Ph-	-CH_3	1.81-1.99(4H, m), 2.00(3H, s), 2.41-2.44(1H, m), 2.75(2H, brs), 3.58(2H, d, J = 12.2 Hz), 6.91-7.20(4H, m), 7.53(1H, dd, J = 8.9 Hz, 2.6 Hz), 7.75(1H, d, J = 2.6 Hz), 7.90-7.99(4H, m), 10.52(1H, s), 12.41(1H, brs).
2656	3,4-Cl_2Ph-	-CH_3	1.63-1.71(2H, m), 1.91-1.94(2H, m), 1.95(3H, s), 2.41-2.48(1H, m), 2.75-2.80(2H, m), 3.58(2H, d, J = 12.9 Hz), 6.85-6.89(3H, m), 7.50(1H, dd, J = 8.7 Hz, 2.6 Hz), 7.68-7.79(2H, m), 7.81-7.98(4H, m), 10.43(1H, s), 12.35(1H, brs).
2657	3,4-Cl_2Ph-	-H	1.74(2H, brs), 1.93-1.98(2H, m), 2.49-2.51(2H, m), 2.88(1H, brs), 3.55-3.60(2H, m), 6.90-7.01(5H, m), 7.50-7.89(5H, m), 10.41(1H, s), 12.13(1H, brs).
2658	4-CF_3Ph-	-H	1.66-1.71(2H, m), 1.88-1.92(2H, m), 2.34-2.42(1H, m), 2.68-2.76(2H, m), 3.56(2H, d, J = 12.4 Hz), 6.85-6.92(5H, m), 7.48(1H, d, J = 2.8 Hz), 7.51(1H, d, J = 2.8 Hz), 7.77-7.99(4H, m), 10.47(1H, s), 12.21(1H, s).

Table 424



Example No.	R_{1145}	R_{1146}	^{1}H NMR (DMSO-d_6) δppm
2659	-H	-CH_2COOH	1.26-1.32(2H, m), 1.74-1.91(3H, m), 2.20(2H, d, J = 6.6 Hz), 2.66(2H, t, J = 11.0 Hz), 3.63(2H, d, J = 12.5 Hz), 6.93-7.03(4H, m), 7.13-7.35(2H, m), 7.65(2H, d, J = 8.6 Hz), 8.42(1H, d, J = 2.3 Hz), 8.47(1H, d, J = 2.3 Hz), 11.00(1H, s), 12.07(1H, brs).
2660	-CH_3	-CH_2COOH	1.30-1.41(2H, m), 1.80-2.00(3H, m), 1.99(3H, s), 2.20(2H, d, J = 6.6 Hz), 2.68-2.76(2H, m), 3.62(2H, d, J = 12.2 Hz), 6.88-6.96(3H, m), 7.33(2H, d, J = 8.2 Hz), 7.65(2H, d, J = 8.6 Hz), 8.44(2H, s), 11.00(1H, s), 12.10(1H, brs).
2661	-H	-COOH	1.63-1.70(2H, m), 1.88-1.92(2H, m), 2.41-2.45(1H, m), 2.71-2.79(2H, m), 3.61(2H, d, J = 12.5 Hz), 6.93-7.00(4H, m), 7.31(2H, d, J = 8.6 Hz), 7.63(2H, d, J = 8.7 Hz), 8.40-8.47(2H, m), 10.63(1H, s), 12.21(1H, s).

Table 425



Example No.	R_{1147}	^{1}H NMR (DMSO-d_6) δppm
2662	4-CF_3PhCO-	2.08(3H, s), 2.09-2.32(2H, m), 3.65-3.93(4H, m), 7.01(1H, d, J = 8.6 Hz), 7.06(1H, d, J = 8.9 Hz), 7.19(1H, dd, J = 2.6 Hz, 8.6 Hz), 7.29(1H, d, J = 2.6 Hz), 7.42-7.51(2H, m), 7.81-7.98(4H, m), 8.10-8.18(2H, m), 8.21(1H, dd, J = 2.6 Hz, 8.9 Hz), 8.43(1H, d, J = 2.6 Hz), 10.60(1H, s), 12.60-12.91(1H, m).
2663	3,4-Cl_2PhSO_2-	1.99(3H, s), 2.07-2.31(2H, m), 3.60-3.91(4H, m), 6.97(1H, d, J = 8.5 Hz), 6.98(1H, d, J = 8.8 Hz), 7.16(1H, dd, J = 2.4 Hz, 8.5 Hz), 7.25(1H, d, J = 2.2 Hz), 7.40-7.51(2H, m), 7.54 (1H, dd, J = 2.8 Hz, 8.8 Hz), 7.62(1H, dd, J = 2.2 Hz, 8.5 Hz), 7.75(1H, d, J = 2.8 Hz), 7.79-7.93(4H, m).

Example 2664

Production of (4-{5-[(4-trifluoromethylphenylamino)-methyl]-pyridin-2-yloxy}phenyl)(4-piperonylpiperazin-1-yl)methanone

Methanesulfonic acid 6-[4-(4-piperonylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl ester (0.433 g, 0.824 mmol) and 4-trifluoromethyl phenylamine (0.310 mL, 2.47 mmol) were mixed together, and the resulting mixture was stirred for 2 hours at 100°C. The formed yellow mass was stirred together with a saturated sodium bicarbonate solution, ethyl acetate and THF (20 ml of each). The organic layer was collected, washed with brine, dried over anhydrous magnesium sulfate, and evaporated under reduced pressure. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 50 : 1), to thereby yield 0.236 g of the title

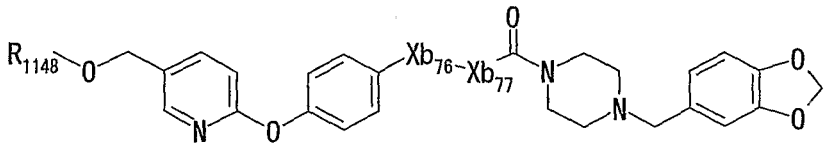
compound.

Appearance: Pale yellow amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.44(4H, brs), 3.45(2H, s), 3.57(2H, brs), 3.75(2H, brs), 4.30-4.35(1H, m), 4.36(2H, s), 5.95(2H, s), 6.63(2H, d, J = 8.7 Hz), 6.74-6.77(2H, m), 6.85(1H, s), 6.93(1H, d, J = 8.4 Hz), 7.15(2H, d, J = 8.4 Hz), 7.39-7.47(4H, m), 7.71(1H, dd, J = 2.5 Hz, 8.4 Hz), 8.18(1H, d, J = 2.3 Hz).

The following compounds were produced in the same manner as in Example 2664.

Table 426



Example No.	R_{1148}	Xb_{76}	Xb_{77}	Form	^{1}H NMR (solvent) δppm
2665	3,4-Cl_2Ph-	-N(CH_3)-	-CH_2-	free	($CDCl_3$) 2.42-2.44(4H, m), 3.03(3H, s), 3.43(2H, brs), 3.49-3.50(2H, m), 3.63(2H, brs), 4.08(2H, s), 4.94(2H, s), 5.94(2H, s), 6.70(2H, d, J = 9.2 Hz), 6.74(2H, brs), 6.80(1H, dd, J = 8.9 Hz, 2.8 Hz), 6.83-6.86(2H, m), 7.01(2H, d, J = 9.1 Hz), 7.05(1H, d, J = 2.8 Hz), 7.32(1H, d, J = 8.9 Hz), 7.86(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.19(1H, d, J = 1.8 Hz).
2666	4-CF_3Ph-	-N(CH_3)-	-CH_2-	free	($CDCl_3$) 2.41-2.44(4H, m), 3.03(3H, s), 3.43(2H, brs), 3.49(2H, brs), 3.63(2H, brs), 4.08(2H, s), 5.02(2H, s), 5.95(2H, s), 6.69-6.74(4H, m), 6.85-6.88(2H, m), 7.00-7.03(4H, m), 7.56(2H, d, J = 8.6 Hz), 7.72(1H, dd, J = 8.6 Hz, 2.5 Hz), 8.22(1H, d, J = 2.3 Hz).
2667	4-CF_3Ph-	none	none	hydro-chloride	(DMSO-d_6) 3.10-3.42(8H, m), 4.24(2H, brs), 5.20(2H, s), 6.07(2H, s), 6.97-7.04(2H, m), 7.15 (1H, d, J = 8.6 Hz), 7.21-7.24(5H, m), 7.52(2H, d, J = 8.6 Hz), 7.68(2H, d, J = 8.7 Hz), 8.01(1H, dd, J = 2.5 Hz, 8.4 Hz), 8.29(1H, d, J = 2.3 Hz), 11.00(1H, brs).

Example 2668

Production of 2-(methyl-{4-[5-(5-trifluoromethyl-pyridin-2-yloxymethyl)pyridin-2-yloxy]phenyl}amino)-1-(4-piperonylpiperazin-1-yl)ethanone

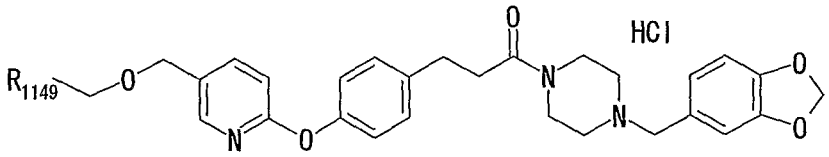
2-{[4-(5-hydroxymethylpyridin-2-yloxy)phenyl]methylamino}-1-(4-piperonylpiperazin-1-yl)ethanone (0.98 g, 2.0 mmol) was dissolved in DMF (30 mL). To the resulting solution was added 60% sodium hydride (60%, 88 mg, 2.2 mmol) under ice cooling, and this solution was stirred for 30 minutes at 0°C. To the reaction solution was added 2-chloro-5-(trifluoromethyl)pyridine (0.36 g, 2.0 mol), and this solution was stirred under a nitrogen atmosphere for 3 hours at 60°C. The resulting reaction solution was concentrated under reduced pressure. To the residue was added ethyl acetate, and this solution was washed with water and brine. The organic layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (*n*-hexane : ethyl acetate = 1 : 5), to thereby yield 0.68 g of the title compound.

Appearance: White powder

^{1}H NMR ($CDCl_3$) δ 2.41-2.44(4H, m), 3.02(3H, s), 3.43(2H, s), 3.48(2H, brs), 3.63(2H, brs), 4.08(2H, s), 5.37(2H, s), 5.94(2H, s), 6.68-6.77(4H, m), 6.81-6.84(3H, m), 7.00(2H, d, J = 9.1 Hz), 7.72-7.79(2H, m), 8.27(1H, d, J = 2.3 Hz), 8.44(1H, brs).

The following compounds were produced in the same manner as in Example 2668.

Table 427



Example No.	R_{1149}	mp (°C)
2669	4-CF_3Ph-	165.0 - 166.0
2670	3-CF_3Ph-	163.0 - 165.0
2671	3,4-Cl_2Ph-	160.0 - 161.5

Example 2672

3,4-dichloro-N-{6-[4-(3,5-dioxoisoxazolidine-4-ylidenemethyl)phenoxy]pyridin-3-yl}benzamide

To a solution of hydroxylamine hydrochloride (500 mg, 1.0 mmol) in water (0.2 mL) were added sodium carbonate (1.05 g, 9.91 mmol) and a solution of 2-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]benzylidene}malonic acid dimethyl ester (500 mg, 1.0 mmol) in THF (5 mL). To the resulting solution was subsequently added methanol (5 mL) and stirred for 8 hours at 60°C. The reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography

(dichloromethane : methanol = 30 : 1). To the resulting white precipitate was added ethyl acetate, filtered, and the filtrate was washed with diethyl ether, to thereby yield 105 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 7.12(1H, d, J = 8.9 Hz), 7.14(2H, d, J = 8.8 Hz), 7.63(2H, d, J = 8.8 Hz), 7.84(1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.15(1H, s), 8.22(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.22(1H, d, J = 2.0 Hz), 8.51(1H, d, J = 2.6 Hz), 10.57(1H, s), 11.16(1H, s).

Example 2673

Production of 3,4-dichloro-N-{6-[4-(5-methyl-[1,2,4]oxadiazol-3-ylmethyl)phenoxy]pyridin-3-yl}benzamide monohydrochloride

To 3,4-dichloro-N-{6-[4-(N-acetoxycarbamimidoylmethyl)phenoxy]pyridin-3-yl}benzamide (340 mg, 0.788 mmol) was added acetic acid (4 mL), and the resulting solution was stirred under reflux for 10 minutes. This reaction solution was concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and the resulting solution was extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (chloroform : methanol = 40 : 1),

and the obtained reside was dissolved in ethyl acetate (5 mL). To this solution was added a solution of 4 N hydrogen chloride in ethyl acetate until the compound no longer precipitated out. The obtained white powder was filtered, and washed with diethyl ether, to thereby yield 154 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.55(3H, s), 4.05(2H, s), 7.07(1H, d, J = 8.7 Hz), 7.07(2H, d, J = 8.6 Hz), 7.33(2H, d, J = 8.6 Hz), 7.83(1H, d, J = 8.4 Hz), 7.96(1H, dd, J = 8.4 Hz, 2.0 Hz), 8.21(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.24(1H, d, J = 2.0 Hz), 8.48(1H, d, J = 2.6 Hz), 10.62(1H, s).

Example 2674

Production of 1-(3-{4-[5-(3,4-dichlorobenzoylamino)-2-pyridylmethyl]phenyl}propionyl)-4-piperonylpiperazine monohydrochloride

To a solution of ethyl 3-(4-{5-[bis(3,4-dichlorobenzoyl)amino]-2-pyridylmethyl}phenyl) propionate (177 mg, 0.281 mmol) in THF (5 mL) and ethanol (5 mL) were added 5 M aqueous sodium hydroxide (0.0929 mL, 0.463 mmol) and water (1 mL), and the resulting solution was refluxed for 1 hour. To this reaction solution was added 5 M hydrochloric acid (0.12 mL), and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was dissolved in DMF (3 mL), and to the

resulting solution were then added 1-piperonylpiperazine (102 mg, 0.463 mmol), triethylamine (0.137 mL, 0.983 mmol) and diethyl cyanophosphonate (0.0703 mL, 463 mmol), and stirred for 1.5 hours at room temperature. Water was added to the resulting reaction solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 70 : 1 → 40 : 1 → 20 : 1), to thereby yield 44.1 mg of a free form. This free form was dissolved in ethanol (5 mL) and 5 M hydrochloric acid (0.03 mL) by heating. The solvent was then evaporated, and the obtained solid was recrystallized from water-containing isopropanol, to thereby yield 19.6 mg of the title compound.

Appearance: Pale yellow powder

Melting point: 181-183°C

Example 2675

Production of N-(6-{4-[4-(5-oxo-4,5-dihydro-[1,3,4]oxadiazole-2-ylmethyl)piperazine-1-carbonyl]-phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide monooxalate

To a suspension of N-{6-[4-(4-hydrazinocarbonylmethylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-4-

trifluoromethylbenzamide trihydrochloride (300 mg, 0.46 mmol) in THF (7 mL) was added triethylamine (0.29 mL, 2.08 mmol), and the resulting solution was stirred for 10 minutes at room temperature. To the solution was added N,N'-carbonyldiimidazole (97 mg, 0.60 mmol) under ice cooling, and the resulting solution was stirred for 1 hour at room temperature. The reaction solution was concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with ethyl acetate. The ethyl acetate layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was then purified by silica gel column chromatography (chloroform : methanol = 15 : 1). The obtained residue was dissolved in ethanol, and to the resulting solution was added oxalic acid. Ethanol was evaporated under reduced pressure, after which the solidified white substance was filtered, and washed with diethyl ether, to thereby yield 140 mg of the title compound.

Appearance: White powder

^{1}H NMR (DMSO-d_6) δ 2.31-2.69(4H, m), 3.53(2H, s), 3.53(4H, brs), 7.16(1H, d, J = 8.9 Hz), 7.17(2H, d, J = 8.5 Hz), 7.45(2H, d, J = 8.5 Hz), 7.94(2H, d, J = 8.1 Hz), 8.17(2H, d, J = 8.1 Hz), 8.26(1H, dd, J = 8.9 Hz, 2.7 Hz), 8.55(1H, d, J = 2.7 Hz), 10.67(1H, s), 12.27(1H, s).

Example 2676

Production of 4-(4-{4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]phenyl}-4-hydroxybutyryl)morpholine

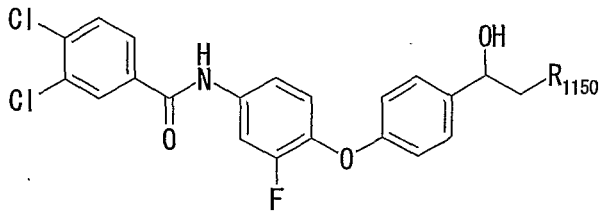
To a suspension of 4-(4-{4-[4-(3,4-dichlorobenzoylamino)-2-fluorophenoxy]phenyl}-4-oxobutyryl)morpholine (1.00 g, 1.83 mmol) in THF (20 mL) and methanol (5 mL) was added sodium borohydride (0.0694 g, 1.83 mmol), and the resulting solution was stirred for 1 hour at room temperature. To this reaction solution were added water and saturated aqueous ammonium chloride, and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1). The obtained solid was recrystallized from water-containing isopropanol, to thereby yield 0.850 g of the title compound.

Appearance: White powder

Melting point: 108-111°C

The following compounds were produced in the same manner as in Example 2676.

Table 428



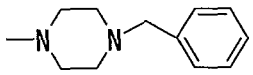
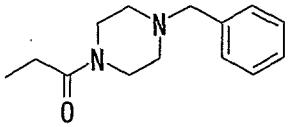
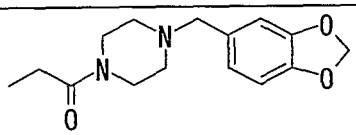
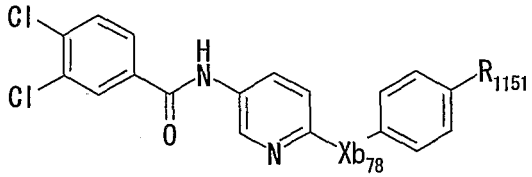
Example No.	R_{1150}	Form	mp (°C)
2677	morpholino	free	142-145
2678		free	150-152
2679		hydro-chloride	197-199
2680		hydro-chloride	222-225

Table 429



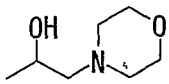
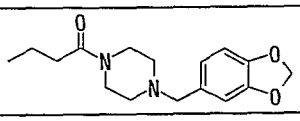
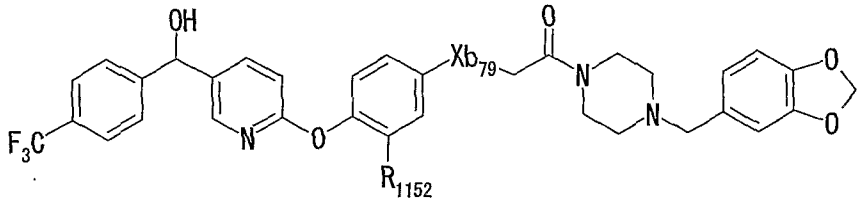
Example No.	Xb_{78}	R_{1151}	Form	mp (°C) or ^{1}H NMR
2681	-O-		free	^{1}H NMR (DMSO-d_6) δ 2.38-2.54(6H, m), 3.58(4H, t, J = 4.5 Hz), 4.73-4.77(1H, m), 5.06 (1H, d, J = 3.8 Hz), 7.04-7.07(3H, m), 7.38(2H, d, J = 8.4 Hz), 7.84 (1H, d, J = 8.4 Hz), 7.95(1H, dd, J = 8.4 Hz, 1.2 Hz), 8.22(1H, d, J = 2.0 Hz), 8.19(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.48(1H, d, J = 2.6 Hz), 10.55(1H, brs).
2682	-CH(OH)-		oxalate	mp 102-108

Table 430



Example No.	R_{1152}	Xb_{79}	^{1}H NMR ($CDCl_3$) δppm
2683	-OCH_3	-CH_2-	2.30-2.39(4H, m), 2.57-2.62(2H, m), 2.90-2.95(2H, m), 3.36-3.43(4H, m), 3.58-3.61(2H, m), 3.70(3H, s), 5.83(1H, s), 5.93(2H, s), 6.69-6.88(6H, m), 6.99(1H, d, J = 8.1 Hz), 7.47-7.62(5H, m), 8.07(1H, d, J = 2.3 Hz).
2684	-H	-N(CH_3)-	2.38-2.43(4H, m), 2.99(3H, s), 3.42-3.60(6H, m), 4.05(2H, s), 5.77(1H, s), 5.94(2H, s), 6.64-6.84(6H, m), 6.93-6.99(2H, m), 7.47(2H, d, J = 8.1 Hz), 7.53-7.59(3H, m), 8.10(1H, d, J = 2.1 Hz).

Example 2685

Production of {6-[4-(4-piperonylpiperazin-1-ylmethyl)phenoxy]pyridin-3-ylmethyl}-(4-trifluoromethylphenyl)amine

To a suspension of lithium aluminum hydride (0.106 g, 2.80 mmol) in THF (10 mL) was added dropwise a solution of 6-[4-(4-piperonylpiperazine-1-carbonyl)-phenoxy]-N-(4-trifluoromethylphenyl)nicotinamide (0.423 g, 0.700 mmol) in THF (10 mL) under ice cooled stirring. Once the entire amount was added dropwise, the solution temperature was slowly raised, and stirred under reflux for 2 hours. After cooling, ice water (50 mL) was added to the solution, and the mixture was extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane :

methanol = 40 : 1), to thereby yield 0.125 g of the title compound.

Appearance: Pale Yellow oil

MS 576(M^+)

The following compounds were produced in the same manner as in Example 2685.

Example 2686

N-[6-(2-fluoro-4-{methyl[2-(4-piperonylpiperazin-1-yl)ethyl]amino}phenoxy)pyridin-3-yl]-3,4-dichlorobenzenesulfonamide

^{1}H NMR ($CDCl_3$) δ 2.50-2.55(10H, m), 2.92(3H, s), 3.41-3.45(4H, m), 5.93(2H, s), 6.39-6.49(2H, m), 6.73-6.74(2H, m), 6.84-6.89(2H, m), 6.99(1H, t, J = 9.1 Hz), 7.42-7.70(4H, m), 7.81(1H, brs).

Example 2687

Production of 3-(3-methyl-4-{5-[2-(4-trifluoromethylphenyl)ethyl]pyridin-2-yloxy}phenyl)-1-piperonyltetrahydropyrimidin-2-one hydrobromide

To a solution of 3-(3-methyl-4-{5-[(*E*)-2-(4-trifluoromethylphenyl)vinyl]pyridin-2-yloxy}phenyl)-1-piperonyltetrahydropyrimidin-2-one (0.16 g, 0.27 mmol) in ethyl acetate (15 mL) was added 5% platinum-carbon (0.05 g) under a nitrogen atmosphere, and the resulting solution was then stirred under a hydrogen atmosphere for 4.5 hours at room temperature. The resulting

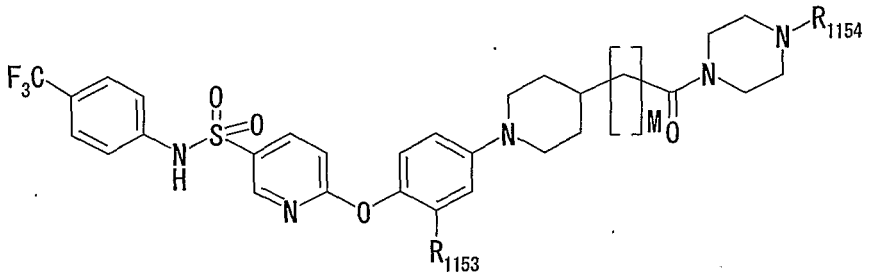
reaction solution was filtered through Celite, and the filtrate was concentrated under reduced pressure. The residue was purified by silica gel chromatography (ethyl acetate : = *n*-hexane 1 : 4-1 : 2), and to the resulting product was added hydrobromide, to thereby yield 50 mg of the title compound.

Appearance:Colorless amorphous powder

^{1}H NMR (DMSO-d_6) δ 1.85-2.09(5H, m), 2.77-3.02(4H, m), 3.15-3.33(2H, m), 3.55-3.70(2H, m), 3.75-4.15(1H, m), 4.40(2H, s), 5.99(2H, s), 6.76(1H, dd, J = 1.5 Hz, 7.8 Hz), 6.80-6.98(4H, m), 7.10(1H, dd, J = 2.6 Hz, 8.5 Hz), 7.19(1H, d, J = 2.6 Hz), 7.44(2H, d, J = 8.1 Hz), 7.62(2H, d, J = 8.1 Hz), 7.71(1H, dd, J = 2.4 Hz, 8.4 Hz), 7.91(1H, d, J = 2.4 Hz).

The following compounds were produced in the same manner as in Reference Example 673.

Table 431



Example No.	R_{1153}	R_{1154}	M	^{1}H NMR ($CDCl_3$) δppm
2688	-H	piperonyl	1	1.31-1.45(2H, m), 1.84-2.02(3H, m), 2.30(2H, d, J = 6.8 Hz), 2.41-2.43(4H, m), 2.72(2H, t, J = 12.2 Hz), 3.43(2H, s), 3.44-3.65(6H, m), 5.95(2H, s), 6.71-6.77(2H, m), 6.85-7.00(6H, m), 7.21-7.26(3H, m), 7.51(2H, d, J = 8.6 Hz), 7.98(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.60(1H, d, J = 2.6 Hz).
2689	-H	-H	1	1.38-1.46(2H, m), 1.84-2.00(3H, m), 2.31(2H, d, J = 6.8 Hz), 2.71(2H, t, J = 12.2 Hz), 2.86-2.89(4H, m), 3.48-3.63(7H, m), 6.86-6.99(5H, m), 7.23-7.29(3H, m), 7.49(2H, d, J = 8.4 Hz), 7.97(1H, dd, J = 8.9 Hz, 2.6 Hz), 8.60(1H, d, J = 2.1 Hz).
2690	-CH_3	piperonyl	1	1.36-1.40(2H, m), 1.82-2.02(3H, m), 2.03(3H, s), 2.30(2H, d, J = 6.8 Hz), 2.41-2.43(4H, m), 2.68(2H, t, J = 12.0 Hz), 3.43(2H, s), 3.49-3.65(6H, m), 5.94(2H, s), 6.74-6.89(8H, m), 7.24(2H, d, J = 8.2 Hz), 7.49(2H, d, J = 8.6 Hz), 7.99(1H, dd, J = 8.7 Hz, 2.5 Hz), 8.58(1H, d, J = 2.1 Hz).
2691	-H	piperonyl	0	1.78-2.03(4H, m), 2.46(4H, brs), 2.55-2.77(3H, m), 3.46(2H, s), 3.55(2H, brs), 3.67(4H, brs), 5.95(2H, s), 6.75-6.78(2H, m), 6.85-7.01(6H, m), 7.21-7.26(3H, m), 7.52(2H, d, J = 8.6 Hz), 7.98(1H, dd, J = 8.7 Hz, 2.6 Hz), 8.60(1H, d, J = 2.5 Hz).

Example 2692

Production of 1-[3-(4-{1-[5-(3,4-dichlorobenzoylamino)-2-pyridyl]-1-hydroxyimino}methylphenyl)propionyl]-4-piperonylpiperazine

To a solution of 1-(3-{4-[5-(3,4-dichlorobenzoylamino)pyridine-2-carbonyl]phenyl}propionyl)-4-piperonylpiperazine (0.330 g, 0.511 mmol) in pyridine (7 mL) was added hydroxylamine hydrochloride (53.3 mg, 0.767 mmol), and the resulting solution was refluxed

for 0.5 hours. The reaction solution was concentrated under reduced pressure, and to the residue was added brine. This solution was extracted with dichloromethane. The dichloromethane layer was dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 15 : 1), whereby 0.225 g of the title compound was obtained as a mixture of the syn form and the anti form (1 : 1) of the oxime.

Appearance: Colorless amorphous powder

^{1}H NMR ($CDCl_3$) δ 2.21-2.39(4H, m), 2.49-2.60(2H, m), 2.78-2.90(2H, m), 3.29-3.44(4H, m), 3.55(2H, s), 5.90(2H, s), 6.62-6.73(2H, m), 6.80(1H, s), 7.07(1H, d, J = 7.7 Hz), 7.12(1H, d, J = 7.7 Hz), 7.15-7.30(2.5H, m), 7.39(0.5H, d, J = 8.4 Hz), 7.42(0.5H, d, J = 8.4 Hz), 7.45-7.51(0.5H, m), 7.62-7.74(1H, m), 7.94(0.5H, d, J = 2.0 Hz), 7.99(0.5H, d, J = 2.0 Hz), 8.09-8.28(1H, m), 8.62(0.5H, s), 8.85(0.5H, s), 9.40(0.5H, brs), 9.62(0.5H, brs), 10.21(0.5H, brs), 13.85(0.5H, brs).

Example 2693

Production of 4-(2-oxo-3-{4-[5-(4-trifluoromethyl-benzoylamino)pyridin-2-yloxy]phenyl}propionyl)-piperazine-1-carboxylic acid *t*-butyl ester

To a solution of 4-(2-hydroxy-3-{4-[5-(4-trifluoromethylbenzoylamino)pyridin-2-

yloxy]phenyl}propionyl)piperazine-1-carboxylic acid *t*-butyl ester (0.58 g, 0.94 mmol) in dichloromethane (4 mL) was added a Dess-Martin reagent (0.8 g, 1.89 mmol), and the resulting solution was then stirred under a nitrogen gas flow for 4 hours at room temperature. The reaction solution was concentrated under reduced pressure. To the residue was added 1 N aqueous sodium hydroxide (50 mL), and extracted with ethyl acetate. The ethyl acetate layer was washed with brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel chromatography (dichloromethane : methanol = 50 : 1), to thereby yield 0.31 g of the title compound.

Appearance: Yellow powder

^{1}H NMR ($CDCl_3$) δ 1.41(9H, s), 2.99-3.22(4H, m), 3.25-3.41(2H, m), 3.42-3.60(2H, m), 4.04(2H, s), 6.97(1H, d, J = 8.9 Hz), 7.10(2H, d, J = 8.4 Hz), 7.27(2H, d, J = 8.4 Hz), 7.73(2H, d, J = 8.0 Hz), 7.99(2H, d, J = 8.0 Hz), 8.13(1H, d, J = 2.8 Hz), 8.30(1H, dd, J = 8.9 Hz, 2.8 Hz), 8.45(1H, brs).

Example 2694

Production of 3,4-dichloro-N-{3-fluoro-4-[4-(1-hydroxy-2-morpholine-4-ylethyl)phenoxy]phenyl}benzamide

3,4-Dichloro-N-{3-fluoro-4-[4-(1-hydroxy-2-morpholine-4-ylethyl)phenoxy]phenyl}benzamide (37.4 g) was recrystallized from ethanol (700 mL) to yield 34.34 g of the title compound.

Appearance: White powder

Melting point: 175-176°C

Example 2695

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzenesulfonamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzenesulfonamide (8.15 g) was recrystallized from ethanol (60 mL) to yield 7.78 g of the title compound.

Appearance: White powder

Melting point: 163-166°C

Example 2696

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide (5.1 g, 7.7 mmol) was recrystallized from acetone (15 mL) to yield 3.7 g of the title compound.

Appearance: White powder

Melting point: 128-131°C

Example 2697

Production of N-{6-[4-(4-benzylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-4-trifluoromethyl-benzamide

N-{6-[4-(4-Benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide (78.86 g) was recrystallized from ethanol (530 mL) to yield 96.66 g of the title compound.

Appearance: White needles

Melting point: 177.6-179.2°C

Example 2698

Production of N-(6-{4-[4-(2-oxo-1,2,3,4-tetrahydro-quinoline-6-ylmethyl)piperazine-1-carbonyl]phenoxy}-pyridin-3-yl)-4-trifluoromethylbenzamide

To a solution of 4-[5-(4-trifluoromethylbenzoylamino)pyridin-2-yloxy]benzoic acid (4.30 g, 10.7 mmol) in DMF (150 mL) were added 1-(2-oxo-1,2,3,4-tetrahydroquinoline-6-ylmethyl)-piperazine (2.6 g, 10.7 mmol), 1-hydroxybenzotriazole monohydrate (1.64 g, 10.7 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (2.46 g, 12.8 mmol) under ice cooling, and the resulting solution was stirred for 1 hour under ice cooling and for 17 hours at room temperature. This reaction solution was concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with ethyl acetate. The ethyl

acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was recrystallized from ethyl acetate, to thereby yield 5.24 g of the title compound.

Appearance: White powder

Melting point: 250.5-252.5°C

Example 2699

Production of N-(6-{4-[4-(4-benzylpiperidine-1-carbonyl)piperazine-1-carbonyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide

To a solution of 1-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]benzoyl}piperidine-4-carboxylic acid (4.5 g, 8.8 mmol) in DMF (88 mL) were added 1-benzylpiperazine (1.83 mL, 10.5 mmol), 1-hydroxybenzotriazole monohydrate (1.61 g, 10.5 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (2.02 g, 10.5 mmol) under ice cooling, and the resulting solution was stirred overnight at room temperature. To this reaction solution was added a saturated sodium bicarbonate solution, and the resulting solution was extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was recrystallized from isopropyl alcohol (700 mL), to thereby yield 3.2 g of

the title compound.

Appearance: White powder

Melting point: 223-225°C

Example 2700

Production of N-[6-(4-{[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

To a suspension of 1-(4-benzylpiperazin-1-yl)-2-{methyl[3-methyl-4-(5-nitropyridin-2-yloxy)phenyl]amino}ethanone (2.85 g, 6.0 mmol) in ethyl acetate (30 mL) was added 5% platinum-carbon (0.30 g) under a nitrogen atmosphere, and the resulting solution was stirred for 3 hours at 40°C under a hydrogen atmosphere. The platinum-carbon was separated off with Celite, and the filtrate was concentrated. The residue was dissolved in THF (30 mL), and to this solution was added triethylamine (1.26 mL, 9.1 mmol) under ice cooling. To the resulting solution was then added dropwise 4-(trifluoromethyl)benzoyl chloride (1.16 mL, 7.8 mmol). This reaction solution was stirred overnight, then a saturated sodium bicarbonate solution was added, and the mixture was extracted with ethyl acetate. The ethyl acetate layer was washed with water, and then dried over anhydrous sodium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (dichloromethane : methanol = 20 : 1). The resulting

product was then recrystallized from a mixed solvent consisting of diisopropyl ether-acetone, to thereby yield 1.37 g of the title compound.

Appearance: White powder

Melting point: 112-113°C

Example 2701

Production of (4-benzylpiperazin-1-yl)(4-{5-[methyl(4-trifluoromethylbenzyl)amino]pyridin-2-yloxy}phenyl)-methanone

To a solution of (4-benzylpiperazin-1-yl){4-[5-(4-trifluoromethylbenzylamino)pyridin-2-yloxy]phenyl}methanone (5.40 g, 9.88 mmol) in methanol (150 mL) were added 37% aqueous formaldehyde (2.8 mL), sodium cyanoborohydride (1.86 g, 29.6 mmol) and acetic acid (1.7 mL) under ice cooling, and the resulting solution was stirred at room temperature for 2 hours. The solvent was evaporated under reduced pressure. Water was added to the residue, and this solution was neutralized with a saturated sodium bicarbonate solution, and extracted with chloroform. The organic layer was washed with water, and then dried over anhydrous magnesium sulfate. The solvent was evaporated, and the residue was purified by silica gel column chromatography (chloroform : methanol = 60 : 1). To the resulting product was then added a solution of 4 M hydrogen chloride in ethyl acetate until the resulting solution had a pH of 1. The precipitates

were collected by filtration and recrystallized from ethanol (80 mL), to thereby yield 2.5 g of the title compound.

Appearance: White powder

Melting point: 180-183.5°C

Example 2702

Production of 4-piperonylpiperazine-1-carboxyl 4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]benzylamide hydrochloride

To a solution of 4-piperonylpiperazine-1-carboxyl 4-(5-aminopyridin-2-yloxy)benzylamide (2.48 g, 5.4 mmol) in THF (50 mL) were added triethylamine (0.9 mL, 6.5 mmol) and 3,4-dichlorobenzoyl chloride (1.13 g, 5.4 mmol) under ice cooling, and the resulting solution was stirred under ice cooling for 10 minutes. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with water and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 25 : 1) to yield 2.97 g of a white powder. This white powder was dissolved in ethanol (45 mL), and to the resulting solution was added a solution of 4 M hydrogen chloride in ethyl acetate until the solution had a pH of 1. The precipitates were collected by filtration and recrystallized from 83% ethanol (36 mL), to thereby yield 2.72 g of the title compound.

Appearance: White powder

Melting point: 243.5-246.5°C

Example 2703

Production of N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzenesulfonamide

N-[6-(4-{4-[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzenesulfonamide (1.35 g) was recrystallized from ethanol (20 mL) to yield 1.23 g of the title compound.

Appearance: White powder

Melting point: 156-158°C

Example 2704

Production of N-(6-{4-[4-(4-piperonylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzenesulfonamide

N-(6-{4-[4-(4-Piperonylpiperidine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzenesulfonamide (1.95 g) was recrystallized from ethanol (35 mL) to yield 1.70 g of the title compound.

Appearance: White powder

Melting point: 130-133°C

Example 2705

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide (0.86 g, 1.30 mmol) was recrystallized from a mixed solvent of aceton (3 mL) diethyl ether (4 mL) and *n*-hexane (1 mL) to yield 0.72 g of the title compound.

Appearance: Pale yellow powder

Melting point: 154-155°C

Example 2706

Production of N-(6-{4-[4-(4-benzylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzensulfonamide

N-(6-{4-[4-(4-Benzylpiperidin-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzensulfonamide (1.55 g) was recrystallized from ethanol (60 mL) to yield 1.41 g of the title compound.

Appearance: White powder

Melting point: 199-201°C

Example 2707

Production of N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-

3,4-dichlorobenzenesulfonamide

To a solution of (1-{4-[5-(3,4-dichlorobenzenesulfonylamino)pyridin-2-yloxy]-3-methylphenyl}piperidine-4-yl)acetic acid (1.70 g, 3.1 mmol) and 1-benzylpiperazine (0.71 g, 4.0 mmol) in DMF (40 mL) were added triethylamine (1.08 mL, 7.8 mmol) and diethyl cyanophosphonate (0.76 g, 4.3 mmol) under ice cooling, and the resulting solution was stirred for 1 hour under ice cooling. To this reaction solution was added a saturated sodium bicarbonate solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous sodium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 40 : 1), after which the resulting product was recrystallized from ethanol, to thereby yield 1.61 g of the title compound.

Appearance: White needles

Melting point: 151-155°C

Example 2708

Production of N-[6-(4-{[2-(4-benzothiazole-6-ylmethylpiperazin-1-yl)-2-oxoethyl]methylamino}-phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide dihydrochloride

To a solution of ({4-[5-(3,4-dichlorobenzoyl-amino)pyridin-2-yloxy]phenyl}methylamino)acetic acid

(1.02 g, 2.3 mmol) and 1-(benzothiazole-6-ylmethyl)-piperazine (0.58 g, 2.5 mmol) in DMF (15 mL) were added triethylamine (0.95 mL, 6.9 mmol) and diethyl cyanophosphonate (0.447 mL, 2.7 mmol) under ice cooling, and the resulting solution was stirred for 30 minutes under ice cooling and for 45 minutes at room temperature. Water was added to the solution, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous sodium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 30 : 1) to obtain 1.28 g of a white powder. This white powder was dissolved in ethanol (15 mL), and to the resulting solution was added a solution of 4 M hydrogen chloride in ethyl acetate until the resulting solution had a pH of 1. The precipitates were collected by filtration and recrystallized from 85% ethanol (30 mL), to thereby yield 1.06 g of the title compound.

Appearance: White powder

Melting point: 202-223°C

Example 2709

Production of 3,4-dichloro-N-{6-[4-({2-[4-(2,3-dihydrobenzo[1,4]dioxin-6-ylmethyl)piperazin-1-yl]-2-oxoethyl}methylamino)phenoxy]pyridin-3-yl}benzamide maleate

To a solution of ({4-[5-(3,4-dichlorobenzoyl-

amino)pyridin-2-yloxy]phenyl}methylamino)acetic acid (2.50 g, 5.6 mmol) in DMF (55 mL) were added 1-(2,3-dihydrobenzo[1,4]dioxin-6-ylmethyl)piperazine (1.7 g, 7.3 mmol), 1-hydroxybenzotriazole monohydrate (0.86 g, 5.6 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (1.29 g, 6.7 mmol) under ice cooling, and the resulting solution was stirred for 30 minutes under ice cooling and for 17 hours at room temperature. This reaction solution was concentrated under reduced pressure. Water was added to the residue, and extracted with ethyl acetate. The ethyl acetate layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was dissolved in ethanol (30 mL). To the resulting solution was added maleic acid (0.32 g, 2.7 mmol), and this solution was left to stand. The precipitates were collected by filtration, to thereby yield 1.45 g of the title compound.

Appearance: Pale yellow powder

Melting point: 188-190°C

Example 2710

Production of N-(6-{4-[4-(4-benzylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzenesulfonamide

N-(6-{4-[4-(4-Benzylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-

dichlorobenzenesulfonamide (0.79 g) was recrystallized from ethanol (15 mL) to yield 0.67 g of the title compound.

Appearance: White powder

Melting point: 185-189°C

Example 2711

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-pyrrole-1-ylbenzamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-pyrrole-1-ylbenzamide (2.49 g) was recrystallized from a mixed solvent consisting of acetone (20 mL) and diethyl ether (30 mL) to yield 2.26 g of the title compound.

Appearance: Pale yellow powder

Melting point: 163.1-166.5°C

Example 2712

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzenesulfonamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzenesulfonamide (8.18 g) was recrystallized from a mixed solvent consisting of ethyl acetate (70 mL) and *n*-hexane (20 mL) to yield 6.93 g of

the title compound.

Appearance: White powder

Melting point: 177.8-180.1°C

Example 2713

Production of 6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl]-2-methylphenoxy}pyridine-3-sulfonyl-(4-trifluoromethylphenyl)amide

6-(4-{4-[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl]-2-methylphenoxy}pyridine-3-sulfonyl-(4-trifluoromethylphenyl)amide (1.50 g) was recrystallized from ethanol (20 mL) to yield 1.40 g of the title compound.

Appearance: White powder

Melting point: 156-160°C

Example 2714

Production of N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide

N-[6-(4-{[2-(4-Piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide (2.1 g, 3.2 mmol) was heated to dissolve in acetone (5 mL), and to the resulting solution was then added diethyl ether (10 mL), whereby recrystallization yielded 2.0 g of the title compound.

Appearance: White powder

Melting point: 113-116°C

Example 2715

Production of 3,4-dichloro-N-{3-fluoro-4-[4-(1-hydroxy-2-morpholine-4-ylethyl)phenoxy]phenyl}benzamide

3,4-Dichloro-N-{3-fluoro-4-[4-(1-hydroxy-2-morpholine-4-ylethyl)phenoxy]phenyl}benzamide (5 g) was recrystallized from ethyl acetate-*n*-hexane to yield 4.73 g of the title compound.

Appearance: White powder

Melting point: 169-170°C

Example 2716

Production of N-(6-{4-[4-(4-piperonylpiperazine-1-carbonyl)piperidine-1-carbonyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide

To a solution of 1-{4-[5-(3,4-dichlorobenzoylamino)pyridin-2-yloxy]benzoyl}piperidine-4-carboxylic acid (7.96 g, 15.5 mmol) in DMF (160 mL) were added 1-piperonylpiperazine (3.75 g, 17.6 mmol), 1-hydroxybenzotriazole monohydrate (2.85 g, 18.6 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (3.56 g, 18.6 mmol) under ice cooling, and the resulting solution was stirred for overnight at room temperature. This reaction solution was concentrated under reduced pressure. To the residue were added water and ethyl acetate, and the resulting solution was vigorously stirred. The resulting precipitates were collected by filtration and

recrystallized from a dichloromethane-methanol mixed solvent, to thereby yield 7.36 g of the title compound.

Appearance: White powder

Melting point: 236-238°C

Example 2717

Production of N-{6-[(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]-pyridin-3-yl]-4-trifluoromethylbenzamide

To a solution of [1-(4-{methyl[5-(4-trifluoromethylbenzoylamino)pyridin-2-yl]amino}phenyl)piperidine-4-yl]acetic acid (0.80 g, 1.6 mmol) in DMF (10 mL) were added 1-piperonylpiperazine (0.41 g, 1.9 mmol), 1-hydroxybenzotriazole monohydrate (0.24 g, 1.6 mmol) and 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (0.39 g, 2.0 mmol) under ice cooling, and the resulting solution was stirred for 3 hours at room temperature. This reaction solution was concentrated under reduced pressure. To the residue was added a saturated sodium bicarbonate solution, and extracted with dichloromethane. The dichloromethane layer was washed with a saturated sodium bicarbonate solution and brine, dried over anhydrous magnesium sulfate, and evaporated. The residue was purified by silica gel column chromatography (dichloromethane : methanol = 20 : 1). The resulting product was then recrystallized from a mixed solvent consisting of 95% ethanol-

dichloromethane, to thereby yield 1.05 g of the title compound.

Appearance: White powder

Melting point: 210-212°C

Formulation Example 1

100 g of the N-[6-(4-{4-[2-(piperonyl-piperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)-pyridin-3-yl]-4-trifluoromethylbenzamide obtained in Example 319, 40 g of Avicel (Tradename, manufactured by Asahi Kasei Corporation), 30 g of cornstarch and 2 g of magnesium stearate were mixed and ground together. The resulting mixture was then formed into a sugar-coated R 10-mm-tablets using a pestle. The obtained tablets were coated with a film coating agent containing 10 g of TC-5 (Tradename, manufactured by Shin-Etsu Chemical Co., Ltd., hydroxypropylmethyl cellulose), 3 g of polyethylene glycol 6000, 40 g of castor oil and a suitable amount of ethanol, to thereby prepare a film-coated tablet.

Pharmacological Test

LI90 cells, a human stellate cell line, were seeded on 12-well plastic plates in DMEM (DULBECCO'S modified eagle medium) supplemented with 10% fetal bovine serum, and were cultured for 24 hours in a carbon dioxide (CO_2) incubator (set temperature : 37°C, set CO_2 concentration: 5%) . The cultured cells were

then washed with D-PBS(-) (DULBECCO's phosphate buffered saline), and subsequently further cultured for 3 days in MEM (Eagle's minimum essential medium) supplemented with 0.1% fetal bovine serum. The cultured cells were again washed with D-PBS(-), and cultured for 16 hours in MEM (0.1% fetal bovine serum with respect to a total MEM volume) which contained a test compound and 10 pM h-TGF-β1 (human transforming growth factor β1). Next, the cultured LI90 cells were washed with D-PBS(-), and cultured for 24 hours in MEM containing ^{3}H-proline (radioactive labelled compound) and 0.25 mM ascorbic acid. The produced collagen was labelled with RI (radioactive isotope). From this culture supernatant, an acid-soluble fraction was extracted. Radioactivity was measured for this fraction. The measured value was taken to be the collagen synthesis activity.

Radioactivity of the culture supernatant cultured with the test compound was compared with that of the culture supernatant cultured without the test compound to calculate a collagen synthesis inhibitory activity (T/C) and determine a concentration (μM) at which collagen synthesis was inhibited by 50% (IC50 = a concentration of the test compound at which T/C corresponded to 0.5).

T/C = (Radioactivity of culture supernatant cultured with the test compound) / (radioactivity of culture supernatant cultured without the test compound)

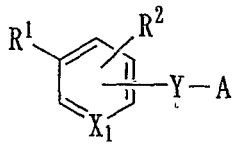
These results are shown in Table 432.

Table 432

Text compound	Collagen synthesis inhibitory activity IC50 (μM)
Example No. 148	0.0230
Example No. 305	0.0069
Example No. 319	0.0019
Example No. 433	0.0130
Example No. 582	0.0370
Example No. 590	0.0380
Example No. 592	0.0950
Example No. 768	0.0860
Example No. 790	0.0055
Example No. 800	0.0290
Example No. 1039	0.0220
Example No. 1049	0.0490
Example No. 1110	0.0390
Example No. 1503	0.0078
Example No. 2063	0.0300
Example No. 2100	0.0790
Example No. 2322	0.0640
Example No. 2362	0.0440
Example No. 2600	0.0220
Example No. 2601	0.0260

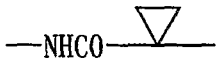
CLAIMS

1. An aromatic compound represented by the following general formula (1) or a salt thereof:

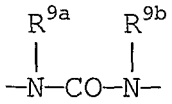


(1)

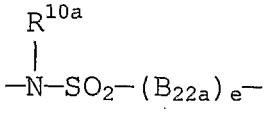
[wherein X_1 represents a nitrogen atom or a group -CH=,
R^1 represents a group $-Z-R^6$,
Z represents a group $-N(R^8)-B-$, a group $-B-N(R^8)-$, a group $-B_0-O-$, a group



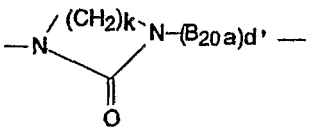
a group -CO-, a group -CH(OH)-, a group



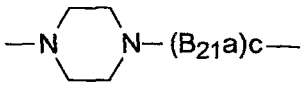
a group -N=CH-, a group



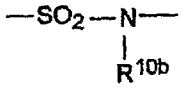
a lower alkenylene group, a group $-NHCO-B_1-$, a group $-NHCO-B_2-(W)u-$, a group $-B_0-O-B_{19a}-$, a group



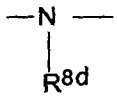
a group



a group



a group -S-, a lower alkynylene group, a lower alkylene group, a group



or a group $-CO-NH-B_{18}a-$,

wherein R^8 represents a hydrogen atom, a lower alkyl group that may have a lower alkoxy group as a substituent, a lower alkanoyl group, a phenyl lower alkyl group, or a lower alkylsulfonyl group,
B represents a group -CO- or a lower alkylene group,
B_0 represents a lower alkylene group,
each of R^{9a} and R^{9b}, which are identical or different, represents a hydrogen atom or a lower alkyl group
R^{10a} represents a hydrogen atom or a lower alkyl group,
B_{22a} represents a lower alkylene group or a lower alkenylene group,
e represents 0 or 1,
B_1 represents a lower alkenylene group that may have a phenyl group as a substituent,
B_2 represents a lower alkylene group that may be substituted by a group selected from the group consisting of a lower alkoxy group and a phenyl group,
W represents an oxygen atom, a group -NH-, or a sulfur

atom,

u represents 0 or 1,

B_{18a} represents a lower alkylene group,

B_{19a} represents a lower alkylene group,

B_{20a} represents a lower alkylene group,

B_{21a} represents a lower alkylene group,

R^{8d} represents a hydrogen atom or a lower alkyl group,

k represents 2 or 3,

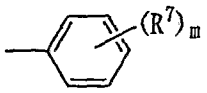
c represents 0 or 1,

d' represents 0 or 1,

R^{10b} represents a hydrogen atom or a lower alkyl group,

R^6 represents a 5- to 15-membered monocyclic, dicyclic, or tricyclic saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein, the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of an oxo group; an optionally halogenated lower alkoxy group; an optionally halogenated lower alkyl group; a halogen atom; a lower alkylsulfonyl group; a phenyl group that may be substituted, on the phenyl ring, by an optionally halogenated lower alkyl group; a lower alkylthio group; a pyrrolyl group; a benzoyl group; a lower alkanoyl group; a lower alkoxycarbonyl group; and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an adamantyl group, a naphthyl group (wherein, the naphthalene ring may be substituted by 1

to 3 groups selected from the group consisting of a lower alkyl group, a halogen atom, and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an alkyl group that may have a lower alkoxy group as a substituent, a cycloalkyl group that may be substituted, on the cycloalkyl ring, by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group on the amino group and a lower alkyl group that may have a halogen atom as a substituent, a lower alkenyl group that may have a halogen atom as a substituent, a lower alkanoyl group, a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group that may have a halogen atom as a substituent and a halogen atom, a group



, a halogen atom-substituted lower alkyl group, or a cycloalkyl lower alkyl group,

R^7 represents a hydrogen atom, a phenyl group, a carboxy group, a hydroxyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a phenoxy group, a lower alkoxy group that may have a halogen atom as a substituent, a lower alkylenedioxy group, an amino group that may have, as a substituent,

a group selected from the group consisting of a lower alkyl group, a lower alkanoyl group, a benzoyl group, and a cycloalkyl group, a cyano group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkylsulfonyl group, an aminosulfonyl group, a lower alkoxycarbonyl group, a lower alkanoyloxy group, a 5- or 6-membered saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein the heterocyclic ring may be substituted, by an oxo group), or a lower alkoxycarbonyl lower alkyl group,

m represents an integer between 1 and 5, wherein when m represents 2 to 5, two to five R^7s may be identical or different,

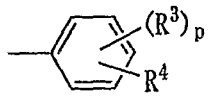
R^2 represents a hydrogen atom, a halogen atom, or a lower alkyl group,

Y represents a group -O-, a group $-N(R^5)-$, a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n-, or a group -C(=N-OH)-,

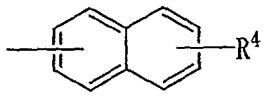
R^5 represents a hydrogen atom, a lower alkyl group, a lower alkanoyl group, a benzoyl group, a phenyl lower alkyl group, or a cycloalkyl group,

n represents 0, 1, or 2,

A represents a group



or a group

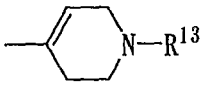


p represents 1 or 2,

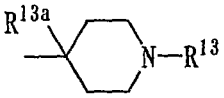
R^3 represents a hydrogen atom, a lower alkoxy group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a carboxy group, a group $-CONR^{11}R^{12}$, or a cyano group,

wherein each of R^{11} and R^{12}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, or a phenyl group, or R^{11} and R^{12}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring,

R^4 represents an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a group



a group



or a group $-(T)_1-N(R^{14})R^{15}$,

R^{13} represents a hydrogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl lower alkyl group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group, a benzoyl group, a morpholino-substituted lower alkanoyl group, a piperazinyl carbonyl lower alkyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a morpholinocarbonyl-substituted lower alkyl group, or an imidazolyl lower alkanoyl group,

R^{13a} represents a hydrogen atom or a hydroxyl group,

T represents a lower alkylene group, a group $-N(R^{17})-B_3-$

CO-, a group $-B_{19}-N(R^{18})-CO-$, a group $-B_4-CO-$, a group $-Q-B_5-CO-$, a group $-B_6-N(R^{19})-B_7-CO-$, a group $-CO-B_8-$, a group $-CH(OH)-B_9-$, a group $-CO-B_{10}-CO-$, a group $-CH(OH)-B_{11}-CO-$, a group -CO-, a group $-SO_2-$, or a group $-B_{23a}-CO-CO-$,

wherein R^{17} represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, a cycloalkylcarbonyl group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkenyl group, an amino-substituted lower alkanoyl group that may have a lower alkyl group as a substituent, or a lower alkylsulfonyl group,

B_3 represents a lower alkylene group,

B_{19} represents a lower alkylene group,

R^{18} represents a hydrogen atom or a lower alkyl group,

B_4 represents a lower alkenylene group or a lower alkylene group that may have a hydroxyl group as a substituent,

Q represents an oxygen atom or a group -S(O)n- (wherein n has the same meanings as described above),

B_5 represents a lower alkylene group,

B_6 represents a lower alkylene group,

R^{19} represents a hydrogen atom or a lower alkanoyl group,

B_7 represents a lower alkylene group,

B_8 represents a lower alkylene group,

B_9 represents a lower alkylene group,

B_{10} represents a lower alkylene group,

B_{11} represents a lower alkylene group,

B_{23a} represents a lower alkylene group,

l represents 0 or 1,

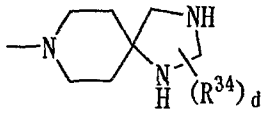
R^{14} represents a hydrogen atom or an alkyl group that may have a hydroxyl group as a substituent,

R^{15} represents (2) a hydroxyl group-substituted alkyl group, (3) a cycloalkyl group that may have a group selected from the group consisting of a hydroxyl group and a lower alkyl group as a substituent, (4) a phenoxy lower alkyl group, (5) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group; a lower alkoxy group that may have a halogen atom as a substituent; a halogen atom; an amino lower alkoxy group that may have a lower alkyl group as a substituent; a hydroxyl group-substituted lower alkyl group; a phenyl lower alkyl group; a lower alkynyl group; an amino group that may have a lower alkylsulfonyl group as a substituent; a lower alkylthio group; a cycloalkyl group; a phenylthio group; an adamantyl group; an anilino group that may have a halogen atom as a substituent on the phenyl ring; a lower alkoxycarbonyl group; a piperazinyl group that may have a lower alkyl group as a substituent on the piperazine ring; a pyrrolidinyl group that may have an oxo group as a substituent on the pyrrolidine ring; a lower alkanoylamino group; a cyano group; and a phenoxy group, (6) a phenoxy group, (7) a phenyl lower alkyl

group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkyl group, (8) a phenyl lower alkyl group that has a lower alkylenedioxy group as a substituent on the phenyl ring, (10) a lower alkoxycarbonyl-substituted lower alkyl group, (11) a carboxy-substituted lower alkyl group, (12) an amino group that may have a lower alkanoyl group as a substituent, (13) a 1,2,3,4-tetrahydroquinolyl group that may have 1 to 3 groups selected from the group consisting of an oxo group, a lower alkoxy group, and a lower alkylenedioxy group as a substituent(s) on the tetrahydroquinoline ring, (14) a cycloalkyl lower alkyl group, (15) a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (16) a pyridyl lower alkyl group, (17) an amino group-substituted lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent, (18) a lower alkoxy lower alkyl group, (19) an imidazolyl group, (20) an imidazolyl lower alkyl group, (21) a 1,2,3,4-tetrahydroisoquinolylcarbonyl-substituted lower alkyl group, (22) a piperidinylcarbonyl group that may have a group selected from the group consisting of a lower

alkoxycarbonyl group, a phenyl lower alkyl group, and a furyl lower alkyl group as a substituent on the piperidine ring, (23) a thiazolidinyl lower alkanoyl group that may have an oxo group as a substituent on the thiazolidine ring, (24) a piperidinyl group that may be substituted, on the piperidine ring, by a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, a lower alkyl group, a benzoyl group, and a furyl lower alkyl group, (25) a carbonyl lower alkyl group substituted by a group

, (26) a carbonyl lower alkyl group substituted by a group



, (27) a group $-CO-B_{20}-N(R^{36})R^{37}$, (26a) a pyrrolidinyl lower alkyl group, (27a) a morpholino lower alkyl group, (28a) a phenyl lower alkenyl group, (29a) an anilinocarbonyl lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, (30a) an indolyl group, (31a) a piperazinyl lower alkyl group that may have, as a substituent on the piperazine ring, a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may

have a lower alkylenedioxy group as a substituent on the phenyl ring, (32a) an amidino lower alkyl group that may have a lower alkyl group as a substituent, (33a) a fluorenyl group, (34a) a carbazolyl group that may have a lower alkyl group as a substituent on the carbazole ring, (35a) an amidino group that may have a lower alkyl group as a substituent, (36a) a piperazinyl-substituted oxalyl group that may have 1 to 3 groups selected from the group consisting of a phenyl lower alkyl group (that may have 1 to 3 groups selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group as a substituent(s) on the phenyl ring) and a pyridyl lower alkyl group as a substituent(s) on the piperazine ring, or (37a) a cyano-substituted lower alkyl group,

R^{34} represents an oxo group or a phenyl group,

d represents an integer between 0 and 3,

B_{20} represents a lower alkylene group,

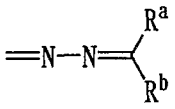
R^{36} and R^{37}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic group may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5-

to 10-membered saturated or unsaturated heterocyclic ring; or a group

wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of (28) a phenyl-substituted lower alkyl group, which has 1 to 2 phenyl groups and which may have a pyridyl group on the lower alkyl group, wherein the phenyl ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkanoyl group, an amino group that may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy group, (29) a carbamoyl group, (30) a pyridyl lower alkyl group that may have, as a substituent(s) on the pyridine ring, 1 to 3 groups selected from the group consisting of a hydroxyl group and a lower alkyl group that may have a hydroxyl group as a substituent, (31) a pyrrolyl lower alkyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the pyrrole ring, (32) a benzoxazolyl lower alkyl group, (33) a benzothiazolyl lower alkyl group, (34) a furyl lower alkyl group, (35)

a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, an amino group that may have a lower alkylsulfonyl group as a substituent, a halogen atom, a lower alkoxy group, a lower alkyl group that may have a halogen atom as a substituent, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a thiazolidinylidene lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, and a lower alkylenedioxy group, (36) a pyrimidinyl group, (37) a pyrazinyl group, (38) a pyridyl group, (39) a lower alkoxycarbonyl group, (40) a thiazolidinyl lower alkanoyl group that may be substituted, on the thiazolidine ring, by a group selected from the group consisting of an oxo group and a group



(wherein each of R^a and R^b represents a lower alkyl group), (41) a lower alkyl group that may have a group selected from the group consisting of a hydroxyl group and a halogen atom as a substituent, (42) a lower alkanoyl group that may have a halogen atom as a substituent, (43) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a carbamoyl group that may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a

lower alkyl group, a lower alkoxycarbonyl group, a carboxy group, a cyano group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a benzoyl group that may have a halogen atom as a substituent on the phenyl ring, a phenyl lower alkyl group that may have a halogen atom as a substituent on the phenyl ring, and a hydroxyl group, (44) a phenyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (45) a naphthyl lower alkyl group, (46) a phenoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (47) a phenoxy lower alkyl group, (48) a phenyl lower alkoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (49) a group $-(B_{12}CO)t-N(R^{20})R^{21}$, (50) a group $-(CO)o-B_{13}-N(R^{22})R^{23}$, (51) a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may be substituted, on the 1,2,3,4-tetrahydronaphthalene ring, by 1 to 5 lower alkyl groups as a substituent(s), (52) a cycloalkyl group

that may have a hydroxyl group as a substituent, (53) a piperidinyl group that may be substituted, on the piperidine ring, by 1 to 3 lower alkyl groups as a substituent(s), (54) a quinolyl lower alkyl group, (55) a 1,2,3,4-tetrazolyl lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent on the tetrazole ring, (56) a thiazolyl lower alkyl group that may have a phenyl group as a substituent on the thiazole ring, (57) a benzoyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkoxy group and a halogen atom as a substituent(s) on the phenyl ring, (58) a piperidinyl lower alkyl group that may have a lower alkyl group as a substituent on the piperidine ring, (59) an imidazolyl group that may have 1 to 3 phenyl groups as a substituent(s) on the imidazole ring, (60) a benzimidazolyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the benzimidazole ring, (61) a pyridyl lower alkoxy group, (62) a 1,2,3,4-tetrahydroquinolyl lower alkyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (63) a 1,3,4-oxadiazolyl lower alkyl group that may have an oxo group as a substituent on the 1,3,4-oxadizole ring, (64) a cycloalkyl lower alkyl group, (65) a tetrahydropyranyl group, (66) a thienyl lower alkyl group, (67) a pyrimidinylcarbonyl group that may have an oxo group as

a substituent on the pyrimidine ring, (68) a hydroxyl group, (69) a carboxy group, (70) a lower alkoxy lower alkyl group, (71) a lower alkoxy lower alkoxy group, (72) a benzoyloxy group, (73) a lower alkoxycarbonyl lower alkoxy group, (74) a carboxy lower alkoxy group, (75) a phenoxy lower alkanoyl group, (76) a 1,2,3,4-tetrahydroquinolylcarbonyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (77) a phenylsulfonyl group, (78) an imidazolyl lower alkanoyl group, (79) an imidazolyl lower alkyl group, (80) a pyridylcarbonyl group, (81) an imidazolylcarbonyl group, (82) a lower alkoxycarbonyl lower alkyl group, (83) a carboxy lower alkyl group, (84) a group $-(O-B_{15})s-CO-N(R^{26})R^{27}$, (85) a group $-N(R^{28})-CO-B_{16}-N(R^{29})R^{30}$, (86) a group $-N(R^{31})-B_{17}-CO-N(R^{32})R^{33}$, (87) a benzoxazolyl group, (88a) a benzothienyl group, (89a) an oxo group, and (90a) a 1,2,3,4-tetrahydroquinolyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring,

B_{12} represents a lower alkylene group,

t represents 0 or 1,

each of R^{20} and R^{21}, which are identical or different, represents a hydrogen atom; a cycloalkyl group; an amino group that may have a lower alkoxycarbonyl group as a substituent; a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring; a lower alkyl group; a lower alkyl group having 1 to 2 phenyl groups that may be substituted, on the

phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkylthio group; a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxy group that may have a halogen atom as a substituent and a lower alkyl group that may have a halogen atom as a substituent; a lower alkoxycarbonyl group; a cycloalkyl lower alkyl group; a pyrrolidinyl lower alkyl group that may have 1 to 3 lower alkyl groups that may have a hydroxyl group as a substituent on the pyrrolidine ring; an amino-substituted lower alkyl group that may have a group selected from the group consisting of a phenyl group and a lower alkyl group as a substituent; a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may have 1 to 5 lower alkyl groups as a substituent(s) on the 1,2,3,4-tetrahydronaphthalene ring; a naphthyl lower alkyl group; a pyridyl lower alkyl group; a quinolyl lower alkyl group; a 1,2,3,4-tetrazolyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent(s) on the tetrazole ring; a 1,2,4-triazolyl lower alkyl group; a tetrahydrofuryl lower alkyl group that may have a

hydroxyl group as a substituent on the lower alkyl group; a phenoxy lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a nitro group as a substituent(s) on the phenyl ring; a phenyl lower alkanoyl group; a lower alkanoyl group that may have a halogen atom as a substituent; an imidazolyl lower alkanoyl group; a lower alkoxycarbonyl lower alkyl group; a pyridyl group; or a carboxy lower alkyl group, or R^{20} and R^{21}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group that may have 1 to 3 groups selected from the group consisting of a halogen atom and a lower alkyl group that may have a halogen atom as a substituent(s) on the phenyl ring, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

o represents 0 or 1,

B_{13} represents a lower alkylene group,

each of R^{22} and R^{23}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring, a phenoxy lower alkyl group that may have a lower alkyl group as a

substituent on the phenyl ring, a phenyl lower alkyl group, or a phenyl group, or R^{22} and R^{23}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

B_{15} represents a lower alkylene group,

s represents 0 or 1,

each of R^{26} and R^{27}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a phenyl lower alkyl group, or an imidazolyl lower alkyl group, or R^{26} and R^{27}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring, as a substituent(s),

R^{28} represents a hydrogen atom or a lower alkyl group,

B_{16} represents a lower alkylene group,

R^{29} and R^{30}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5-

to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{31} represents a hydrogen atom or a lower alkyl group,

B_{17} represents a lower alkylene group,

R^{32} and R^{33}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

provided that the above described aromatic compound or a salt thereof satisfy the following requirements (i) to (v):

(i) when X_1 represents a group -CH=, then R^3 represents a hydrogen atom;

(ii) when X_1 represents a group -CH=, l represents 1, T represents -CO-, and R^{14} represents a hydrogen atom or an alkyl group that may have a hydroxyl group as a substituent, then R^{15} represents the group (24) described above;

(iii) when X_1 represents a group -CH=, l

represents 1, and T represents $-N(R^{17})-B_3-CO-$, then R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated or unsaturated heterocyclic ring, wherein the heterocyclic ring is substituted by 1 to 3 groups of (28) described above;

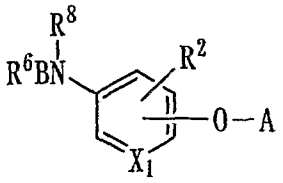
(iv) when X_1 represents a nitrogen atom, and l represents 0, or when X_1 represents a nitrogen atom, l represents 1, and T represents -CO- or $-SO_2$, then R^{15} is not the group being any one of (5), (7), (19), and (20) described above; and

(v) when R^6 represents a cycloalkyl group wherein the cycloalkyl ring may be substituted by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group and a lower alkyl group that may have a halogen atom as a substituent, then R^{14} represents a group $-(T)_l-N(R^{14})R^{15}$ (wherein T and l have the same meanings as described above, and R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated heterocyclic ring; or R^{14} and R^{15} form a group

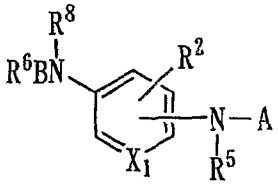
)].

2. The aromatic compound or a salt thereof

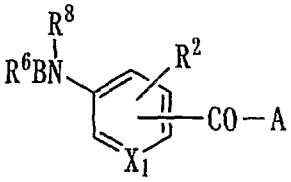
according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-1) to (1-7):



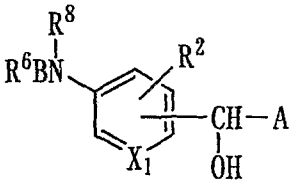
(1-1)



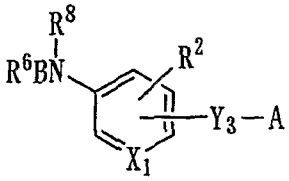
(1-2)



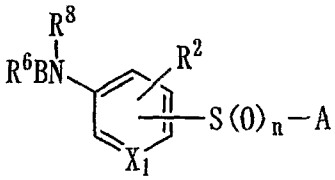
(1-3)



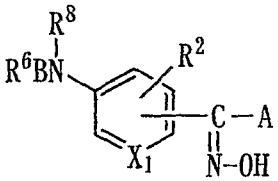
(1-4)



(1-5)



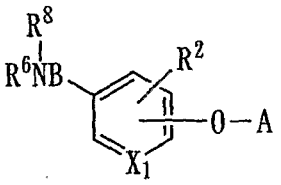
(1-6)



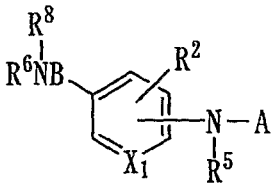
(1-7)

[wherein, in said general formulas (1-1) to (1-7), R^6, B, R^8, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 represents a lower alkylene group].

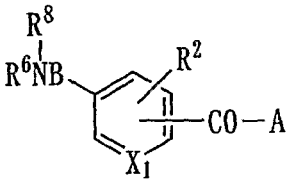
3. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-8) to (1-14):



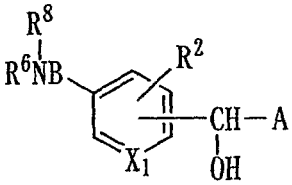
(1-8)



(1-9)



(1-10)



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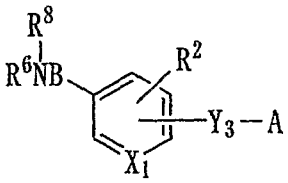
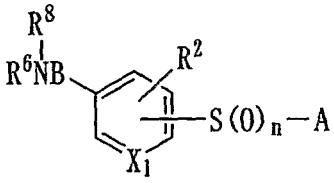
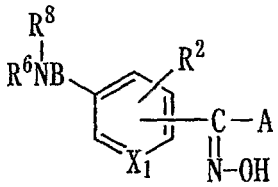


(1-12)



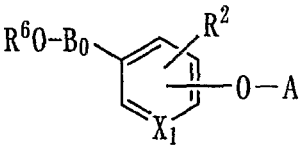
(1-13)



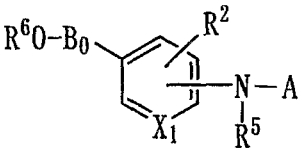
(1-14)

[wherein, in said general formulas (1-8) to (1-14), R^6, B, R^8, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

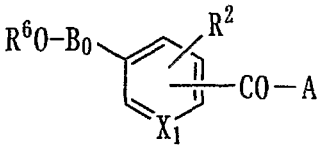
4. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-15) to (1-21):



(1-15)



(1-16)



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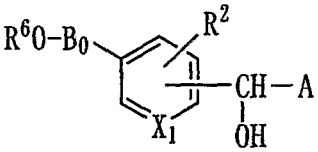
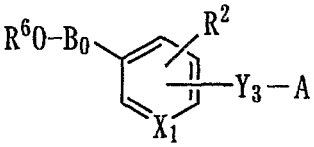
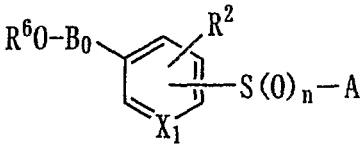


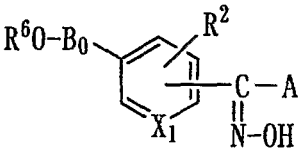
(1-18)



(1-19)



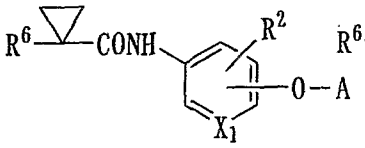
(1-20)



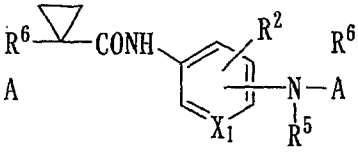
(1-21)

[wherein, in said general formulas (1-15) to (1-21), R^6, B_0, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

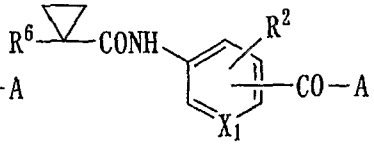
5. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-22) to (1-28):



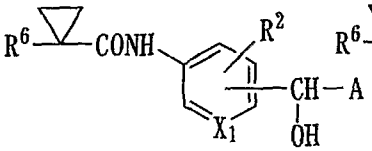
(1-22)



(1-23)



(1-24)



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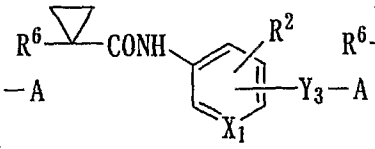
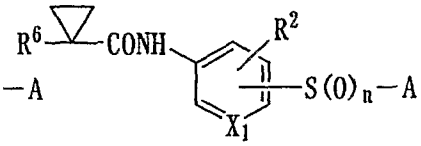
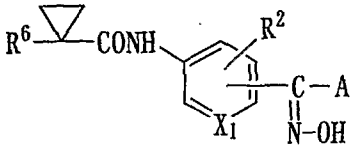


(1-26)



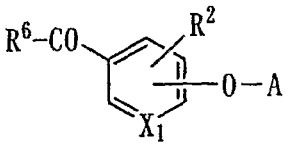
(1-27)



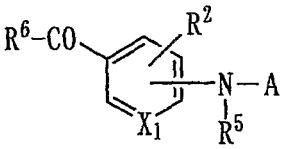
(1-28)

[wherein, in said general formulas (1-22) to (1-28), R^6, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

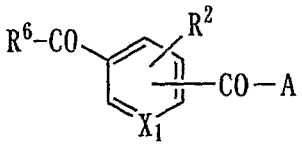
6. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-29) to (1-35):



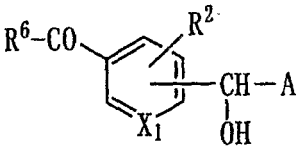
(1-29)



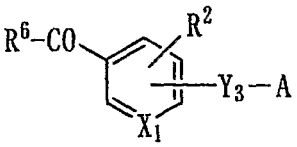
(1-30)



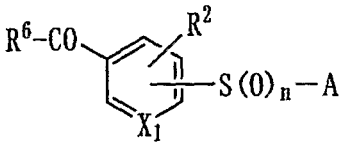
(1-31)



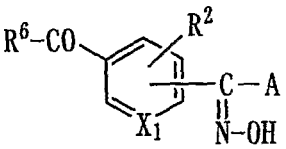
(1-32)



(1-33)



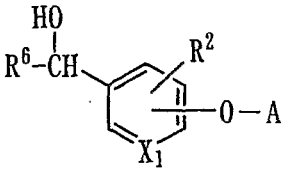
(1-34)



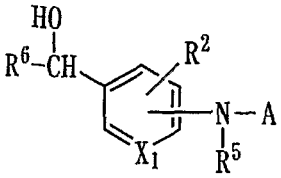
(1-35)

[wherein, in said general formulas (1-29) to (1-35), R^6, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

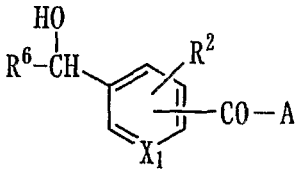
7. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-36) to (1-42):



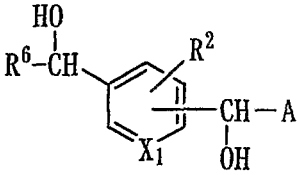
(1-36)



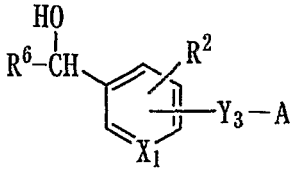
(1-37)



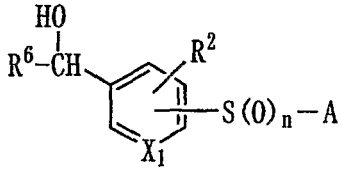
(1-38)



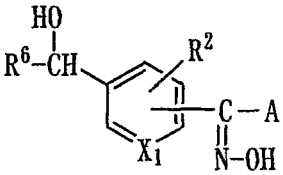
(1-39)



(1-40)



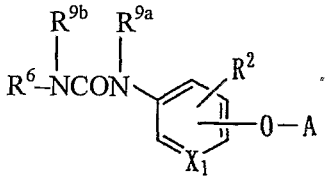
(1-41)



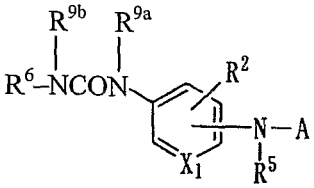
(1-42)

[wherein, in said general formulas (1-36) to (1-42), R^6, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

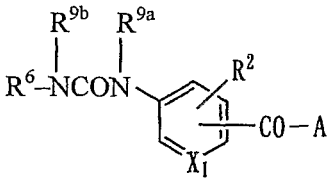
8. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-43) to (1-49):



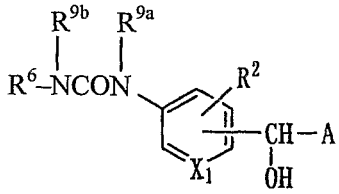
(1-43)



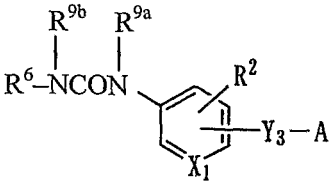
(1-44)



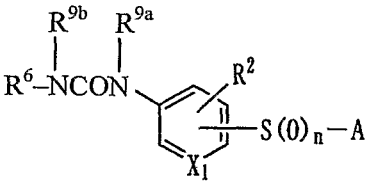
(1-45)



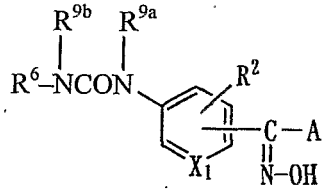
(1-46)



(1-47)



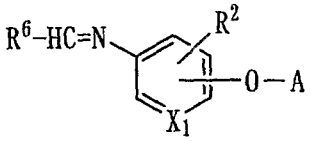
(1-48)



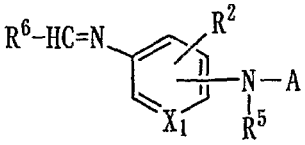
(1-49)

[wherein, in said general formulas (1-43) to (1-49), R^6, R^2, R^5, n, X_1, A, R^{9a}, and R^{9b} have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

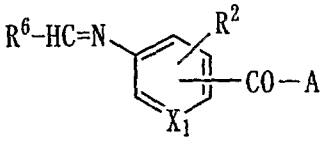
9. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-50) to (1-56):



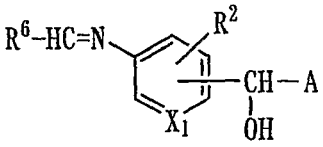
(1-50)



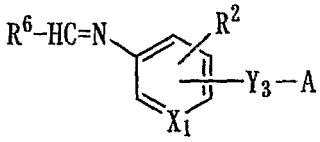
(1-51)



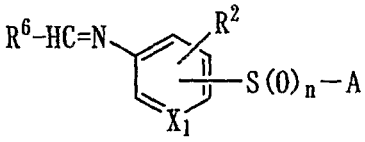
(1-52)



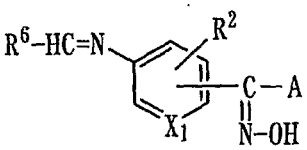
(1-53)



(1-54)



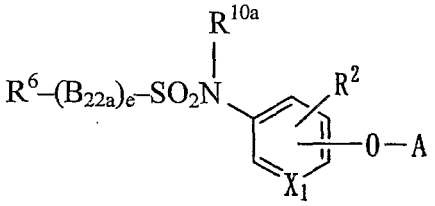
(1-55)



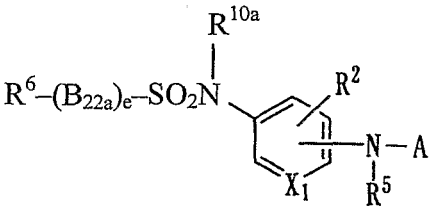
(1-56)

[wherein, in said general formulas (1-50) to (1-56), R^6, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

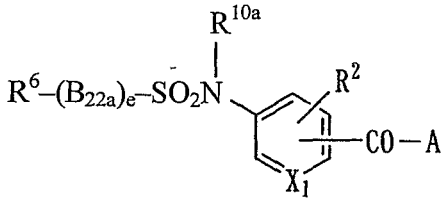
10. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-57) to (1-63):



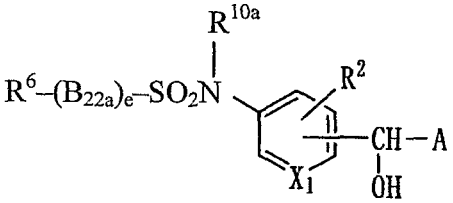
(1-57)



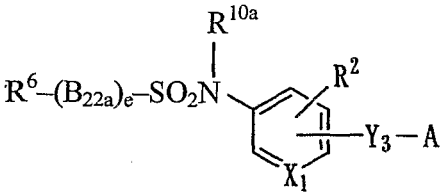
(1-58)



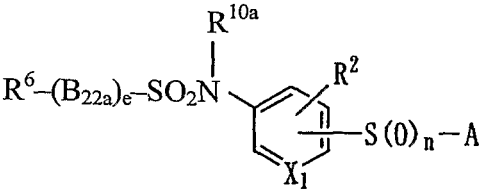
(1-59)



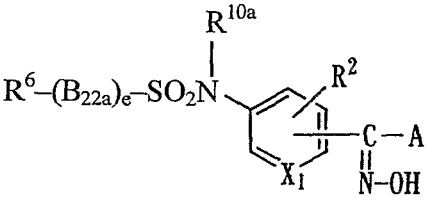
(1-60)



(1-61)



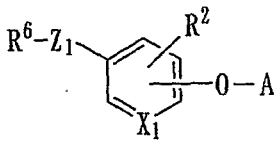
(1-62)



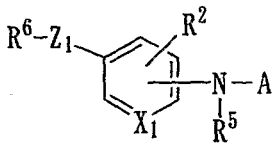
(1-63)

[wherein, in said general formulas (1-57) to (1-63), R^6, R^2, R^5, n, X_1, A, R^{10a}, B_{22a}, and e have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

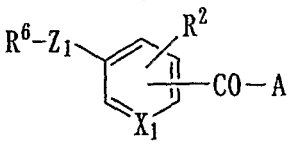
11. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-64) to (1-70):



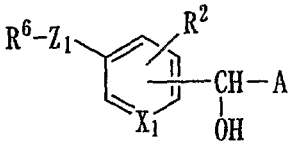
(1-64)



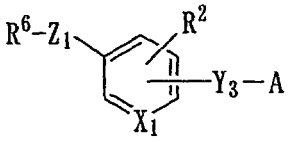
(1-65)



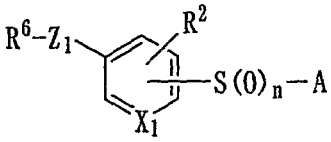
(1-66)



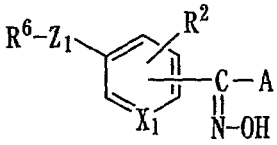
(1-67)



(1-68)



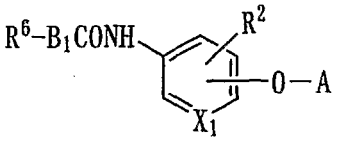
(1-69)



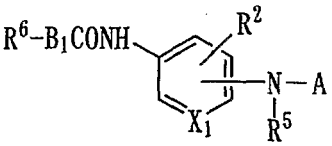
(1-70)

[wherein, in said general formulas (1-64) to (1-70), R^6, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, Y_3 has the same meanings as described in Claim 2, and Z_1 represents a lower alkenylene group].

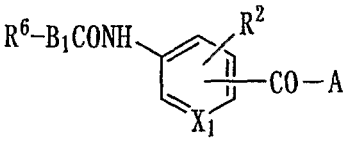
12. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-71) to (1-77):



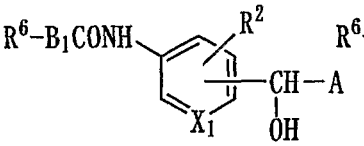
(1-71)



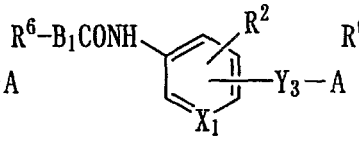
(1-72)



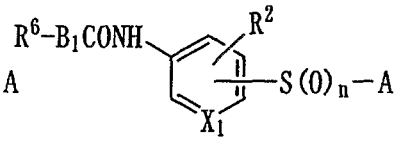
(1-73)



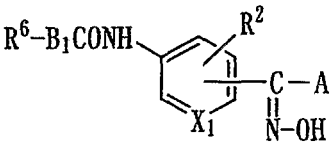
(1-74)



(1-75)



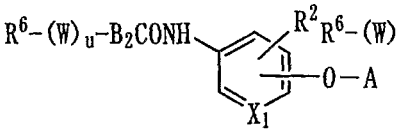
(1-76)



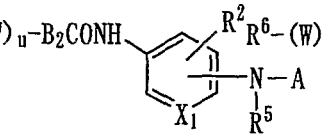
(1-77)

[wherein, in said general formulas (1-71) to (1-77), R^6, R^2, B_1, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

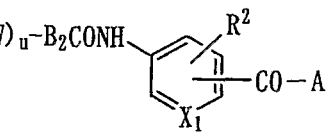
13. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-78) to (1-84):



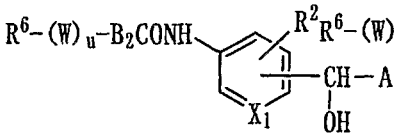
(1-78)



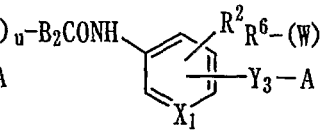
(1-79)



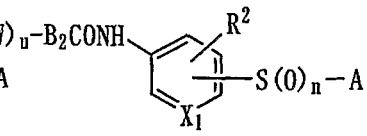
(1-80)



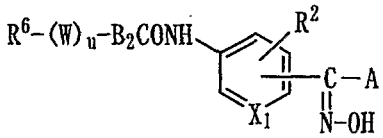
(1-81)



(1-82)



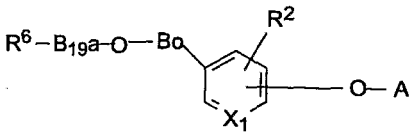
(1-83)



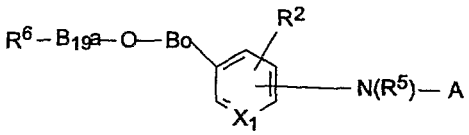
(1-84)

[wherein, in said general formulas (1-78) to (1-84), R^6, W, u, B_2, R^2, R^5, n, X_1, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

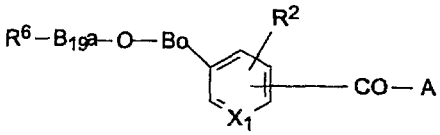
14. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-85) to (1-91):



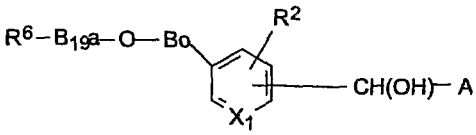
(1-85)



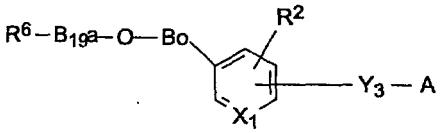
(1-86)



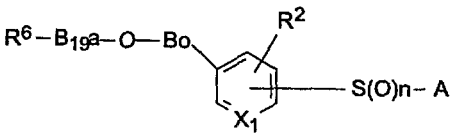
(1-87)



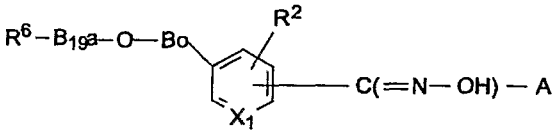
(1-88)



(1-89)



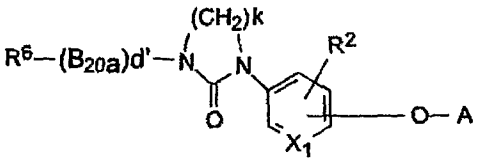
(1-90)



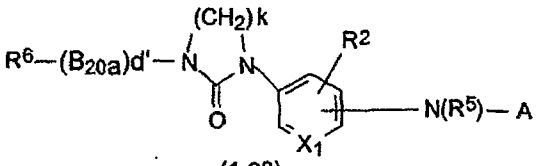
(1-91)

[wherein, in said general formulas (1-85) to (1-91), R^5, R^6, B_{19a}, B_0, R^2, X_1, n and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

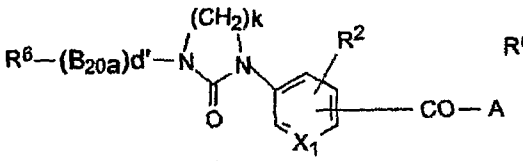
15. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-92) to (1-98):



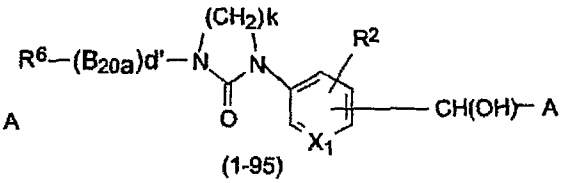
(1-92)



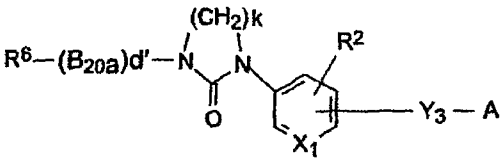
(1-93)



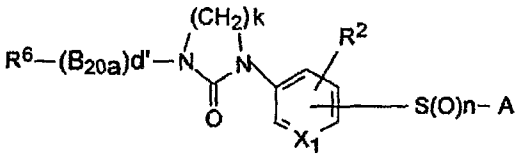
(1-94)



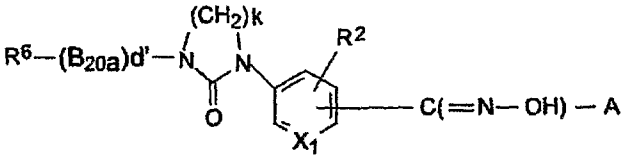
(1-95)



(1-96)



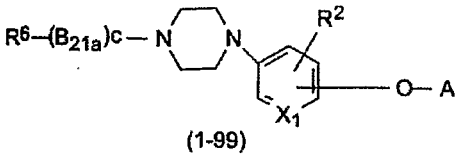
(1-97)



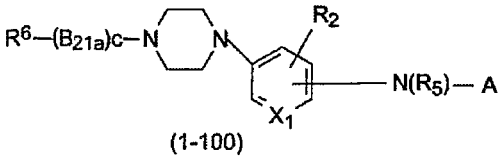
(1-98)

[wherein, in said general formulas (1-92) to (1-98), R^5, R^6, B_{20a}, R^2, X_1, A, n, d′ and k have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

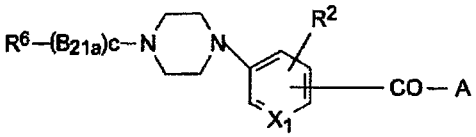
16. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-99) to (1-105):



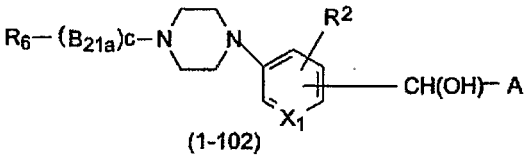
(1-99)



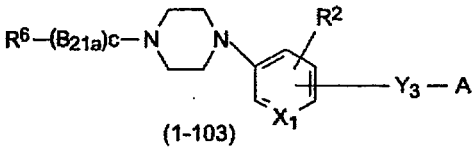
(1-100)



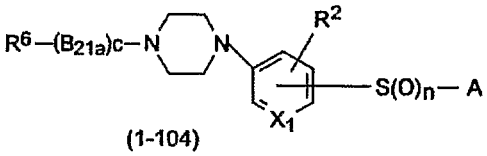
(1-101)



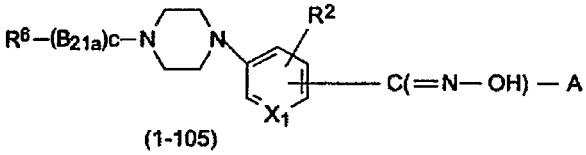
(1-102)



(1-103)



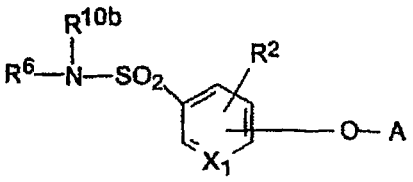
(1-104)



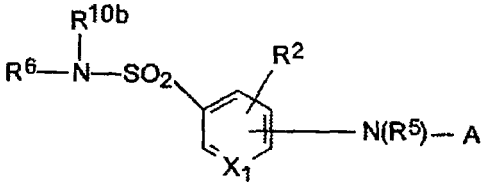
(1-105)

[wherein, in said general formulas (1-99) to (1-105), R^6, R^5, B_{21a}, R^2, X_1, A, n and c have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

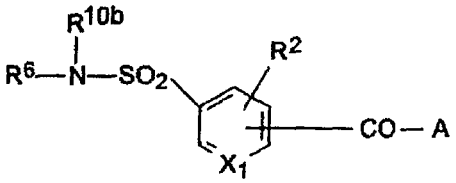
17. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-106) to (1-112):



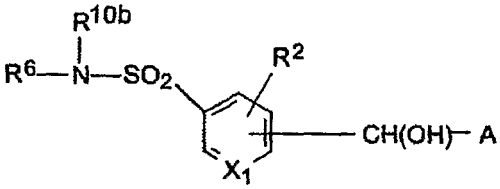
(1-106)



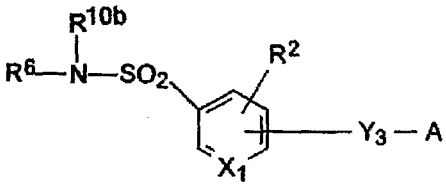
(1-107)



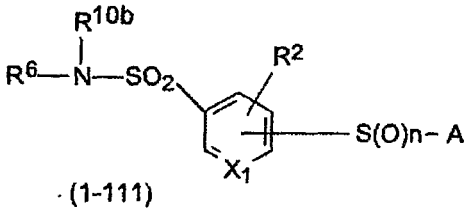
(1-108)



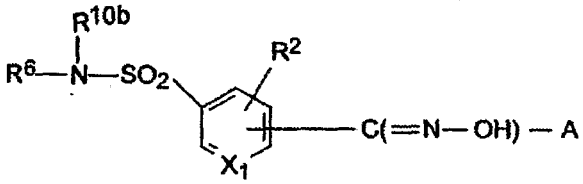
(1-109)



(1-110)



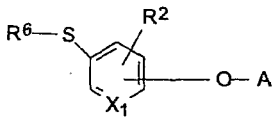
(1-111)

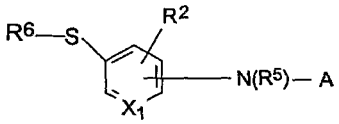


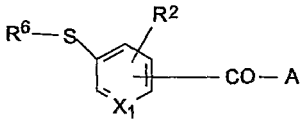
(1-112)

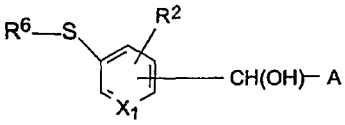
[wherein, in said general formulas (1-106) to (1-112), R^5, n, R^6, R^{10b}, X_1, R^2, and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

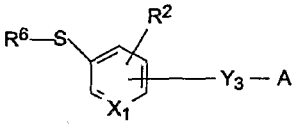
18. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-113) to (1-119):

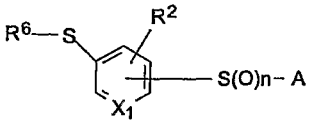

(1-113)

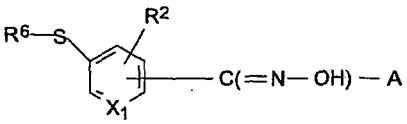

(1-114)


(1-115)


(1-116)

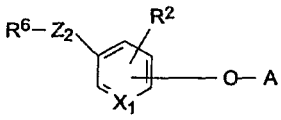

(1-117)

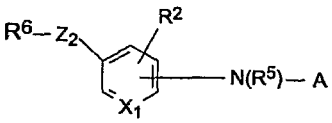

(1-118)

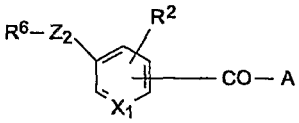

(1-119)

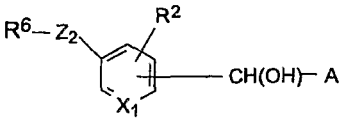
[wherein, in said general formulas (1-113) to (1-119), R^6, R^2, X_1, R^5, n and A have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

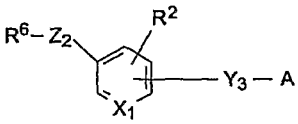
19. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-120) to (1-126):

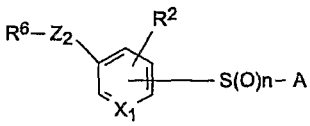

(1-120)

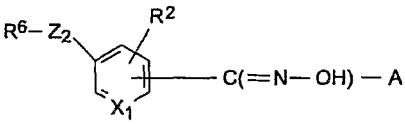

(1-121)


(1-122)


(1-123)

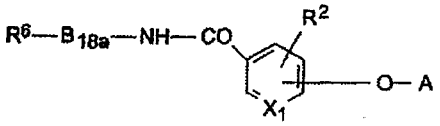

(1-124)


(1-125)

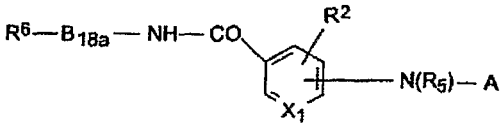

(1-126)

[wherein, in said general formulas (1-120) to (1-126), R^6, R^2, X_1, A, R^5, and n have the same meanings as described in Claim 1, Y_3 has the same meanings as described in Claim 2, and Z_2 represents a lower alkynylene group].

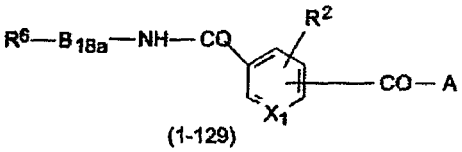
20. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-127) to (1-133):



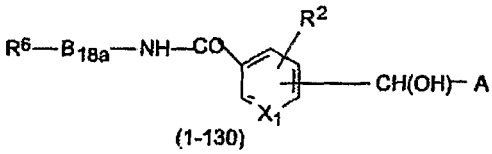
(1-127)



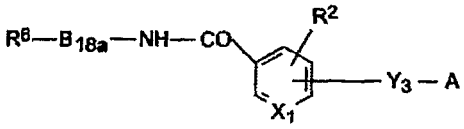
(1-128)



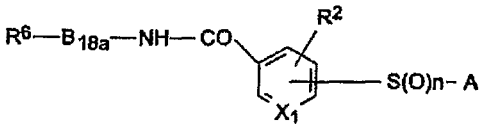
(1-129)



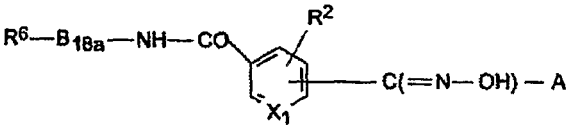
(1-130)



(1-131)



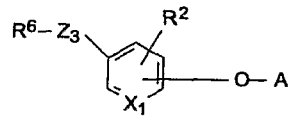
(1-132)



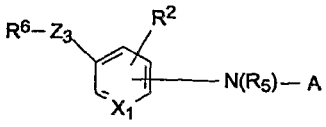
(1-133)

[wherein, in said general formulas (1-127) to (1-133), R^6, B_{18a}, R^2, X_1, A, R^5, and n have the same meanings as described in Claim 1, and Y_3 has the same meanings as described in Claim 2].

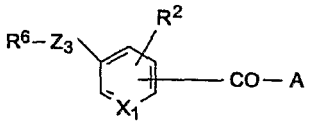
21. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the following general formulas (1-134) to (1-140):



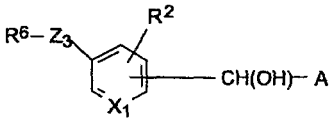
(1-134)



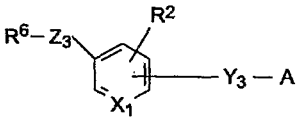
(1-135)



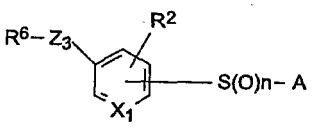
(1-136)



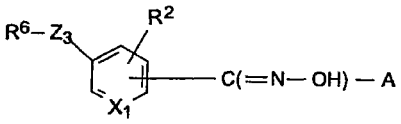
(1-137)



(1-138)



(1-139)



(1-140)

[wherein, in said general formulas (1-134) to (1-140), R^6, R^2, X_1, A, R^5, and n have the same meanings as described in Claim 1, Y_3 has the same meanings as described in Claim 2, and Z_3 represents a lower alkylene group or a group $-\underset{\underset{R^{8d}}{|}}{N}-$ (R^{8d} is the same meanings as described in Claim 1)].

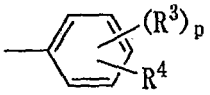
22. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein Y is a group -O-.

23. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein Y is a

group $-N(R^5)-$ (R^5 has the same meanings as described in Claim 1).

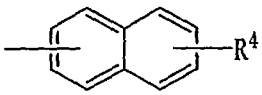
24. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein Y is a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n- (n has the same meanings as described in Claim 1), or a group -C(=N-OH)-.

25. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein A is a group



(R^3, R^4 and p have the same meanings as described in Claim 1).

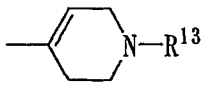
26. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein A is a group



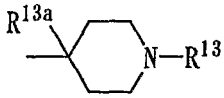
(R^4 has the same meanings as described in Claim 1).

27. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine

ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a group



or a group



(R^{13} and R^{13a} have the same meanings as described in Claim 1).

28. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (T, R^{14} and R^{15} have the same meanings as described in Claim 1), and l is 0.

29. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (T, R^{14} and R^{15} have the same meanings as described in Claim 1), and l is 1.

30. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-N(R^{17})-B_3-CO-$ (R^{14}, R^{15}, R^{17} and B_3 have the same meanings as described in Claim 1).

31. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_{19}-N(R^{18})-CO-$ (R^{14}, R^{15}, B_{19} and R^{18} have the same meanings as described in Claim 1).

32. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_4-CO-$ (R^{14}, R^{15}, and B_4 have the same meanings as described in Claim 1).

33. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-Q-B_5-CO-$ (R^{14}, R^{15}, Q and B_5 have the same meanings as described in Claim 1).

34. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_6-N(R^{19})-B_7-$ (R^{14}, R^{15}, B_6, R^{19} and B_7 have the same meanings as described in Claim 1).

35. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CO-B_8-$ (R^{14}, R^{15}, and B_8 have the same meanings as described in Claim 1).

36. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CH(OH)-$

B_9- (R^{14}, R^{15}, and B_9 have the same meanings as described in Claim 1).

37. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CO-B_{10}-CO-$ (R^{14}, R^{15}, and B_{10} have the same meanings as described in Claim 1).

38. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-CH(OH)-B_{11}-CO-$ (R^{14}, R^{15}, and B_{11} have the same meanings as described in Claim 1).

39. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group -CO- (R^{14} and R^{15} have the same meanings as described in Claim 1).

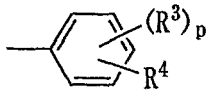
40. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-SO_2-$ (R^{14} and R^{15} have the same meanings as described in Claim 1).

41. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a group $-B_{23a}-CO-CO-$ (R^{14}, R^{15} and B_{23a} have the same meanings as described in Claim 1).

42. The aromatic compound or a salt thereof according to any one of Claims 1 to 21, wherein R^4 is a group $-(T)_l-N(R^{14})R^{15}$, l is 1, and T is a lower alkylene

group (R^{14} and R^{15} have the same meanings as described in Claim 1).

43. The aromatic compound or a salt thereof according to Claim 1, wherein the compound represented by general formula (1) is any one selected from the group consisting of the general formulas (1-1), (1-2), (1-8), (1-9), (1-15), (1-16), (1-29), (1-30), (1-43), (1-44), (1-57), (1-58), (1-64), and (1-65) defined in Claims 2, 3, 4, 6, 8, 10, and 11, Y is a group -O- or a group $-N(R^5)-$, A is a group



, and R^4 is a group $-(T)_l-N(R^{14})R^{15}$ (R^3, R^4, R^5, R^{14}, R^{15}, p and l have the same meanings as described in Claim 1).

44. The aromatic compound or a salt thereof according to Claim 43, wherein l is 1, and T is a group $-N(R^{17})-B_3-CO-$ (R^{17} and B_3 have the same meanings as described in Claim 1).

45. The aromatic compound or a salt thereof according to Claim 43, wherein l is 1, and T is a group $-B_4-CO-$ (B_4 have the same meanings as described in Claim 1).

46. The aromatic compound or a salt thereof according to Claim 43, wherein l is 1, and T is a group -CO-.

47. The aromatic compound or a salt thereof according to Claim 43, wherein l is 0.

48. An aromatic compound selected from the group consisting of:

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzene-

sulfonamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperazin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide,

N-[6-({4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenyl}methylamino)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-

dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

1-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3-(3,4-dichlorophenyl)-1-ethylurea,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-(6-{4-[3-(4-piperonylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-(6-{4-[(2-{4-[4-(4-fluorobenzoyl)phenyl]-piperazin-1-yl}-2-oxoethyl)methylamino]-2-methoxy-phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

2-(4-piperonylpiperazin-1-yl)-N-{3-methyl-4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenyl}-2-oxoacetamide,

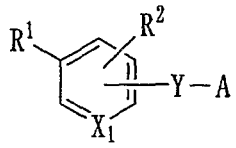
N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-2-fluoro-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide, and

4-(3-{3-methyl-4-[5-(4-trifluoromethyl-benzoylamino)pyridin-2-yloxy]phenyl}-2-oxohexahydropyrimidin-1-yl)benzoic acid ethyl ester, or salts thereof.

49. A method for producing the compound according to Claim 1, which is characterized in that the compound is produced by the method described in any one of reaction formulas-1 to 46, 48, 49, 52, 59, 104, 105, 108 to 132, and 135.

50. A pharmaceutical composition for treating fibrosis, characterized by comprising an aromatic compound represented by the following general formula (1A) or a salt thereof:

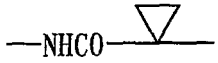


(1A)

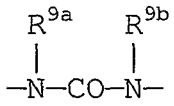
[wherein X_1 represents a nitrogen atom or a group -CH=,

R^1 represents a group $-Z-R^6$,

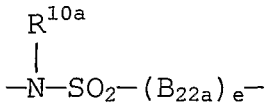
Z represents a group $-N(R^8)-B-$, a group $-B-N(R^8)-$, a group $-B_0-O-$, a group



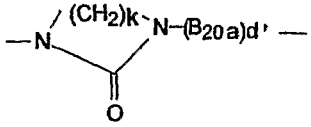
a group -CO-, a group -CH(OH)-, a group



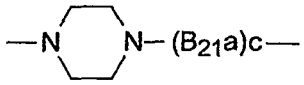
a group -N=CH-, a group



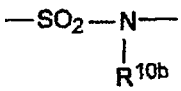
a lower alkenylene group, a group $-NHCO-B_1-$, a group $-NHCO-B_2-(W)u-$, a group $-B_0-O-B_{19a}-$, a group



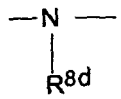
a group



a group



a group -S-, a lower alkynylene group, a lower alkylene group, a group



or a group —CO—NH—B_{18a}— ,

wherein R^8 represents a hydrogen atom, a lower alkyl group that may have a lower alkoxy group as a substituent, a lower alkanoyl group, a phenyl lower alkyl group, or a lower alkylsulfonyl group,

B represents a group -CO- or a lower alkylene group,

B_0 represents a lower alkylene group,

each of R^{9a} and R^{9b}, which are identical or different, represents a hydrogen atom or a lower alkyl group

R^{10a} represents a hydrogen atom or a lower alkyl group,

B_{22a} represents a lower alkylene group or a lower alkenylene group,

e represents 0 or 1,

B_1 represents a lower alkenylene group that may have a phenyl group as a substituent,

B_2 represents a lower alkylene group that may be substituted by a group selected from the group consisting of a lower alkoxy group and a phenyl group,

W represents an oxygen atom, a group -NH-, or a sulfur atom,

u represents 0 or 1,

B_{18a} represents a lower alkylene group,

B_{19a} represents a lower alkylene group,

B_{20a} represents a lower alkylene group,

B_{21a} represents a lower alkylene group,

R^{8d} represents a hydrogen atom or a lower alkyl group,

k represents 2 or 3,

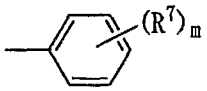
c represents 0 or 1,

d' represents 0 or 1,

R^{10b} represents a hydrogen atom or a lower alkyl group,

R^6 represents a 5- to 15-membered monocyclic, dicyclic, or tricyclic saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein, the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of an oxo group; an optionally halogenated lower alkoxy group; an optionally halogenated lower alkyl group; a halogen atom; a lower alkylsulfonyl group; a phenyl group that may be substituted, on the phenyl ring, by an optionally halogenated lower alkyl group; a lower alkylthio group; a pyrrolyl group; a benzoyl group; a lower alkanoyl group; a lower alkoxycarbonyl group; and an amino group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an adamantyl group, a naphthyl group (wherein, the naphthalene ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a halogen atom, and an amino group that may have a group selected from the group

consisting of a lower alkyl group and a lower alkanoyl group as a substituent), an alkyl group that may have a lower alkoxy group as a substituent, a cycloalkyl group that may be substituted, on the cycloalkyl ring, by a group selected from the group consisting of an amino-substituted lower alkyl group that may have a lower alkyl group on the amino group and a lower alkyl group that may have a halogen atom as a substituent, a lower alkenyl group that may have a halogen atom as a substituent, a lower alkanoyl group, a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group that may have a halogen atom as a substituent and a halogen atom, a group



, a halogen atom-substituted lower alkyl group, or a cycloalkyl lower alkyl group,

R^7 represents a hydrogen atom, a phenyl group, a carboxy group, a hydroxyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a phenoxy group, a lower alkoxy group that may have a halogen atom as a substituent, a lower alkylenedioxy group, an amino group that may have, as a substituent, a group selected from the group consisting of a lower alkyl group, a lower alkanoyl group, a benzoyl group, and a cycloalkyl group, a cyano group, a lower alkanoyl

group that may have a halogen atom as a substituent, a lower alkylsulfonyl group, an aminosulfonyl group, a lower alkoxycarbonyl group, a lower alkanoyloxy group, a 5- or 6-membered saturated or unsaturated heterocyclic group having 1 to 4 nitrogen atoms, oxygen atoms, or sulfur atoms (wherein the heterocyclic ring may be substituted, by an oxo group), or a lower alkoxycarbonyl lower alkyl group,

m represents an integer between 1 and 5, wherein when m represents 2 to 5, two to five R^7s may be identical or different,

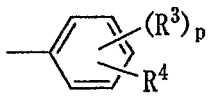
R^2 represents a hydrogen atom, a halogen atom, or a lower alkyl group,

Y represents a group -O-, a group $-N(R^5)-$, a group -CO-, a group -CH(OH)-, a lower alkylene group, a group -S(O)n-, or a group -C(=N-OH)-,

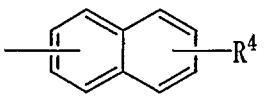
R^5 represents a hydrogen atom, a lower alkyl group, a lower alkanoyl group, a benzoyl group, a phenyl lower alkyl group, or a cycloalkyl group,

n represents 0, 1, or 2,

A represents a group



or a group

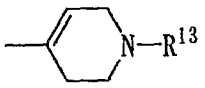


p represents 1 or 2,

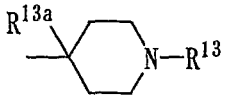
R^3 represents a hydrogen atom, a lower alkoxy group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a carboxy group, a group $-CONR^{11}R^{12}$, or a cyano group,

wherein each of R^{11} and R^{12}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, or a phenyl group, or R^{11} and R^{12}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring,

R^4 represents an imidazolyl lower alkyl group, a 1,2,4-triazolyl lower alkyl group, a 1,2,3-triazolyl lower alkyl group, a 1,2,5-triazolyl lower alkyl group, a pyrazolyl lower alkyl group, a pyrimidinyl lower alkyl group that may have an oxo group as a substituent on the pyrimidine ring, a 3,5-dioxoisoxazolidin-4-ylidene lower alkyl group, a 1,2,4-oxadiazolyl lower alkyl group that may have a lower alkyl group as a substituent on the 1,2,4-oxadiazole ring, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a group



a group



or a group $-(T)_1-N(R^{14})R^{15}$,

R^{13} represents a hydrogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkoxycarbonyl group, a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, an imidazolyl lower alkyl group, a lower alkoxycarbonyl lower alkyl group, a carboxy lower alkyl group, a benzoyl group, a morpholino-substituted lower alkanoyl group, a piperazinyl carbonyl lower alkyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, a morpholinocarbonyl-substituted lower alkyl group, or an imidazolyl lower alkanoyl group,

R^{13a} represents a hydrogen atom or a hydroxyl group,

T represents a lower alkylene group, a group $-N(R^{17})-B_3-CO-$, a group $-(B_{19})_e-N(R^{18})-CO-$, a group $-B_4-CO-$, a group $-Q-B_5-CO-$, a group $-B_6-N(R^{19})-B_7-CO-$, a group $-CO-B_8-$, a group $-CH(OH)-B_9-$, a group $-CO-B_{10}-CO-$, a group $-CH(OH)-$

B_{11}-CO-, a group -CO-, a group -SO_2-, or a group -B_{23a}-CO-CO-,

wherein R^{17} represents a hydrogen atom, a lower alkyl group, a cycloalkyl group, a cycloalkylcarbonyl group, a lower alkanoyl group that may have a halogen atom as a substituent, a lower alkenyl group, an amino-substituted lower alkanoyl group that may have a lower alkyl group as a substituent, or a lower alkylsulfonyl group,

B_3 represents a lower alkylene group,

B_{19} represents a lower alkylene group,

e represents 0 or 1,

R^{18} represents a hydrogen atom or a lower alkyl group,

B_4 represents a lower alkenylene group or a lower alkylene group that may have a hydroxyl group as a substituent,

Q represents an oxygen atom or a group -S(O)n- (wherein n has the same meanings as described above),

B_5 represents a lower alkylene group,

B_6 represents a lower alkylene group,

R^{19} represents a hydrogen atom or a lower alkanoyl group,

B_7 represents a lower alkylene group,

B_8 represents a lower alkylene group,

B_9 represents a lower alkylene group,

B_{10} represents a lower alkylene group,

B_{11} represents a lower alkylene group,

B_{23a} represents a lower alkylene group,

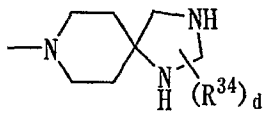
l represents 0 or 1,

each of R^{14} and R^{15}, which are identical or different represents (1) a hydrogen atom, (2) an alkyl group that may have a hydroxyl group as a substituent, (3) a cycloalkyl group that may have a group selected from the group consisting of a hydroxyl group and a lower alkyl group as a substituent, (4) a phenoxy lower alkyl group, (5) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkyl group; a lower alkoxy group that may have a halogen atom as a substituent; a halogen atom; an amino lower alkoxy group that may have a lower alkyl group as a substituent; a hydroxyl group-substituted lower alkyl group; a phenyl lower alkyl group; a lower alkynyl group; an amino group that may have a lower alkylsulfonyl group as a substituent; a lower alkylthio group; a cycloalkyl group; a phenylthio group; an adamantyl group; an anilino group that may have a halogen atom as a substituent on the phenyl ring; a lower alkoxycarbonyl group; a piperazinyl group that may have a lower alkyl group as a substituent on the piperazine ring; a pyrrolidinyl group that may have an oxo group as a substituent on the pyrrolidine ring; a lower alkanoylamino group; a cyano group; and a phenoxy group, (6) a phenoxy group, (7) a phenyl lower alkyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkoxy group that

may have a halogen atom as a substituent, and a lower alkyl group, (8) a phenyl lower alkyl group that has a lower alkylenedioxy group as a substituent on the phenyl ring, (9) a lower alkanoyl group, (10) a lower alkoxycarbonyl-substituted lower alkyl group, (11) a carboxy-substituted lower alkyl group, (12) an amino group that may have a lower alkanoyl group as a substituent, (13) a 1,2,3,4-tetrahydroquinolyl group that may have 1 to 3 groups selected from the group consisting of an oxo group, a lower alkoxy group, and a lower alkylenedioxy group as a substituent(s) on the tetrahydroquinoline ring, (14) a cycloalkyl lower alkyl group, (15) a piperazinyl lower alkanoyl group that may be substituted, on the piperazine ring, by a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (16) a pyridyl lower alkyl group, (17) an amino group-substituted lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a lower alkanoyl group as a substituent, (18) a lower alkoxy lower alkyl group, (19) an imidazolyl group, (20) an imidazolyl lower alkyl group, (21) a 1,2,3,4-tetrahydroisoquinolylcarbonyl-substituted lower alkyl group, (22) a piperidinylcarbonyl group that may have a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, and a furyl lower alkyl group as a substituent on the piperidine ring, (23) a thiazolidinyl lower alkanoyl

group that may have an oxo group as a substituent on the thiazolidine ring, (24) a piperidinyl group that may be substituted, on the piperidine ring, by a group selected from the group consisting of a lower alkoxycarbonyl group, a phenyl lower alkyl group, a lower alkyl group, a benzoyl group, and a furyl lower alkyl group, (25) a carbonyl lower alkyl group substituted by a group

, (26) a carbonyl lower alkyl group substituted by a group



, (27) a group $-CO-B_{20}-N(R^{36})R^{37}$, (26a) a pyrrolidinyl lower alkyl group, (27a) a morpholino lower alkyl group, (28a) a phenyl lower alkenyl group, (29a) an anilinocarbonyl lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, (30a) an indolyl group, (31a) a piperazinyl lower alkyl group that may have, as a substituent on the piperazine ring, a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (32a) an amidino lower alkyl group that may have a lower alkyl group as a substituent,

(33a) a fluorenyl group, (34a) a carbazolyl group that may have a lower alkyl group as a substituent on the carbazole ring, (35a) an amidino group that may have a lower alkyl group as a substituent, (36a) a piperazinyl-substituted oxalyl group that may have 1 to 3 groups selected from the group consisting of a phenyl lower alkyl group (that may have 1 to 3 groups selected from the group consisting of a lower alkylenedioxy group and a lower alkoxy group as a substituent(s) on the phenyl ring) and a pyridyl lower alkyl group as a substituent(s) on the piperazine ring, or (37a) a cyano-substituted lower alkyl group,

R^{34} represents an oxo group or a phenyl group,

d represents an integer between 0 and 3,

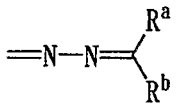
B_{20} represents a lower alkylene group,

R^{36} and R^{37}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic group may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{14} and R^{15}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 10-membered saturated or unsaturated heterocyclic ring; or a group

wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of (28) a phenyl-substituted lower alkyl group, which has 1 to 2 phenyl groups and which may have a pyridyl group on the lower alkyl group, wherein the phenyl ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkanoyl group, an amino group that may have a lower alkanoyl group as a substituent, a lower alkoxycarbonyl group, a cyano group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a phenyl lower alkoxy group, a hydroxyl group, and a lower alkylenedioxy group, (29) a carbamoyl group, (30) a pyridyl lower alkyl group that may have, as a substituent(s) on the pyridine ring, 1 to 3 groups selected from the group consisting of a hydroxyl group and a lower alkyl group that may have a hydroxyl group as a substituent, (31) a pyrrolyl lower alkyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the pyrrole ring, (32) a benzoxazolyl lower alkyl group, (33) a benzothiazolyl lower alkyl group, (34) a furyl lower alkyl group, (35) a benzoyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group

consisting of a cyano group, an amino group that may have a lower alkylsulfonyl group as a substituent, a halogen atom, a lower alkoxy group, a lower alkyl group that may have a halogen atom as a substituent, a thiazolidinyl lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, a thiazolidinylidene lower alkyl group that may have an oxo group as a substituent on the thiazolidine ring, and a lower alkylenedioxy group, (36) a pyrimidinyl group, (37) a pyrazinyl group, (38) a pyridyl group, (39) a lower alkoxycarbonyl group, (40) a thiazolidinyl lower alkanoyl group that may be substituted, on the thiazolidine ring, by a group selected from the group consisting of an oxo group and a group



(wherein each of R^a and R^b represents a lower alkyl group), (41) a lower alkyl group that may have a group selected from the group consisting of a hydroxyl group and a halogen atom as a substituent, (42) a lower alkanoyl group that may have a halogen atom as a substituent, (43) a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a carbamoyl group that may have a group selected from the group consisting of a lower alkoxy lower alkyl group and a lower alkyl group, a lower alkoxycarbonyl group, a carboxy group, a cyano group, a phenyl group, a halogen

atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, a benzoyl group that may have a halogen atom as a substituent on the phenyl ring, a phenyl lower alkyl group that may have a halogen atom as a substituent on the phenyl ring, and a hydroxyl group, (44) a phenyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring, (45) a naphthyl lower alkyl group, (46) a phenoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a cyano group, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (47) a phenoxy lower alkyl group, (48) a phenyl lower alkoxy group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, and a lower alkoxy group that may have a halogen atom as a substituent, (49) a group $-(B_{12}CO)t-N(R^{20})R^{21}$, (50) a group $-(CO)o-B_{13}-N(R^{22})R^{23}$, (51) a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may be substituted, on the 1,2,3,4-tetrahydronaphthalene ring, by 1 to 5 lower alkyl groups as a substituent(s), (52) a cycloalkyl group that may have a hydroxyl group as a substituent, (53) a piperidinyl group that may be substituted, on the

piperidine ring, by 1 to 3 lower alkyl groups as a substituent(s), (54) a quinolyl lower alkyl group, (55) a 1,2,3,4-tetrazolyl lower alkyl group that may have a group selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent on the tetrazole ring, (56) a thiazolyl lower alkyl group that may have a phenyl group as a substituent on the thiazole ring, (57) a benzoyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkoxy group and a halogen atom as a substituent(s) on the phenyl ring, (58) a piperidinyl lower alkyl group that may have a lower alkyl group as a substituent on the piperidine ring, (59) an imidazolyl group that may have 1 to 3 phenyl groups as a substituent(s) on the imidazole ring, (60) a benzimidazolyl group that may have 1 to 3 lower alkyl groups as a substituent(s) on the benzimidazole ring, (61) a pyridyl lower alkoxy group, (62) a 1,2,3,4-tetrahydroquinolyl lower alkyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (63) a 1,3,4-oxadiazolyl lower alkyl group that may have an oxo group as a substituent on the 1,3,4-oxadizole ring, (64) a cycloalkyl lower alkyl group, (65) a tetrahydropyranyl group, (66) a thienyl lower alkyl group, (67) a pyrimidinylcarbonyl group that may have an oxo group as a substituent on the pyrimidine ring, (68) a hydroxyl group, (69) a carboxy group, (70) a lower alkoxy lower

alkyl group, (71) a lower alkoxy lower alkoxy group, (72) a benzoyloxy group, (73) a lower alkoxycarbonyl lower alkoxy group, (74) a carboxy lower alkoxy group, (75) a phenoxy lower alkanoyl group, (76) a 1,2,3,4-tetrahydroquinolylcarbonyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring, (77) a phenylsulfonyl group, (78) an imidazolyl lower alkanoyl group, (79) an imidazolyl lower alkyl group, (80) a pyridylcarbonyl group, (81) an imidazolylcarbonyl group, (82) a lower alkoxycarbonyl lower alkyl group, (83) a carboxy lower alkyl group, (84) a group $-(O-B_{15})s-CO-N(R^{26})R^{27}$, (85) a group $-N(R^{28})-CO-B_{16}-N(R^{29})R^{30}$, (86) a group $-N(R^{31})-B_{17}-CO-N(R^{32})R^{33}$, (87) a benzoxazolyl group, (88a) a benzothienyl group, (89a) an oxo group, and (90a) a 1,2,3,4-tetrahydroquinolyl group that may have an oxo group as a substituent on the tetrahydroquinoline ring,

B_{12} represents a lower alkylene group,

t represents 0 or 1,

each of R^{20} and R^{21}, which are identical or different, represents a hydrogen atom; a cycloalkyl group; an amino group that may have a lower alkoxycarbonyl group as a substituent; a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring; a lower alkyl group; a lower alkyl group having 1 to 2 phenyl groups that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxycarbonyl group, a cyano

group, a nitro group, a phenyl group, a halogen atom, a lower alkyl group that may have a halogen atom as a substituent, a lower alkoxy group that may have a halogen atom as a substituent, and a lower alkylthio group; a phenyl group that may be substituted, on the phenyl ring, by 1 to 3 groups selected from the group consisting of a lower alkoxy group that may have a halogen atom as a substituent and a lower alkyl group that may have a halogen atom as a substituent; a lower alkoxycarbonyl group; a cycloalkyl lower alkyl group; a pyrrolidinyl lower alkyl group that may have 1 to 3 lower alkyl groups that may have a hydroxyl group as a substituent on the pyrrolidine ring; an amino-substituted lower alkyl group that may have a group selected from the group consisting of a phenyl group and a lower alkyl group as a substituent; a 1,2,3,4-tetrahydronaphthyl-substituted lower alkyl group that may have 1 to 5 lower alkyl groups as a substituent(s) on the 1,2,3,4-tetrahydronaphthalene ring; a naphthyl lower alkyl group; a pyridyl lower alkyl group; a quinolyl lower alkyl group; a 1,2,3,4-tetrazolyl lower alkyl group that may have 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group as a substituent(s) on the tetrazole ring; a 1,2,4-triazolyl lower alkyl group; a tetrahydrofuryl lower alkyl group that may have a hydroxyl group as a substituent on the lower alkyl group; a phenoxy lower alkyl group that may have 1 to 3

groups selected from the group consisting of a lower alkyl group and a nitro group as a substituent(s) on the phenyl ring; a phenyl lower alkanoyl group; a lower alkanoyl group that may have a halogen atom as a substituent; an imidazolyl lower alkanoyl group; a lower alkoxycarbonyl lower alkyl group; a pyridyl group; or a carboxy lower alkyl group, or R^{20} and R^{21}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group that may have 1 to 3 groups selected from the group consisting of a halogen atom and a lower alkyl group that may have a halogen atom as a substituent(s) on the phenyl ring, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

o represents 0 or 1,

B_{13} represents a lower alkylene group,

each of R^{22} and R^{23}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a benzoyl group that may have 1 to 3 lower alkoxy groups as a substituent(s) on the phenyl ring, a phenoxy lower alkyl group that may have a lower alkyl group as a substituent on the phenyl ring, a phenyl lower alkyl group, or a phenyl group, or R^{22} and R^{23}, together with

the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

B_{15} represents a lower alkylene group,

s represents 0 or 1,

each of R^{26} and R^{27}, which are identical or different, represents a hydrogen atom, a lower alkyl group, a phenyl lower alkyl group, or an imidazolyl lower alkyl group, or R^{26} and R^{27}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic ring, wherein the heterocyclic ring may be substituted by 1 to 3 phenyl lower alkyl groups that may have a lower alkylenedioxy group as a substituent on the phenyl ring, as a substituent(s),

R^{28} represents a hydrogen atom or a lower alkyl group,

B_{16} represents a lower alkylene group,

R^{29} and R^{30}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups

selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring,

R^{31} represents a hydrogen atom or a lower alkyl group,

B_{17} represents a lower alkylene group,

R^{32} and R^{33}, together with the nitrogen atom to which they bind, may bind to each other, directly or via a nitrogen atom, oxygen atom, or sulfur atom to form a 5- to 7-membered saturated heterocyclic group, wherein the heterocyclic ring may be substituted by 1 to 3 groups selected from the group consisting of a lower alkyl group, a phenyl group, and a phenyl lower alkyl group that may have a lower alkylenedioxy group as a substituent on the phenyl ring].

51. The pharmaceutical composition for treating fibrosis according to Claim 50, which is characterized in that it comprises the aromatic compound represented by general formula (1) or a salt thereof as defined in Claim 1.

52. The pharmaceutical composition for treating fibrosis according to Claim 50 or 51, which comprises an aromatic compound selected from the group consisting of:

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-

oxoethyl]ethylamino}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzene-sulfonamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperazin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-

trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methylphenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)-phenoxy]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-{6-[4-(4-benzylpiperazine-1-carbonyl)phenoxy]pyridin-3-yl}-3,4-dichlorobenzamide,

N-[6-({4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenyl}methylamino)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]ethylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-fluorophenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methoxyphenoxy)pyridin-3-yl]-

3,4-dichlorobenzamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

1-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-3-(3,4-dichlorophenyl)-1-ethylurea,

N-(6-{4-[3-(4-piperonylpiperazin-1-yl)-3-oxopropyl]phenoxy}pyridin-3-yl)-4-trifluoromethyl-benzamide,

N-[6-(4-{[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-3,4-dichlorobenzamide,

N-(6-{4-[3-(4-piperonylpiperazine-1-carbonyl)piperidin-1-yl]phenoxy}pyridin-3-yl)-3,4-dichlorobenzamide,

N-[6-(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide,

N-{6-[(4-{4-[2-(4-benzylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}phenyl)methylamino]pyridin-3-yl}-4-trifluoromethylbenzamide,

N-(6-{4-[(2-{4-[4-(4-fluorobenzoyl)phenyl]-piperazin-1-yl}-2-oxoethyl)methylamino]-2-methoxy-phenoxy}pyridin-3-yl)-4-trifluoromethylbenzamide,

2-(4-piperonylpiperazin-1-yl)-N-{3-methyl-4-[5-(4-trifluoromethylphenoxymethyl)pyridin-2-yloxy]phenyl}-2-oxoacetamide,

N-[6-(4-{[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]methylamino}-2-methylphenoxy)pyridin-3-yl]-2-fluoro-4-trifluoromethylbenzamide,

N-[6-(4-{4-[2-(4-piperonylpiperazin-1-yl)-2-oxoethyl]piperidin-1-yl}-2-methoxyphenoxy)pyridin-3-yl]-4-trifluoromethylbenzamide, and

4-(3-{3-methyl-4-[5-(4-trifluoromethyl-benzoylamino)pyridin-2-yloxy]phenyl}-2-oxohexahydropyrimidin-1-yl)benzoic acid ethyl ester, or salts thereof.

53. The pharmaceutical composition for treating fibrosis according to Claim 50, 51 or 52, wherein the fibrosis is lung fibrosis.

54. The pharmaceutical composition for treating fibrosis according to Claim 50, 51 or 52, wherein the fibrosis is hepatic fibrosis.

55. The pharmaceutical composition for treating fibrosis according to Claim 50, 51 or 52, wherein the fibrosis is glomerulosclerosis.