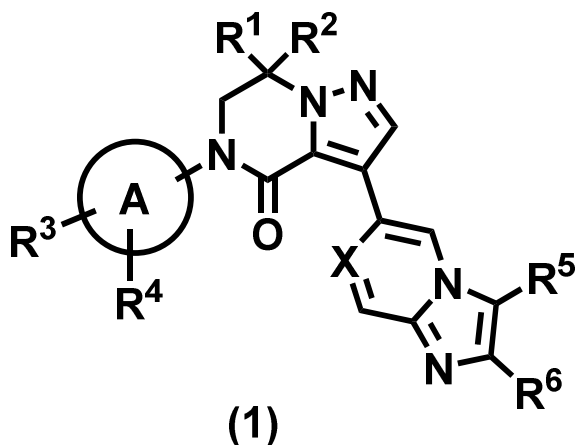


CLAIMS

1. A compound of Formula (1):



5 or a pharmaceutically acceptable salt thereof,

wherein R¹ and R² are each independently hydrogen atom, or C₁₋₄ alkyl, ~~or C₃₋₆ saturated carbocyclyl group,~~ wherein the alkyl ~~and the saturated carbocyclyl group are each independent and~~ may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C₁₋₄ alkoxy, ~~or alternatively, R¹ and R² may combine together with the carbon atom to which they attach to form a C₃₋₄ saturated carbocyclyl group, wherein the saturated carbocyclyl group may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C₁₋₄ alkoxy;~~

Ring A is benzene, pyridine, pyrimidine, pyrazine, thiophene, thiazole, isothiazole, oxazole, isoxazole, quinoline, isoquinoline, 1,3-benzodioxole;

R³ and R⁴ are each independently hydrogen atom,
 5 halogen atom, hydroxy, C₁₋₆ alkyl, C₁₋₄ alkoxy, wherein the alkyl and the alkoxy are each independent and may be optionally substituted with the same or different 1 to 5 halogen atoms, or C₃₋₆ saturated carbocyclyl group, wherein the saturated carbocyclyl group is each independent and may
 10 be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom and C₁₋₄ alkyl;

R⁵ and R⁶ are each independently

- (1) hydrogen atom,
- 15 (2) halogen atom, ~~hydroxy,~~
- (3) C₁₋₄ alkyl, ~~C₁₋₆ alkoxy,~~ wherein the alkyl ~~and the alkoxy~~ are each independent and may be optionally substituted with the same or different 1 to 5 ~~fluorine~~ substituents selected from the group consisting of
 20 ~~halogen atoms, hydroxy, and~~
- (4) C₁₋₄ alkoxy, wherein the alkoxy may be optionally substituted with the same or different 1 to 5 ~~fluorine~~ halogen atoms, or
- (5) ~~-NR^aR^b, -NR^d-C(O)-R^e, -NR^d-C(O)-OR^e, -NR^d-C(O)-NR^aR^b, or~~
 25 ~~-NR^d-SO₂-R^e;~~

R^a and R^b are each independent, and R^a s or R^b s when NR^aR^b exists plurally are each independent, and they are each hydrogen atom, or C_{1-4} alkyl, wherein the alkyl is each independent and may be optionally substituted with the same or different 1 to 5 fluorine substituents selected from the group consisting of halogen atoms, hydroxy, and C_{1-4} alkoxy, or

alternatively, R^a and R^b may combine together with the nitrogen atom to which they attach to form a 4 to 6 membered nitrogen-containing saturated heterocyclyl group, wherein the nitrogen-containing saturated heterocyclyl group may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, C_{1-4} alkyl, and C_{1-4} alkoxy;

R^c , where R^c s are each independent when existing plurally, is C_{1-4} alkyl, or C_{3-6} saturated carbocyclyl group, wherein the alkyl and the saturated carbocyclyl group are each independent and may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C_{1-4} alkoxy;

R^d , where R^d s are each independent when existing plurally, is hydrogen atom, C_{1-4} alkyl, or C_{3-6} saturated carbocyclyl group, wherein the alkyl and the saturated carbocyclyl group are each independent and may be

~~optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C₁₋₄ alkoxy;~~

X is nitrogen atom or -CR^e-; and

5 R^e is hydrogen atom, halogen atom, C₁₋₆ alkyl, or C₁₋₆ alkoxy, wherein the alkyl and the alkoxy may be optionally substituted with the same or different 1 to 5 halogen atoms.

10 ~~2. The compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein R¹ and R² are each independently hydrogen atom or C₁₋₄ alkyl, wherein the alkyl may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C₁₋₄ alkoxy, or~~
15 ~~alternatively, R¹ and R² combine together with the carbon atom to which they attach to form a cyclopropane ring or cyclobutane ring.~~

20 ~~32.~~ The compound according to claim 1 ~~or 2~~, or a pharmaceutically acceptable salt thereof, wherein R³ and R⁴ are each independently

(1) hydrogen atom,

(2) halogen atom,

(3) hydroxy,

(4) C₁₋₄ alkyl optionally substituted with the same or different 1 to 5 halogen atoms, or

(5) C₁₋₄ alkoxy optionally substituted with the same or different 1 to 5 halogen atoms.

5

~~4. The compound according to any one of claims 1 to 3, or a pharmaceutically acceptable salt thereof, wherein R⁵ and R⁶ are each independently~~

~~(1) hydrogen atom,~~

10 ~~(2) halogen atom,~~

~~(3) hydroxy,~~

~~(4) C₁₋₄ alkyl, wherein the alkyl may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy,~~

15 ~~and C₁₋₄ alkoxy optionally substituted with the same or different 1 to 5 halogen atoms,~~

~~(5) C₁₋₄ alkoxy, wherein the alkoxy may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy,~~

20 ~~and C₁₋₄ alkoxy optionally substituted with the same or different 1 to 5 halogen atoms, or~~

~~(6) -NR^aR^b.~~

~~5. The compound according to any one of claims 1 to 4, or a pharmaceutically acceptable salt thereof, wherein R^d , where R^d s are each independent when existing plurally, is~~
~~(1) hydrogen atom, or~~

5 ~~(2) C_{1-4} alkyl, wherein the alkyl may be optionally substituted with the same or different 1 to 5 substituents selected from the group consisting of halogen atom, hydroxy, and C_{1-4} alkoxy.~~

10 ~~63. The compound according to any one of claims 1 or 2 to 5, or a pharmaceutically acceptable salt thereof, wherein R^e is~~

(1) hydrogen atom,

(2) halogen atom, or

15 (3) C_{1-4} alkyl optionally substituted with the same or different 1 to 5 halogen atoms.

~~74. The compound according to any one of the preceding claims 1, 3 to 6, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are each independently hydrogen atom, methyl, ethyl, isopropyl, cyclopropyl, methoxymethyl, hydroxymethyl, difluoromethyl, or trifluoromethyl, or alternatively, R^1 and R^2 combine together with the carbon atom to which they attach to form a cyclopropane ring or a~~
 20
 25 ~~cyclobutane ring.~~

85. The compound according to any one of the preceding
claims ~~1 to 7~~, or a pharmaceutically acceptable salt
thereof, wherein Ring A is benzene, thiophene, pyridine,
5 quinoline, or 1,3-benzodioxole.

96. The compound according to any one of the preceding
claims ~~1 to 8~~, or a pharmaceutically acceptable salt
thereof, wherein R³ and R⁴ are each independently
10 (1) hydrogen atom,
(2) halogen atom,
(3) C₁₋₄ alkyl optionally substituted with the same or
different 1 to 5 halogen atoms, or
(4) C₁₋₄ alkoxy optionally substituted with the same or
15 different 1 to 5 halogen atoms.

~~10. The compound according to any one of claims 1 to 9, or
a pharmaceutically acceptable salt thereof, wherein R^c,
where R^cs are each independent when existing plurally, is
20 C₁₋₄-alkyl optionally substituted with the same or different
1 to 5 halogen atoms.~~

~~11. The compound according to any one of claims 1 to 10,
or a pharmaceutically acceptable salt thereof, wherein R^d,
25 where R^ds are each independent when existing plurally, is~~

~~hydrogen atom or C₁₋₄ alkyl optionally substituted with the same or different 1 to 5 halogen atoms.~~

~~12. The compound according to any one of claims 1 to 11,
or a pharmaceutically acceptable salt thereof, wherein R⁵
and R⁶ are each independently~~

~~(1) hydrogen atom,~~

~~(2) halogen atom,~~

~~(3) C₁₋₄ alkyl, wherein the alkyl may be optionally
substituted with the same or different 1 to 5 substituents
selected from the group consisting of halogen atom, hydroxy,
and C₁₋₄ alkoxy optionally substituted with the same or
different 1 to 5 halogen atoms,~~

~~(4) C₁₋₄ alkoxy, wherein the alkoxy may be optionally
substituted with the same or different 1 to 5 substituents
selected from the group consisting of halogen atom, hydroxy,
and C₁₋₄ alkoxy optionally substituted with the same or
different 1 to 5 halogen atoms, or~~

~~(5) NR^aR^b.~~

~~13. The compound according to any one of claims 1 to 12,
or a pharmaceutically acceptable salt thereof, wherein R^a
and R^b are each independent and R^as or R^bs when NR^aR^b exists
plurally are each independent, and they are hydrogen atom
or C₁₋₄ alkyl, wherein the alkyl may be optionally~~

~~substituted with the same or different 1 to 3 substituents
selected from the group consisting of halogen atom, hydroxy,
and C₁₋₄-alkoxy.~~

5 ~~147.~~ The compound according to any one of the preceding
claims ~~1 to 13,~~ or a pharmaceutically acceptable salt
thereof, wherein R^e is

- (1) hydrogen atom,
- (2) fluorine atom, or

10 (3) C₁₋₄ alkyl optionally substituted with the same or
different 1 to 5 halogen atoms.

15 ~~158.~~ The compound according to claim 1, or a
pharmaceutically acceptable salt thereof, wherein R¹ is
methyl;

R² is hydrogen atom;

a 6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one moiety
has S-configuration at the 7-position;

Ring A is benzene;

20 R³ and R⁴ are each independently hydrogen atom,
fluorine, chlorine, difluoromethyl, trifluoromethyl, or
difluoromethoxy;

R⁵ and R⁶ are each independently hydrogen atom or -NH₂;
and

25 X is nitrogen atom or -CH-.

169. The compound according to claim 1, or a pharmaceutically acceptable salt thereof, selected from the following compounds:

5 (7S)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-3-(imidazo[1,2-a]pyrazin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-
10 4(5H)-one;

(7S)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[3-chloro-4-fluorophenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-5-[4-(difluoromethyl)phenyl]-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

15 (7S)-5-(4-chloro-3-fluorophenyl)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-5-(4-chlorophenyl)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-5-[4-(difluoromethoxy)phenyl]-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-6,7-dihydropyrazolo[1,5-a]pyrazin-
20 4(5H)-one; and

(7S)-3-(3-aminoimidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one.

~~17~~10. The compound according to claim 1, or a pharmaceutically acceptable salt thereof, selected from the following compounds:

(7S)-3-(3-fluoroimidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-7-methyl-3-(3-methylimidazo[1,2-a]pyridin-6-yl)-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

10 (7S)-3-(3-ethylimidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one; and

(7S)-7-methyl-3-(3-propylimidazo[1,2-a]pyridin-6-yl)-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-15 4(5H)-one.

~~18~~11. The compound according to claim 1, or a pharmaceutically acceptable salt thereof, selected from the following compounds:

20 (7S)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-3-(imidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[3-chloro-4-fluorophenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one;

(7S)-3-(3-fluoroimidazo[1,2-a]pyridin-6-yl)-7-methyl-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one; and

(7S)-7-methyl-3-(3-methylimidazo[1,2-a]pyridin-6-yl)-5-[4-(trifluoromethyl)phenyl]-6,7-dihydropyrazolo[1,5-a]pyrazin-4(5H)-one.

~~19~~12. A pharmaceutical composition comprising a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof.

~~20~~13. A therapeutic agent and/or preventive agent for a disease involving Group II mGlu receptor, comprising a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof, as an active ingredient, wherein the disease involving Group II mGlu receptor is psychiatric disease or neurodegenerative disease.

~~21~~14. The therapeutic agent and/or preventive agent according to claim ~~20~~13, wherein the psychiatric disease or neurodegenerative disease is major depressive disorder, depressive disorder, bipolar and related disorders, anxiety disorder, posttraumatic stress disorder, obsessive-compulsive disorder, acute stress disorder, schizophrenia,

autism spectrum disorder, Alzheimer's disease, cognitive dysfunction, dementia, drug dependence, obesity, seizure, tremor, pain, or sleep disorder.

5 ~~22~~15. A therapeutic agent and/or preventive agent for a psychiatric disease or neurodegenerative disease, comprising a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof, as an active ingredient, wherein the psychiatric disease or
10 neurodegenerative disease is major depressive disorder, depressive disorder, bipolar and related disorders, anxiety disorder, posttraumatic stress disorder, obsessive-compulsive disorder, acute stress disorder, schizophrenia, autism spectrum disorder, Alzheimer's disease, cognitive
15 dysfunction, dementia, drug dependence, obesity, seizure, tremor, pain, or sleep disorder.

~~23~~16. Use of a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof,
20 in the manufacture of a therapeutic agent and/or preventive agent for a disease involving Group II mGlu receptor, wherein the disease involving Group II mGlu receptor is psychiatric disease or neurodegenerative disease.

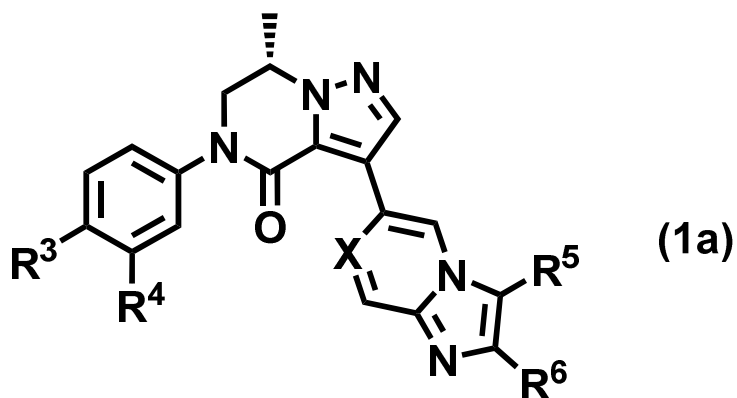
~~24~~17. A compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof, for use in the treatment and/or prevention of a disease involving Group II mGlu receptor, wherein the disease
5 involving Group II mGlu receptor is psychiatric disease or neurodegenerative disease.

~~25~~18. A medicament which comprises a medicament comprising a compound according to any one of claims 1 to
10 ~~18~~11, or a pharmaceutically acceptable salt thereof, and one or more medicaments selected from therapeutic agents for major depressive disorder, depressive disorder, bipolar and related disorders, anxiety disorder, posttraumatic stress disorder, obsessive-compulsive disorder, acute
15 stress disorder, schizophrenia, autism spectrum disorder, Alzheimer's disease, cognitive dysfunction, dementia, drug dependence, obesity, seizure, tremor, pain, or sleep disorder.

20 ~~26~~19. A medicament for treating psychiatric disease or neurodegenerative disease, comprising a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof, for use in combination with one or more antipsychotic drugs.

~~27~~20. A medicament for treating psychiatric disease or neurodegenerative disease, comprising a compound according to any one of claims 1 to ~~18~~11, or a pharmaceutically acceptable salt thereof, for use in combination with one or more medicaments selected from therapeutic agents for major depressive disorder, depressive disorder, bipolar and related disorders, anxiety disorder, posttraumatic stress disorder, obsessive-compulsive disorder, acute stress disorder, schizophrenia, autism spectrum disorder, Alzheimer's disease, cognitive dysfunction, dementia, drug dependence, obesity, seizure, tremor, pain, or sleep disorder.

~~28~~21. A method of preparing a compound of Formula (1a):



or a pharmaceutically acceptable salt thereof,

wherein R³ and R⁴ are each independently hydrogen atom, halogen atom, C₁₋₆ alkyl, or C₁₋₄ alkoxy, wherein the alkyl and the alkoxy are each independent and may be optionally

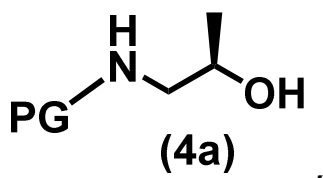
substituted with the same or different 1 to 5 halogen atoms;

R^5 and R^6 are each independently hydrogen atom, halogen atom, C_{1-6} alkyl, or $-NH_2$; and

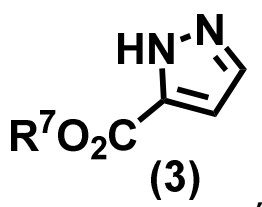
5 X is nitrogen atom or $-CH-$,

which comprises the following steps:

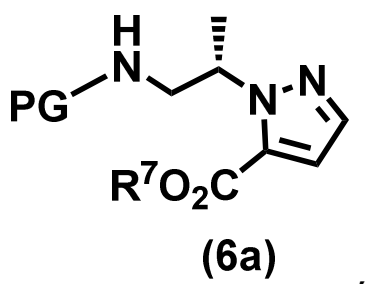
(step A1) reacting a compound of Formula (4a):



wherein PG is a protecting group such as tert-butoxycarbonyl group and benzyloxycarbonyl group,
10 and a compound of Formula (3):

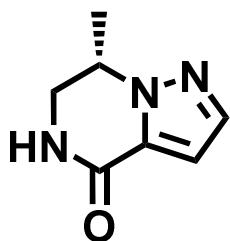


wherein R^7 is methyl or ethyl,
under Mitsunobu condition to give a compound of Formula
15 (6a):



wherein PG and R⁷ are as defined in this claim;

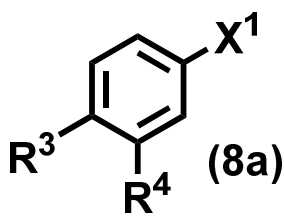
(step A2) cyclizing the compound of Formula (6a) in the presence of an acid or base to give a compound of Formula (7a):



(7a) ;

5

(step A3) coupling the compound of Formula (7a) and a compound of Formula (8a):

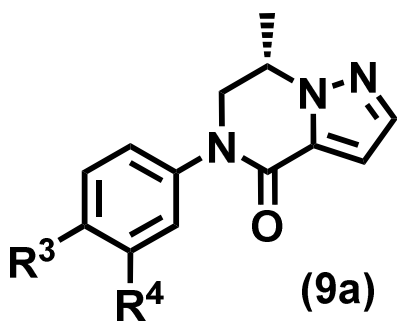


(8a) ,

wherein R³ and R⁴ are as defined in this claim, and X¹

10 is iodine, bromine, or chlorine,

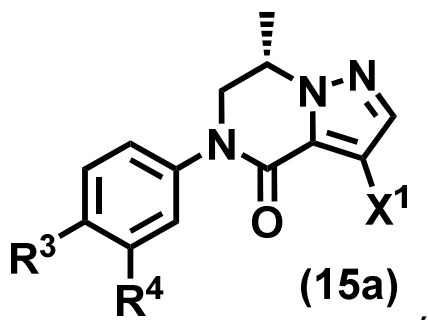
in the presence of a transition metal catalyst to give a compound of Formula (9a):



(9a) ,

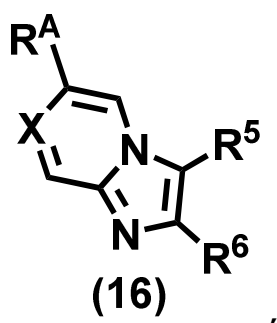
wherein R³ and R⁴ are as defined in this claim;

(step A4) reacting the compound of Formula (9a) in the presence of a halogenating agent to give a compound of Formula (15a):



5 wherein R^3 , R^4 , and X^1 are as defined in this claim;
and

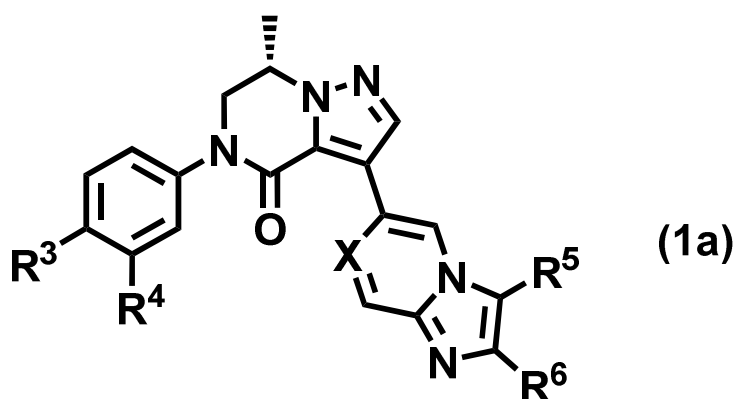
(step A5) coupling the compound of Formula (15a) and a compound of Formula (16):



10 or a salt thereof,

 wherein R^5 , R^6 , and X are as defined in this claim,
and R^A is boronic acid or boronic acid ester,
in the presence of a transition metal catalyst to give a
compound of Formula (1a) or a pharmaceutically acceptable
15 salt thereof.

~~2922.~~ A method of preparing a compound of Formula (1a):



or a pharmaceutically acceptable salt thereof,

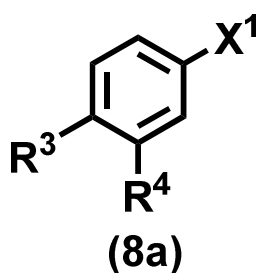
wherein R^3 and R^4 are each independently hydrogen atom, halogen atom, C_{1-6} alkyl, or C_{1-4} alkoxy, wherein the alkyl and the alkoxy are each independent and may be optionally substituted with the same or different 1 to 5 halogen atoms;

R^5 and R^6 are each independently hydrogen atom, halogen atom, C_{1-6} alkyl, or $-NH_2$; and

X is nitrogen atom or $-CH-$,

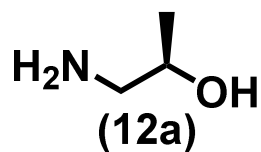
which comprises the following steps:

(step B1) coupling a compound of Formula (8a):



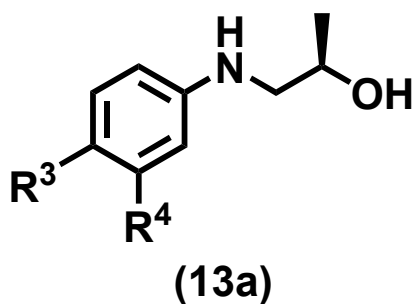
wherein R^3 and R^4 are as defined in this claim, and X^1 is iodine, bromine, or chlorine,

with a compound of Formula (12a):



or a salt thereof,

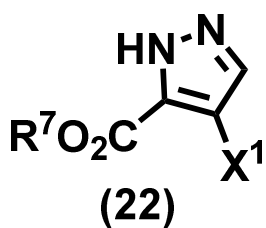
in the presence of a transition metal catalyst to give a compound of Formula (13a):



or a salt thereof,

wherein R³ and R⁴ are as defined in this claim;

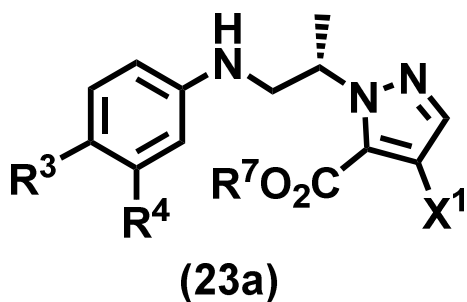
(step B2) reacting the compound of Formula (13a), or a salt thereof, and a compound of Formula (22):



or a salt thereof,

wherein X¹ is as defined in this claim, and R⁷ is methyl or ethyl,

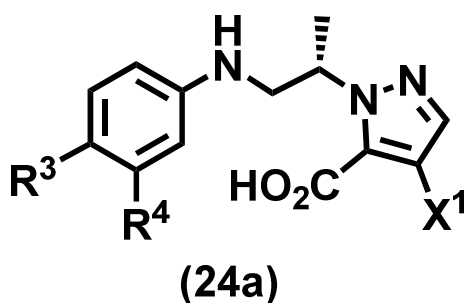
under Mitsunobu condition to give a compound of Formula (23a):



or a salt thereof,

wherein R^3 , R^4 , R^7 , and X^1 are as defined in this claim;

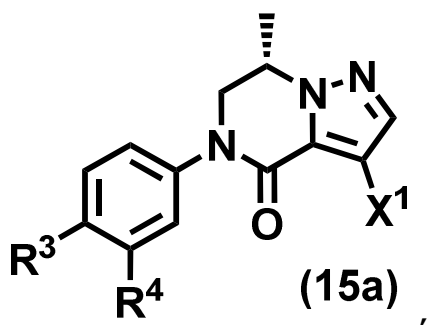
- 5 (step B3) hydrolyzing the compound of Formula (23a), or a salt thereof, in the presence of an acid or base to give a compound of Formula (24a):



or a salt thereof,

- 10 wherein R^3 , R^4 , and X^1 are as defined in this claim;

(step B4) cyclizing the compound of Formula (24a), or a salt thereof, in the presence of an acid or base to give a compound of Formula (15a):

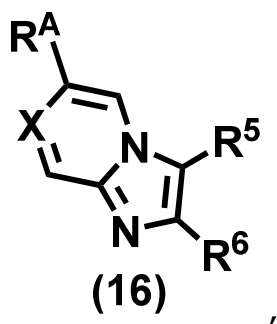


wherein R^3 , R^4 , and X^1 are as defined in this claim;

and

(step B5) coupling the compound of Formula (15a) and a

5 compound of Formula (16):



or a salt thereof,

wherein R^5 , R^6 , and X are as defined in this claim,

and R^A is boronic acid or boronic acid ester,

10 in the presence of a transition metal catalyst to give a compound of Formula (1a), or a pharmaceutically acceptable salt thereof;

wherein the step B3 and step B4 may be replaced with one single step of the following step B6:

15 (step B6) cyclizing the compound of Formula (23a), or a salt thereof, in the presence of an acid or base to give a compound of Formula (15a).