substituted with the same or different 1 to 5 groups selected from the group consisting of (a) to (s) defined in the above (1), or

(3) 5- to 10-membered heteroaryl group which may be optionally substituted with the same or different 1 to 5 groups selected from the group consisting of (a) to (s) defined in the above (1);

W^1 is C_{1-4} alkylene group which may be optionally substituted with the same or different 1 to 4 groups selected from the group consisting of halogen atom, hydroxy, and C_{1-6} alkoxy;

ring Q^2 is benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, or pyrazine ring wherein the benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, and pyrazine ring may be optionally substituted with the same or different 1 to 3 groups selected from the group consisting of

(1) halogen atom,

(2) C_{1-6} alkyl which may be optionally substituted with the same or different 1 to 4 groups selected from the group consisting of the same or different 1 to 3 halogen atoms, hydroxy and C_{1-6} alkoxy,

(3) C_{1-6} alkoxy which may be optionally substituted with the same or different 1 to 3 halogen atoms,

(4) hydroxy, and

(5) cyano;

ring Q^3 is 5-membered heteroaryl ring which may be optionally substituted with halogen atom or C_{1-6} alkyl which may be optionally substituted with the same or different 1

esophageal cancer, thyroid cancer, small-cell lung cancer, non-small cell lung cancer, breast cancer, stomach cancer, gallbladder or bile duct cancer, liver cancer, pancreatic cancer, colon cancer, rectal cancer, ovarian cancer, chorioepithelioma, endometrial cancer, cervical cancer, urothelial cancer, renal cell cancer, prostate cancer, testicular tumor, Wilms' tumor, malignant melanoma, neuroblastoma, osteosarcoma, Ewing's sarcoma, or soft tissue sarcoma.

[0038]

[31] A medicament comprising the compound according to any one of [1] to [27] or a pharmaceutically acceptable salt thereof in combination with another anti-cancer agent selected from the group consisting of an anticancer alkylating agent, an anticancer antimetabolite, an anticancer antibiotic, a plant-based anti-cancer agent, an anticancer platinum coordination compound, an anticancer camptothecin derivative, an anticancer tyrosine kinase inhibitor, a serine-threonine kinase inhibitor, a phospholipid kinase inhibitor, a monoclonal antibody, an interferon, a biological response modifier, a hormone preparation, an immune checkpoint inhibitor, an epigenetics-related molecule inhibitor, a post-translational protein modification inhibitor, and an anti-cancer agent other than the foregoings or a pharmaceutically acceptable salt thereof.

used as the acid catalyst. The amount of the acid to be used is 0.1 mole or more per mole of compound (1-3).

[0100]

Step 1-3: Preparation process of compound (1-6)

Compound (1-6) is prepared by reacting compound (1-4) with compound (1-5) in an inert solvent in the presence of a condensation agent.

[0101] The reaction may be carried out in the presence of a base, as appropriate. The reaction temperature is typically about -20°C to the boiling point of the used solvent, but is not limited thereto. The reaction time is typically 10 minutes to 48 hours, which may vary according to various conditions such as a reaction temperature, a condensation agent, a starting material, and a solvent to be used.

[0102] Specific examples of the condensation agent include dicyclohexylcarbodiimide (DCC), diisopropylcarbodiimide (DIPC), 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide (WSC), benzotriazol-1-yl-tris(dimethylamino)phosphonium hexafluorophosphate (BOP), diphenylphosphoryl azide (DPPA), N,N-carbonyldiimidazole (CDI), O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate (HBTU), and O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate (HATU). As appropriate, the reaction may be carried out with the

include sodium borohydride, sodium cyanoborohydride, borane and lithium aluminium hydride.

[0156] Examples of the solvent to be used in the reaction with the hydride reducing agent include methanol, ethanol, dichloromehane, toluene, tetrahydrofuran and a mixture thereof.

The reaction temperature is typically −78°C to 100°C, preferably 0°C to 50°C, but is not limited thereto. The reaction time is typically 5 minutes to 12 hours, preferably 30 minutes to 6 hours.

[0157]

Step 7-2: Preparation process of compound (7-3)

Compound (7-3) is prepared by reducing olefin in compound (7-2) with a reagent for introducing a protective group. For example, reactions such as catalytic hydrogenation reaction with a metal catalyst such as palladium/carbon, Raney nickel, platinum oxide/carbon and rhodium/carbon under hydrogen atmosphere in the presence of Boc_2O are used.

[0158] In the catalytic hydrogenation reaction, the amount of the metal catalyst to be used for compound (7-2) is typically 0.1% by weight to 1000% by weight, preferably 1% by weight to 100% by weight. The reaction may be carried out in a solvent such as an alcohol such as methanol; an ether such as tetrahydrofuran; and an ester

examples thereof include lactose, mannitol, crystalline cellulose, low substituted hydroxypropylcellulose, corn starch, partly pregelatinized starch, carmellose calcium, croscarmellose sodium, hydroxypropylcellulose, hydroxypropylmethylcellulose, polyvinylalcohol, magnesium stearate, sodium stearyl fumarate, polyethylene glycol, propylene glycol, titanium oxide, and talc.

[0171] The present compound may be used in combination with another drug(s) to enhance the therapeutic effect thereof and/or reduce side effects thereof. Specifically, the present compound can be used in combination with a drug such as a hormone therapeutic drug, a chemotherapeutic drug, an immunotherapeutic drug or a cell growth factor and a drug for inhibiting a receptor effect thereof. Hereinafter, a drug which can be used in combination with the present compound is referred to as "combined medicine".

[0172] Examples of the combined medicine include an anticancer alkylating agent, an anticancer antimetabolite, an anticancer antibiotic, a plant-based anti-cancer agent, an anticancer platinum coordination compound, an anticancer camptothecin derivative, an anticancer tyrosine kinase inhibitor, a serine-threonine kinase inhibitor, a phospholipid kinase inhibitor, a monoclonal antibody, an interferon, a biological response modifier, a hormone preparation, an immune checkpoint inhibitor, an epigenetics-related molecule inhibitor, a

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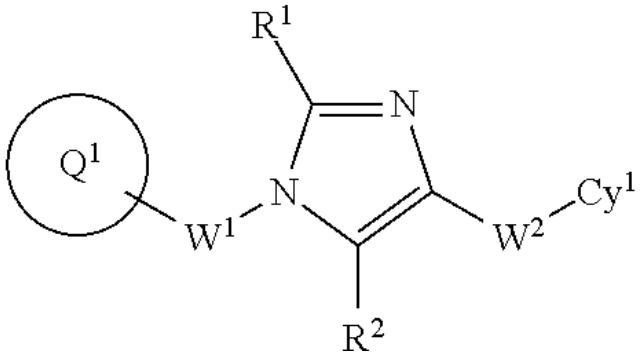
1. A compound of formula (1):

(1)



or a pharmaceutically acceptable salt thereof, wherein ring Q^1 is optionally-substituted C_{6-10} aryl group, optionally-substituted C_{3-10} cycloalkyl group, or optionally-substituted 5- to 10-membered heteroaryl group, wherein the substituents of the C_{6-10} aryl group, the C_{3-10} cycloalkyl group, or 5- to 10-membered heteroaryl group are selected from the group consisting of:

(a) halogen;

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(d) cyano;

(e) C_{6-10} aryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from

the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(g) C_{6-10} aryloxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(h) hydroxy,

(i) amino which is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(j) aminocarbonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(k) C_{1-6} alkoxy-carbonyl, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(l) C_{1-6} alkyl-carbonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(m) C_{1-6} alkylsulfonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(n) C_{1-6} alkyl-carbonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(o) C_{1-6} alkylsulfonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(p) C_{1-6} alkoxy-carbonylamino, wherein the alkoxy moiety is optionally substituted 1 to 3 groups independently selected

from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(q) C_{1-6} alkyl-carbonyloxy, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(r) aminosulfonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups; and

(s) C_{3-10} cycloalkyl, which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

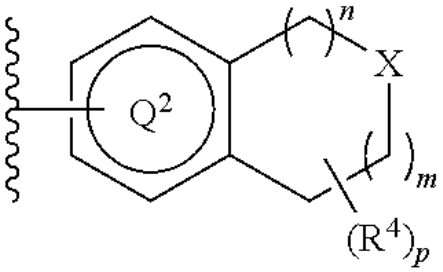
R^1 and R^2 are independently hydrogen, halogen, or C_{1-6} alkyl which is optionally substituted with 1 to 3 independently selected halogen groups;

W^1 is optionally-substituted C_{1-4} alkylene group, wherein the substituents of C_{1-4} alkylene group are selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

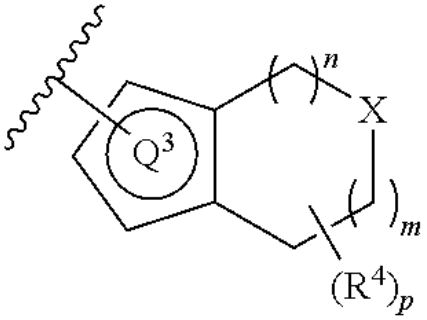
W^2-Cy^1 is --$NR^{3a}C(O)$-Cy^1, --$NR^{3a}C(O)O$-Cy^1, --$NR^{3a}C(O)OCH_2$-Cy^1, --$NR^{3a}C(O)NR^{3b}$-Cy^1, --$NR^{3a}C(O)NR^{3b}CH_2$-Cy^1, --$NR^{3a}C(O)CH_2O$-Cy^1, --$NR^{3a}C(O)CH_2$-Cy^1, --$NR^{3a}C(O)CH_2CH_2$-Cy^1, --$C(O)NR^{3a}$-Cy^1, --$C(O)NR^{3a}CH_2$-Cy^1, --$C(O)NR^{3a}CH_2CH_2$-Cy^1, or --$NR^{3a}C(O)$--CR^{3c}==CR^{3d}-Cy^1 wherein R^{3a} and R^{3b} are independently hydrogen or C_{1-6} alkyl; and R^{3c} and R^{3d} are independently hydrogen, fluorine, or C_{1-6} alkyl; and

Cy^1 is a group of the following formula (11), (12), (13), or (15):

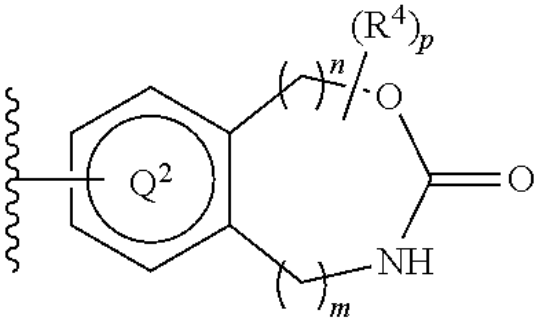
(11)



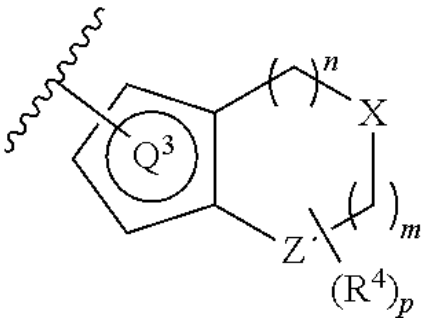
(12)



(13)



(15)



wherein ring Q^2 is an optionally-substituted benzene ring, an optionally-substituted pyridine ring, an optionally-

substituted pyrimidine ring, an optionally-substituted pyridazine ring, or an optionally-substituted pyrazine ring, wherein the substituents of the benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, or pyrazine ring are selected from the group consisting of:

(a) halogen,

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(d) cyano,

(e) C_{6-10} aryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(g) C_{6-10} aryloxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(h) hydroxy;

(i) amino which is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(i) aminocarbonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(k) C_{1-6} alkoxy-carbonyl, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(l) C_{1-6} alkyl-carbonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(m) C_{1-6} alkylsulfonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(n) C_{1-6} alkyl-carbonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(o) C_{1-6} alkylsulfonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(p) C_{1-6} alkoxy-carbonylamino, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(q) C_{1-6} alkyl-carbonyloxy, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(r) aminosulfonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups; and

(s) C_{3-10} cycloalkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

ring Q^3 is an optionally-substituted 5-membered heteroaryl ring;

n and m are independently 0, 1 or 2, provided that n and m are not simultaneously 0;

X and Z are independently NR^5, --NR^{3e}C(O)--, --C(O)NR^{3e}--, or O wherein R^5 is hydrogen or C_{1-6} alkyl which is optionally substituted with 1 to 3 independently selected halogen groups; and R^{3e} is hydrogen or C_{1-6} alkyl;

p is 1, 2, 3, 4 or 5; and

R^4 is, independently when two or more exist, hydrogen, halogen, hydroxy, oxo, a C_{1-6} alkyl group which optionally substituted with 1 to 3 independently selected halogen groups, or a C_{1-6} alkoxy group which is optionally substituted with 1 to 3 independently selected halogen groups; or

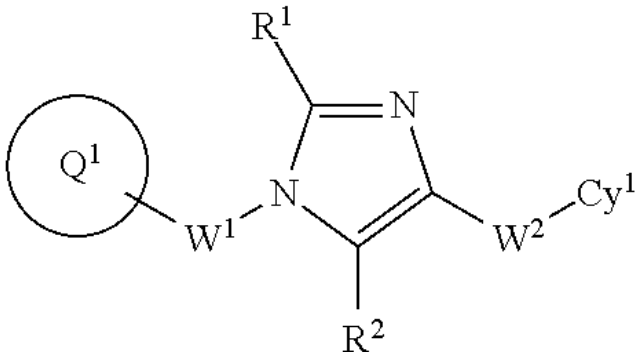
when two R^4 are attached to the same carbon atom or adjacent carbon atoms on the ring, they may be combined with the carbon atom(s) to form

(1) a 5- to 8-membered saturated or partially-unsaturated carbocyclic ring which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, C_{1-6} alkyl, and C_{1-6} alkoxy, or

(2) a 5- to 8-membered saturated or partially-unsaturated heterocyclic ring which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, C_{1-6} alkyl, and C_{1-6} alkoxy.

2. A compound of formula (1):

(1)



or a pharmaceutically acceptable salt thereof, wherein ring Q^1 is an optionally-substituted C_{6-10} aryl group, an optionally-substituted C_{3-10} cycloalkyl group, or an optionally-substituted 5- to 10-membered heteroaryl group, wherein the substituents of the C_{6-10} aryl group, C_{3-10} cycloalkyl group, or 5- to 10-membered heteroaryl group are selected from the group consisting of

(a) halogen;

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(d) cyano,

(e) C_{6-10} aryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(g) C_{6-10} aryloxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(h) hydroxy,

(i) amino which is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(i) aminocarbonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(k) C_{1-6} alkoxy-carbonyl, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(l) C_{1-6} alkyl-carbonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(m) C_{1-6} alkylsulfonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(n) C_{1-6} alkyl-carbonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(o) C_{1-6} alkylsulfonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(p) C_{1-6} alkoxy-carbonylamino, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(q) C_{1-6} alkyl-carbonyloxy, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently

selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(r) aminosulfonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups; and

(s) C_{3-10} cycloalkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

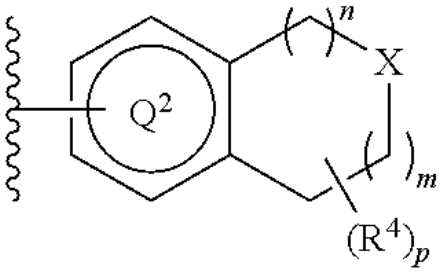
R^1 and R^2 are independently hydrogen, halogen, or a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups;

W^1 is an optionally-substituted C_{1-4} alkylene group, wherein, the substituents of the C_{1-4} alkylene group are selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

W^2–Cy^1 is --$NR^{3a}C(O)$–Cy^1, --$NR^{3a}C(O)O$–Cy^1, --$NR^{3a}C(O)OCH_2$–Cy^1, --$NR^{3a}C(O)NR^{3b}$–Cy^1, --$NR^{3a}C(O)NR^{3b}CH_2$–Cy^1, --$NR^{3a}C(O)CH_2O$–Cy^1, --$NR^{3a}C(O)CH_2$–Cy^1, --$NR^{3a}C(O)CH_2CH_2$–Cy^1, --$C(O)NR^{3a}$–Cy^1, --$C(O)NR^{3a}CH_2$–Cy^1, or --$C(O)NR^{3a}CH_2CH_2$–Cy^1 wherein R^{3a} and R^{3b} are independently hydrogen or C_{1-6} alkyl; and

Cy^1 is a group of the following formula (11), (12), or (13):

(11)



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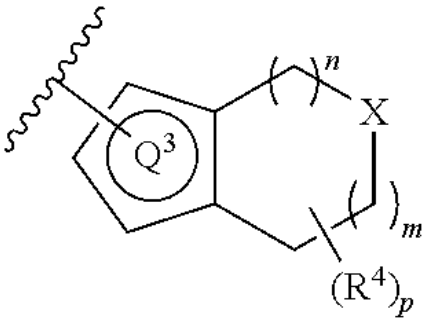
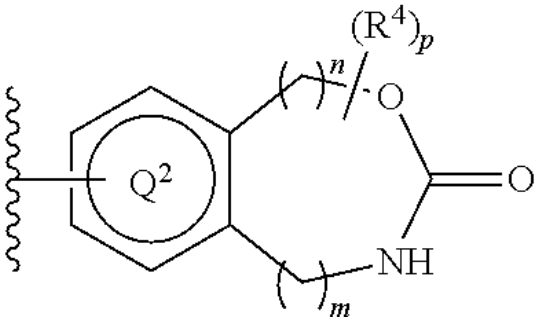


(13)



wherein ring Q^2 is an optionally-substituted benzene ring, an optionally-substituted pyridine ring, an optionally-substituted pyrimidine ring, an optionally-substituted pyridazine ring, or an optionally-substituted pyrazine ring, wherein the substituents of the benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, or pyrazine ring are selected from the group consisting of:

(a) halogen;

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(d) cyano,

(e) C_{6-10} aryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(g) C_{6-10} aryloxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy;

(h) hydroxy,

(i) amino which is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(i) aminocarbonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups;

(k) C_{1-6} alkoxy-carbonyl, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(l) C_{1-6} alkyl-carbonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(m) C_{1-6} alkylsulfonyl, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently

selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(n) C_{1-6} alkyl-carbonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(o) C_{1-6} alkylsulfonylamino, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(p) C_{1-6} alkoxy-carbonylamino, wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(q) C_{1-6} alkyl-carbonyloxy, wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

(r) aminosulfonyl, wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups; and

(s) C_{3-10} cycloalkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

ring Q^3 is an optionally-substituted 5-membered heteroaryl ring;

n and m are independently 0, 1 or 2, provided that n and m are not simultaneously 0;

X is NR^5 or O wherein R^5 is hydrogen or C_{1-6} alkyl which is optionally substituted with 1 to 3 independently selected halogen groups;

p is 1, 2, 3, 4 or 5; and

R^4 is, independently when two or more exist, hydrogen, halogen, or a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups.

3. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein ring Q^1 is

(1) C_{6-10} aryl group which is optionally substituted with 1 to 5 groups independently selected from the group consisting of:

(a) halogen,

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(d) cyano,

(e) C_{6-10} aryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy,

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy,

(g) C_{6-10} aryloxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl, and C_{1-6} alkoxy,

(h) hydroxy,

(i) amino which is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups,

(j) aminocarbonyl wherein the amino moiety thereof is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups,

(k) C_{1-6} alkoxy-carbonyl wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(l) C_{1-6} alkyl-carbonyl wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(m) C_{1-6} alkylsulfonyl wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(n) C_{1-6} alkyl-carbonylamino wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(o) C_{1-6} alkylsulfonylamino wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(p) C_{1-6} alkoxy-carbonylamino wherein the alkoxy moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(q) C_{1-6} alkyl-carbonyloxy wherein the alkyl moiety is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(r) aminosulfonyl wherein the amino moiety is optionally substituted with 1 to 2 independently selected C_{1-6} alkyl groups, and

(s) C_{3-10} cycloalkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(2) C_{3-10} cycloalkyl group which is optionally substituted with 1 to 5 groups independently selected from the group consisting of (a) to (s) defined in the above group (1), or

(3) 5- to 10-membered heteroaryl group which is optionally substituted with 1 to 5 groups independently selected from the group consisting of (a) to (s) defined in the above group (1);

W^1 is a C_{1-4} alkylene group which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy;

ring Q^2 is a benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, or pyrazine ring wherein the benzene ring, pyridine ring, pyrimidine ring, pyridazine ring, and pyrazine ring are each optionally substituted with 1 to 3 groups independently selected from the group consisting of:

(1) halogen,

(2) C_{1-6} alkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy,

(3) C_{1-6} alkoxy which is optionally substituted with 1 to 3 halogen groups,

(4) hydroxyl, and

(5) cyano;

ring Q^3 is a 5-membered heteroaryl ring which is optionally substituted with halogen or C_{1-6} alkyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, hydroxy, and C_{1-6} alkoxy.

4. The compound according to claim 3 or a pharmaceutically acceptable salt thereof, wherein ring Q^1 is

(1) phenyl group which is optionally substituted with 1 to 5 groups selected from the group consisting of:

(a) halogen atom,

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy and C_{1-6} alkoxy,

(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 groups independently selected from the group consisting of halogen, hydroxy and C_{1-6} alkoxy,

(d) cyano,

(e) phenyl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl and C_{1-6} alkoxy,

(f) 5- or 6-membered heteroaryl which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl and C_{1-6} alkoxy, and

(g) phenoxy which is optionally substituted with 1 to 4 groups independently selected from the group consisting of halogen, C_{1-6} alkyl and C_{1-6} alkoxy,

(2) C_{3-7} cycloalkyl group which is optionally substituted with 1 to 4 groups independently selected from the group consisting of (a) to (g) defined in the above group (1), or

(3) pyridyl group which is optionally substituted with 1 to 4 groups independently selected from the group consisting of (a) to (g) defined in the above group (1).

5. The compound according to claim 4 or a pharmaceutically acceptable salt thereof, wherein ring Q^1 is phenyl group which is optionally substituted with 1 to 5 groups independently selected from the group consisting of:

(a) halogen,

(b) C_{1-6} alkyl which is optionally substituted with 1 to 3 independently selected halogen groups, and
(c) C_{1-6} alkoxy which is optionally substituted with 1 to 3 independently selected halogen groups.

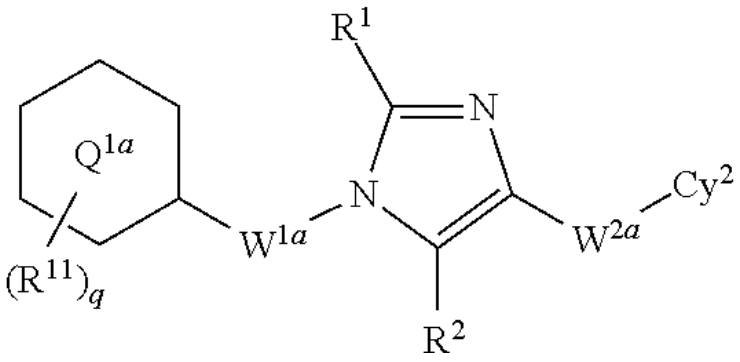
6. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein W^1 is methylene group which is optionally substituted with 1 to 2 independently selected halogen groups, or ethylene which is optionally substituted with 1 to 4 independently selected halogen groups.

7. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein W^2–Cy^1 is --$NR^{3a}C(O)$–Cy^1 or --$C(O)NR^{3a}$–Cy^1, wherein R^{3a} is hydrogen or C_{1-6} alkyl.

8. The compound according to claim 7 or a pharmaceutically acceptable salt thereof, wherein W^2–Cy^1 is --$NR^{3a}C(O)$–Cy^1, wherein R^{3a} is hydrogen or C_{1-6} alkyl.

9. The compound according to claim 1 represented by formula (1a):

(1a)



or a pharmaceutically acceptable salt thereof, wherein ring Q^{1a} is phenyl, pyridyl, or cyclohexyl;

q is 1, 2, 3, 4 or 5;

R^{11} is, independently when two or more exist,

(1) hydrogen,

(2) halogen,

(3) a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups, or

(4) a C_{1-6} alkoxy group which is optionally substituted with 1 to 3 independently selected halogen groups;

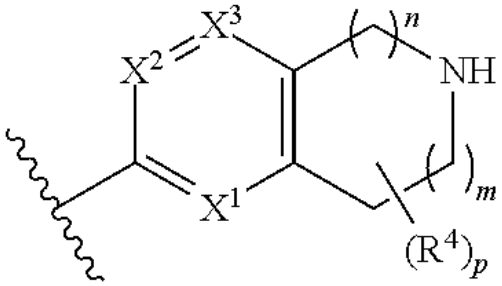
R^1 and R^2 are independently hydrogen, halogen, or C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups;

W^{1a} is methylene which is optionally substituted with 1 to 2 independently selected halogen groups, or ethylene which is optionally substituted with 1 to 4 independently selected halogen groups;

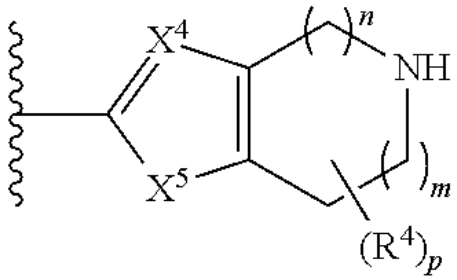
W^{2a}–Cy^2 is --$NR^{3a}C(O)$–Cy^2 or --$C(O)NR^{3a}$–Cy^2 wherein R^{3a} is hydrogen or C_{1-6} alkyl; and

Cy^2 is a group of the following formula (21), (22), or (23):

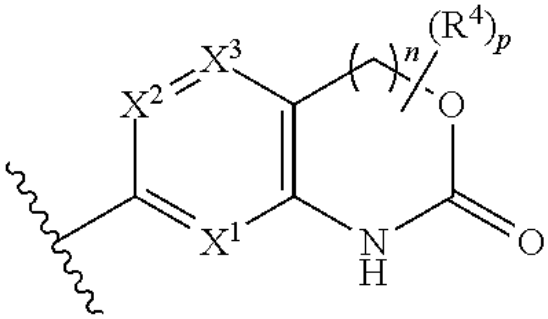
(21)



(22)



(23)



wherein X^1 is N or CR^{12};

X^2 is N or CR^{13};

X^3 is N or CR^{14};

X^4 is N or CR^{15};

X^5 is S, O or NH;

provided that X^1, X^2 and X^3 are not simultaneously N;

R^{12}, R^{13}, R^{14} and R^{15} are independently

(1) hydrogen,

(2) halogen,

(3) a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups, or
(4) a C_{1-6} alkoxy group which is optionally substituted with 1 to 3 independently selected halogen groups;
n and m are independently 0, 1 or 2, provided that n and m are not simultaneously 0;
p is 1, 2, 3, 4 or 5; and
R^4 is, independently when two or more exist, hydrogen, halogen, or a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups.

10. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein ring Q^{1a} is phenyl.

11. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein W^{2a}–Cy^2 is --NHC(O)–Cy^2.

12. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein W^{2a}–Cy^2 is --C(O)NH–Cy^2.

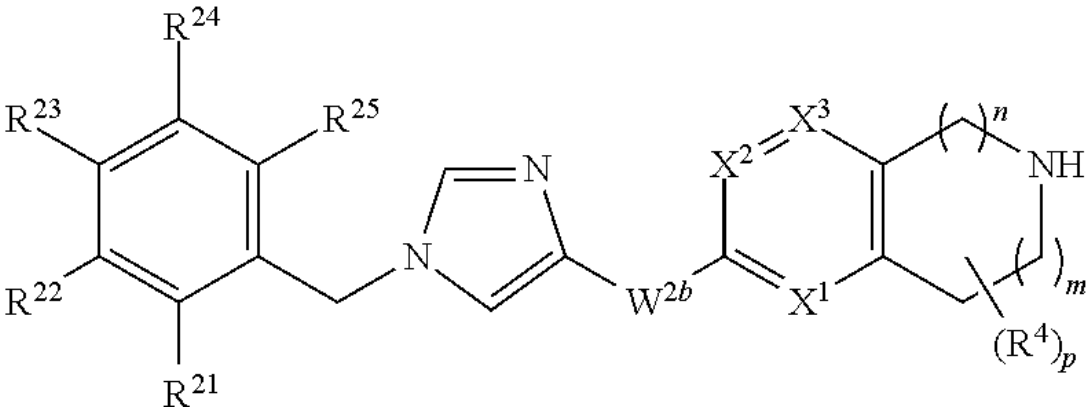
13. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein Cy^2 is a group of formula (21) or (23).

14. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein Cy^2 is a group of formula (22); X^4 is N or CH; and X^5 is S.

15. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are each hydrogen.

16. The compound according to claim 1 represented by formula (1b):

(1b)



or a pharmaceutically acceptable salt thereof, wherein X^1 is N or CR^{12};

X^2 is N or CR^{13};

X^3 is N or CR^{14};

provided that X^1, X^2 and X^3 are not simultaneously N;

W^{2b} is --NHC(O)--, or --C(O)NH--;

R^{12}, R^{13}, R^{14}, R^{21}, R^{22}, R^{23}, R^{24}, and R^{25} are independently

(1) hydrogen,

(2) halogen,

(3) a C_{1-6} alkyl group which optionally substituted with 1 to 3 independently selected halogen groups, or

(4) a C_{1-6} alkoxy group which optionally substituted with 1 to 3 independently selected halogen groups;

n and m are independently 0, 1 or 2, provided that n and m are not simultaneously 0;

p is 1, 2, 3, 4 or 5; and

R^4 is, independently when two or more exist, hydrogen, halogen, or a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups.

17. The compound according to claim 16 or a pharmaceutically acceptable salt thereof, wherein R^{22} is halogen or a C_{1-6} alkyl group which optionally substituted with 1 to 3 independently selected halogen groups.

18. The compound according to claim 16 or a pharmaceutically acceptable salt thereof, wherein R^{22} is halogen.

19. The compound according to claim 16 or a pharmaceutically acceptable salt thereof, wherein R^{21}, R^{23}, R^{24} and R^{25} are independently
(1) hydrogen,
(2) halogen, or
(3) a C_{1-6} alkyl group which is optionally substituted with 1 to 3 independently selected halogen groups.

20. The compound according to claim 16 or a pharmaceutically acceptable salt thereof, wherein W^{2b} is --NHC(O)--.

21. The compound according to claim 16 or a pharmaceutically acceptable salt thereof, wherein W^{2b} is --C(O)NH--.

22. The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein only one of X^1, X^2 and X^3 is N.

23. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein R^4 is hydrogen.

24. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, wherein n is 1 and m is 1; or n is 2 and m is 0.

25. The compound according to claim 24 or a pharmaceutically acceptable salt thereof, wherein n is 1 and m is 1.

26. The compound according to claim 1 selected from the following compounds or a pharmaceutically acceptable salt thereof:
N-(7-fluoro-1,2,3,4-tetrahydroisoquinolin-6-yl)-1-(3,4,5-trifluorobenzyl)-1H-imidazole-4-carboxamide,
N-(5,6,7,8-tetrahydro-2,7-naphthyridin-3-yl)-1-(3,4,5-trifluorobenzyl)-1H-imidazole-4-carboxamide,
N-(1,2,3,4-tetrahydroisoquinolin-6-yl)-1-(3,4,5-trifluorobenzyl)-1H-imidazole-4-carboxamide,
8-fluoro-N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-2,7-naphthyridine-3-carboxamide,
N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-2,7-naphthyridine-3-carboxamide,
N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,6-naphthyridine-2-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,6-naphthyridine-2-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,

N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
1-(3,4-difluorobenzyl)-N-(5,6,7,8-tetrahydro-2,7-naphthyridin-3-yl)-1H-imidazole-4-carboxamide,
N-[1-(3,5-difluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(3,4-difluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[3-(trifluoromethoxy)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(3-phenoxybenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(4-chloro-3-fluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(3-chloro-5-fluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[4-fluoro-3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[4-chloro-3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[4-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(4-chlorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-{1-[3-chloro-5-(trifluoromethoxy)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide,
N-[1-(3-phenoxybenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(4-chloro-3-fluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3-chloro-5-fluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,

N-{1-[4-fluoro-3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-{1-[4-chloro-3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3-chloro-4-fluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-{1-[4-methyl-3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-{1-[3-fluoro-5-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-{1-[3-chloro-5-(trifluoromethoxy)benzyl]-1H-imidazol-4-yl}-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3,5-dichlorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide, and
N-[1-(3,4-dichlorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide.

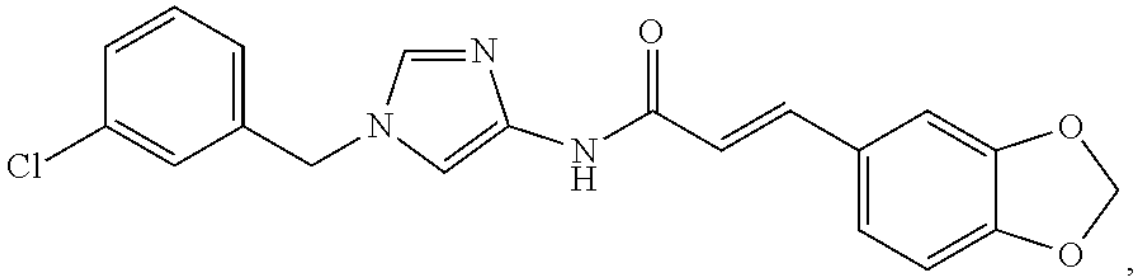
27. The compound according to claim 1 selected from the following compounds or a pharmaceutically acceptable salt thereof:
N-(5,6,7,8-tetrahydro-2,7-naphthyridin-3-yl)-1-(3,4,5-trifluorobenzyl)-1H-imidazole-4-carboxamide,
8-fluoro-N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-1,2,3,4-tetrahydroisoquinoline-6-carboxamide,
N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,6-naphthyridine-2-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,6-naphthyridine-2-carboxamide,
N-[1-(3,4,5-trifluorobenzyl)-1H-imidazol-4-yl]-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamid, and

N-{1-[3-(trifluoromethyl)benzyl]-1H-imidazol-4-yl}-5,6,7,8-tetrahydro-1,7-naphthyridine-3-carboxamide.

28. Use of the compound according to claim 1 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating cancer.

29. A pharmaceutical composition comprising the compound according to claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

30. A compound selected from the following compounds or a pharmaceutically acceptable salt thereof:



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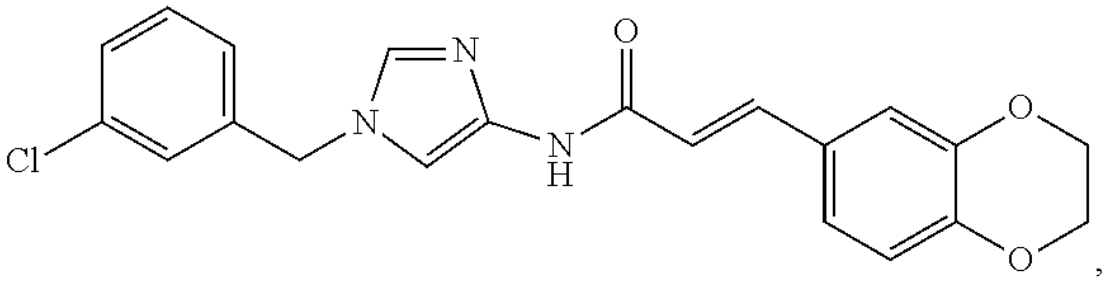

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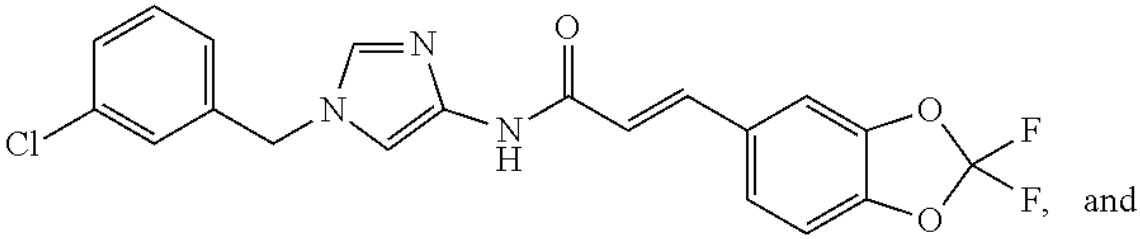
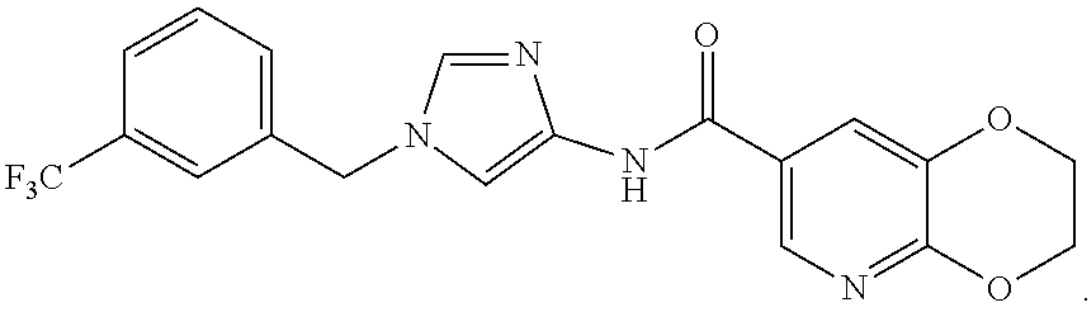


and



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31. Use of the compound according to claim 1 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating tumor, wherein the tumor is acute leukemia, chronic lymphatic leukemia, chronic

myelocytic leukemia, polycythemia vera, malignant lymphoma, myeloma, brain tumor, head and neck cancer, esophageal cancer, thyroid cancer, small cell lung cancer, non-small cell lung cancer, breast cancer, stomach cancer, gallbladder or bile duct cancer, liver cancer, pancreatic cancer, colon cancer, rectal cancer, ovarian cancer, chorioepithelioma, endometrial cancer, cervical cancer, urothelial cancer, renal cell cancer, prostate cancer, testicular tumor, Wilms' tumor, malignant melanoma, neuroblastoma, osteosarcoma, Ewing's sarcoma, or soft tissue sarcoma.

32. Use of the compound according to claim 1 or a pharmaceutically acceptable salt thereof and another anti-cancer agent selected from the group consisting of an anticancer alkylating agent, an anticancer antimetabolite, an anticancer antibiotic, a plant-based anti-cancer agent, an anticancer platinum coordination compound, an anticancer camptothecin derivative, an anticancer tyrosine kinase inhibitor, a serine-threonine kinase inhibitor, a phospholipid kinase inhibitor, a monoclonal antibody, an interferon, a biological response modifier, a hormone preparation, an immune checkpoint inhibitor, an epigenetics-related molecule inhibitor, a post-translational protein modification inhibitor, and an anti-cancer agent other than the foregoings or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating cancer.

33. Use of the compound according to claim 26 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating cancer.

34. A pharmaceutical composition comprising the compound according to claim 26 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

35. Use of the compound according to claim 26 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating tumor, wherein the tumor is acute leukemia, chronic lymphatic leukemia, chronic myelocytic leukemia, polycythemia vera, malignant lymphoma, myeloma, brain tumor, head and neck cancer, esophageal cancer, thyroid cancer, small cell lung cancer, non-small cell lung cancer, breast cancer, stomach cancer, gallbladder or bile duct cancer, liver cancer, pancreatic cancer, colon cancer, rectal cancer, ovarian cancer, chorioepithelioma, endometrial cancer, cervical cancer, urothelial cancer, renal cell cancer, prostate cancer, testicular tumor, Wilms' tumor, malignant melanoma, neuroblastoma, osteosarcoma, Ewing's sarcoma, or soft tissue sarcoma.

36. Use of the compound according to claim 26 or a pharmaceutically acceptable salt thereof and another anti-cancer agent selected from the group consisting of an anticancer alkylating agent, an anticancer antimetabolite, an anticancer antibiotic, a plant-based anti-cancer agent, an anticancer platinum coordination compound, an anticancer camptothecin derivative, an anticancer tyrosine kinase inhibitor, a serine-threonine kinase inhibitor, a phospholipid kinase inhibitor, a monoclonal antibody, an interferon, a biological response modifier, a hormone preparation, an immune checkpoint inhibitor, an epigenetics-related molecule inhibitor, a post-translational protein modification inhibitor, and an anti-

cancer agent other than the foregoings or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating cancer.