[DESCRIPTION]

[Title of Invention] OXO-SUBSTITUTED COMPOUND

[Technical Field]

[0001]

The present invention relates to an oxo-substituted compound that is useful as a medicament or a pharmaceutically acceptable salt thereof. More specifically, the present invention relates to a pharmaceutical composition comprising a novel oxo-substituted compound or a pharmaceutically acceptable salt thereof. The present invention relates to a therapeutic agent comprising the oxo-substituted compound or a pharmaceutically acceptable salt thereof.

[Background Art]

[0002]

Since the discovery of penicillin, antimicrobial agents have taken an important role in the treatment of infections.

In particular, β-lactam agents (e.g., penicillin antimicrobial agents, cephalosporin antimicrobial agents, and carbapenem antimicrobial agents) are agents that are most commonly used in the treatment of bacterial infections in view of their potent sterilizing capacity and high degree of safety. However, with increased use of β-lactam agents, emergence and prevalence of pathogenic bacteria that have acquired resistance to β-lactam agents have become a global problem. Examples of the mechanism of acquiring resistance of such pathogens include production of β-lactamase, structural change in the target molecule of a β-lactam agent, reduced drug permeation into microbial cell, elevated drug discharge, and the like. In particular, production of β-lactamase, which degrades and inactivates β-lactam agents, is one of the most influential in the maintenance of efficacy of β-lactam agents. Various bacteria are involved in the evolution of β-lactamase that antagonizes the efficacy of various β-lactam agents. β-lactamases can be classified into 4 classes based on their

amino acid sequences, i.e., Ambler classes A, B, C, and D. Since class A, C, and D enzymes have a serine residue at the center of enzymatic activity, they are known as serine-β-lactamases. Since class B enzymes do not have a serine residue at the center of enzymatic activity but have metal ion zinc (Zn^{2+}), they are known as metallo-β-lactamases (zinc-β-lactamases).

[0003]

It has been already confirmed that concomitant use of a β-lactamase inhibiting agent and a β-lactam agent is effective for solving the problem of resistance acquisition due to production of β-lactamase. It is known that commercially available β-lactamase inhibiting agents clavulanic acid, sulbactam, and tazobactam primarily inhibit class A β–lactamases excluding KPC (Klebsiella pneumoniae Carbapenemase), and avibactam inhibits class A β-lactamases (including KPC), class C β-lactamases, and some class D β-lactamases including OXA-48 (Non Patent Literature 1). However, these existing β-lactamase inhibiting agents cannot effectively and broadly inhibit all β-lactamases produced by various bacteria. For example, such inhibiting agents do not exert an effect on class B metallo-β lactamases. Recently, β-lactamases called ESBLs (Extended Spectrum β-Lactamases) that can degrade more substrates (β-lactam agent) compared to conventional β-lactamases were isolated, which have led to a problem as a new resistant bacteria, especially as a causative bacteria for hospital-acquired infections in the US and Europe. In addition, emergence and prevalence of metallo-β-lactamas producing bacteria is becoming a problem in Japan. In view of such a circumstance, it is very important to address β-lactamase producing bacteria including ESBLs and metallo-β-lactamase for the prophylaxis of hospital-acquired infections. Furthermore, pathogenic bacteria evolve quickly, such that emergence of new β-lactamase resistant bacteria is very likely. Accordingly, as a solution to such problems

or as a safeguard against such issues to be addressed, there is a demand for the development of a novel β-lactamase inhibiting agent that has a different structure from existing β-lactamse inhibiting agents, whereby a broader β-lactamase inhibitory action or metallo-β-lactamase inhibitory action is expected.

[0004]

Recently, boronic acid derivatives with β-lactamase inhibitory action have been reported in Patent Literatures 1 to 9 and the like. These Patent Literatures do not disclose a structure related to the oxo-substituted compounds encompassed by the present invention, i.e., a boronic acid compound group having a non-aryl heterocycle (preferably a nitrogen-containing non-aryl heterocycle) on a side chain at a specific position and an oxo substituent (-C(=O)-, -S(=O)-, $-S(=O)_2-$, or the like) that attaches to the ring.

[Citation List]

[Patent Literature]

[0005]

[PTL 1] WO 2014/107535

[PTL 2] WO 2014/107536

[PTL 3] WO 2015/179308

[PTL 4] WO 2016/003929

[PTL 5] WO 2016/149393

[PTL 6] WO 2014/089365

[PTL 7] WO 2014/110442

[PTL 8] WO 2014/151958

[PTL 9] WO 2015/191907

[Non Patent Literature]

[0006]

[NPL 1] Buynak. JD. Expert Opinion on Therapeutic Patents, 2013, 23(11), 1469-1481.

[Summary of Invention]

[Solution to Problem]

[0007]

The present invention provides a novel compound having excellent β-lactamase inhibitory action and provides a prophylactic or therapeutic agent that is useful for a bacteria infection, alone or in concomitant use with a β-lactam agent. Specifically, the present invention provides a prophylactic or therapeutic agent that is useful for therapy, by concomitant use with a β-lactam agent, of a disease such as sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, urinary tract infection, genital infection, eye infection, or odontogenic infection.

[0008]

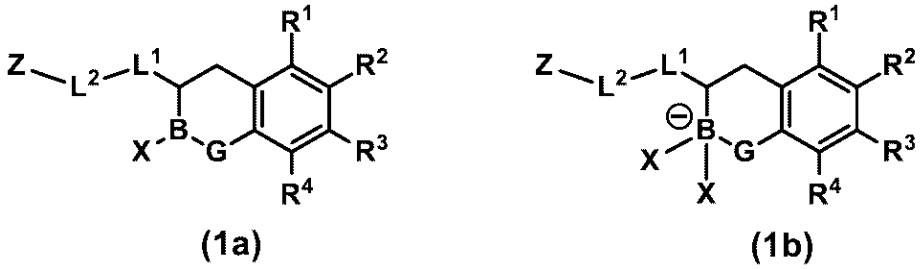
More specifically, the inventors completed the present invention by finding that a compound represented by formula (1a), (1b), or (11) described below or a pharmaceutically acceptable salt thereof (also referred to as the "compound of the invention" hereinafter) has excellent β-lactamase inhibitory action. Specifically, the present invention is the following.

[0009]

[Item A1]

A compound represented by formula (1a) or (1b):

[Chemical Formula 1]



(1a) (1b)

or a pharmaceutically acceptable salt thereof

wherein

G is an oxygen atom, a sulfur atom, or $-NR^{a1}-$,

X is a hydroxyl group, an optionally substituted C_{1-6} alkoxy group, or $-NR^{a2}R^{b1}$,

R^{a1}, R^{a2}, and R^{b1} are the same or different, each independently

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl,

5) 5- or 6-membered heteroaryl,

6) a 4- to 10-membered non-aryl heterocycle,

7) a C_{1-6} alkylcarbonyl group,

8) a C_{3-10} alicyclic carbonyl group,

9) a C_{6-10} arylcarbonyl group,

10) a 5- or 6-membered heteroarylcarbonyl group,

11) a C_{1-6} alkylsulfonyl group,

12) a C_{3-10} alicyclic sulfonyl group,

13) a C_{6-10} arylsulfonyl group,

14) a 5- or 6-membered heteroarylsulfonyl group, or

15) $-OR^{c1}$,

(wherein each substituent from 2) to 14) is optionally substituted),

wherein R^{a2} and R^{b1} together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{c1} is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl,

5) 5- or 6-membered heteroaryl, or

6) a 4- to 10-membered non-aryl heterocycle,

(wherein each substituent from 2) to 6) is optionally substituted),

L^1 is a single bond, an oxygen atom, a sulfur atom, -

SO-, $-SO_2-$, $-NR^d-$, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group,

Z is

1) a hydrogen atom,
2) a hydroxyl group,
3) a cyano group,
4) a carboxyl group,
5) a C_{3-10} alicyclic group,
6) C_{6-10} aryl,
7) 5- or 6-membered heteroaryl,
8) a 4- to 10-membered non-aryl heterocycle,
9) a C_{1-6} alkoxy group,
10) a C_{3-10} alicyclic oxy group,
11) a C_{6-10} aryloxy group,
12) a 5- or 6-membered heteroaryloxy group,
13) a 4- to 10-membered non-aryl heterocyclyl oxy group,
14) a C_{1-6} alkylthio group,
15) a C_{3-10} alicyclic thio group,
16) a C_{6-10} arylthio group,
17) a 5- or 6-membered heteroarylthio group,
18) a 4- to 10-membered non-aryl heterocyclyl thio group,

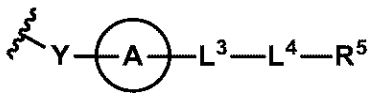
(wherein each substituent from 5) to 18) is optionally substituted),

19) $-SO_2-NR^{e1}R^{f1}$,
20) $-NR^{e1}-C(=O)OR^{f1}$,
21) $-NR^{g1}-C(=O)NR^{e1}R^{f1}$,
22) $-NR^{e1}-C(=S)R^{f1}$,
23) $-NR^{e1}-C(=S)OR^{f1}$,
24) $-NR^{g1}-C(=S)NR^{e1}R^{f1}$,
25) $-NR^{g1}-CR^{e1}(=NR^{f1})$,
26) $-NR^{g1}-CR^{e1}(=N-OR^{f1})$,
27) $-NR^{h1}-C(=NR^{g1})NR^{e1}R^{f1}$,
28) $-NR^{h1}-C(=N-OR^{g1})NR^{e1}R^{f1}$,
29) $-NR^{i1}-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
30) $-NR^{i1}-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

31) $-NR^{e1}-SO_2-R^{f1}$,
32) $-NR^{g1}-SO_2-NR^{e1}R^{f1}$,
33) $-C(=O)OR^{e1}$,
34) $-C(=S)OR^{e1}$,
35) $-C(=S)NR^{e1}R^{f1}$,
36) $-C(=S)NR^{e1}OR^{f1}$,
37) $-C(=S)NR^{g1}-NR^{e1}R^{f1}$,
38) $-C(=NR^{e1})R^{f1}$,
39) $-C(=N-OR^{e1})R^{f1}$,
40) $-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
41) $-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
42) $-NR^{e1}R^{f1}$,
43) $-NR^{g1}-NR^{e1}R^{f1}$,
44) $-NR^{e1}OR^{f1}$,
45) $-NR^{e1}-C(=O)R^{f1}$,
46) $-C(=O)NR^{e1}R^{f1}$,
47) $-C(=O)NR^{e1}OR^{f1}$,
48) $-C(=O)NR^{g1}-NR^{e1}R^{f1}$,
49) $-C(=O)R^{e1}$,
50) $-C(=NR^{g1})NR^{e1}R^{f1}$, or
51) $-C(=N-OR^{h1})NR^{e1}R^{f1}$,

one of R^1, R^2, and R^3 is a group represented by formula (2):

[Chemical Formula 2]



(2)

wherein

Y is an oxygen atom, a sulfur atom, or $-NR^j-$,

ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle,

L^3 is $-C(=O)-$, $-S(=O)-$, or $-S(=O)_2-$,

L^4 is

1) a single bond,
2) a C_{1-6} alkylene group,

3) a C_{3-10} cycloalkylene group,
4) a C_{6-10} arylene group
5) a 5- or 6-membered heteroarylene group,
6) a 4- to 10-membered non-aryl heterocyclylene group, or
7) $-C(=N-OR^{h1})-$
(wherein each substituent from 2) to 6) is optionally substituted), and

R^5 is
1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) a 4- to 10-membered non-aryl heterocycle,
5) C_{6-10} aryl,
6) 5- or 6-membered heteroaryl,
7) a C_{1-6} alkylthio group,
(wherein each substituent from 2) to 7) is optionally substituted), or
8) $-NR^{e1}OH$,

the remaining two (without the structure of formula (2) among R^1, R^2, and R^3) are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6} alkylthio group, an optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$,

R^d, R^{e1}, R^{e2}, R^{f1}, R^{f2}, R^{g1}, R^{g2}, R^{h1}, R^{h2}, R^{i1}, R^{i2}, and R^j are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{3-10} alicyclic group, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, or an optionally substituted 4- to 10-membered non-aryl heterocycle,

a combination of R^{e1} and R^{f1} or R^{e2} and R^{f2}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^4 is

1) $-C(=O)R^8$,

2) $-SO_2-L^6-R^8$,

(wherein R^8 in 1) and 2) is $-NR^{a5}R^{b4}$, $-NR^{a5}-L^7-B(OR^{m1})_2$, $-OR^{m1}$, or an optionally substituted C_{1-6} alkyl group, and L^6 is a single bond or $-NR^{a6}-$),

3) $-NR^{a4}R^{b3}$,

4) $-B(OR^{m1})_2$,

5) $-PO(OR^{m1})(OR^{m2})$,

6) optionally substituted 5-membered heteroaryl,

7) an optionally substituted 5-membered non-aryl heterocycle, or

8) a bioisostere of one of 1) to 7),

(wherein the formulas of 2), 4), 5), and 6) include a carboxylic acid isostere, and 8) may include them in duplicates),

R^{a3}, R^{a4}, R^{a5}, R^{a6}, R^{b2}, R^{b3}, and R^{b4} are the same or different, each independently having the same definition as R^{a1}, R^{a2}, and R^{b1}, wherein a combination of R^{a3} and R^{b2}, R^{a4} and R^{b3}, or R^{a5} and R^{b4}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{m1} is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl,

5) 5- or 6-membered heteroaryl, or

6) a 4- to 10-membered non-aryl heterocycle

(wherein each substituent from 2) to 6) is optionally substituted),

wherein if R^{m1} is attached to a boron atom via an oxygen atom, two R^{m1}, as C_{2-4} alkylene, together with the boron atom and two oxygen atoms, may form a 5- to 7-membered non-aryl heterocycle (wherein an alkylene moiety is optionally substituted in the non-aryl heterocycle),

R^{m2} is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group, and

L^7 is an optionally substituted C_{1-3} alkylene group.

[Item A2]

The compound or the pharmaceutically acceptable salt thereof according to item A1, wherein

L^1 is a single bond, a sulfur atom, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group, and

Z is

1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl,
6) a 4- to 10-membered non-aryl heterocycle,
7) $-C(=N-OR^{e1})R^{f1}$, or
8) $-NR^{e1}R^{f1}$.

[Item A3]

The compound or the pharmaceutically acceptable salt thereof according to item A1 or A2, wherein

$Z-L^2-L^1$ is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{1-6} alkylthio group.

[Item A4]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A3, wherein $Z-L^2-L^1$ is a hydrogen atom.

[Item A5]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A4, wherein G is an oxygen atom.

[Item A6]

The compound or the pharmaceutically acceptable salt

thereof according to any one of items A1 to A5, wherein X is a hydroxyl group or an optionally substituted C_{1-6} alkoxy group.

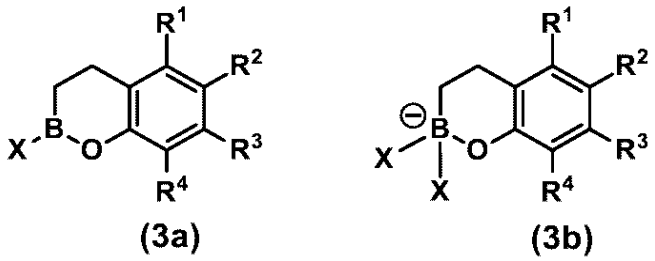
[Item A7]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A6, wherein X is a hydroxyl group.

[Item A8]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A7, wherein the compounds of formulas (1a) and (1b) are represented by formulas (3a) and (3b), respectively:

[Chemical Formula 3]



(3a) (3b)

wherein X, R^1, R^2, and R^3 are defined the same as any one of items A1 to A7, and

R^4 is selected from the group consisting of

1) $-COOR^{m1}$ (wherein R^{m1} is a hydrogen atom, a C_{1-6} alkyl group, a C_{3-10} alicyclic group, C_{6-10} aryl, 5- or 6-membered heteroaryl, or a 4- to 10-membered non-aryl heterocycle, and wherein the C_{1-6} alkyl group, the C_{3-10} alicyclic group, the C_{6-10} aryl, the 5- or 6-membered heteroaryl, and the 4- to 10-membered non-aryl heterocycle are each optionally substituted), and

2) a bioisostere of 1).

[Item A9]

The compound or the pharmaceutically acceptable salt thereof according to item A8, wherein R^4 is

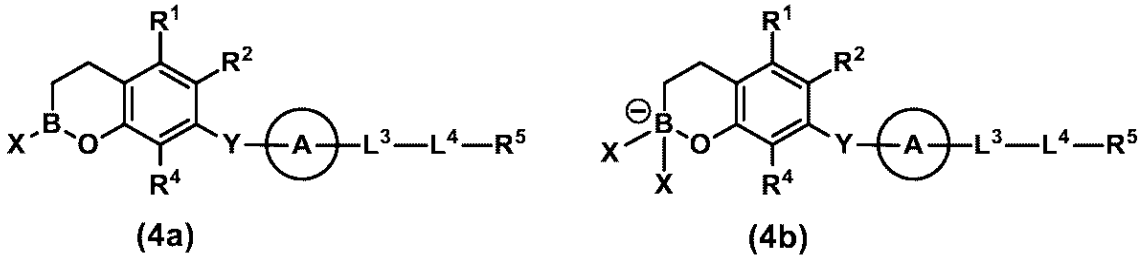
1) –COOH (i.e., a carboxyl group), or

2) a carboxylic acid isostere.

[Item A10]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A9, wherein the compounds of formulas (1a) and (1b) or the compounds of formulas (3a) and (3b) are represented by formulas (4a) and (4b), respectively:

[Chemical Formula 4]



(4a) (4b)

wherein X, R^4, Y, ring A, L^3, L^4, and R^5 are defined the same as any one of items A1 to A9, and

R^1 and R^2 are the same or different, each independently a hydrogen atom, a halogen atom, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group (wherein the C_{1-6} alkyl group and C_{1-6} alkoxy group are optionally substituted with 1 to 5 halogen atoms).

[Item A11]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A10, wherein ring A is an optionally substituted 4- to 10-membered non-aryl heterocycle.

[Item A12]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A11, wherein ring A is an optionally substituted 4- to 7-membered non-aryl heterocycle.

[Item A13]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A12, wherein Y is an oxygen atom or a sulfur atom.

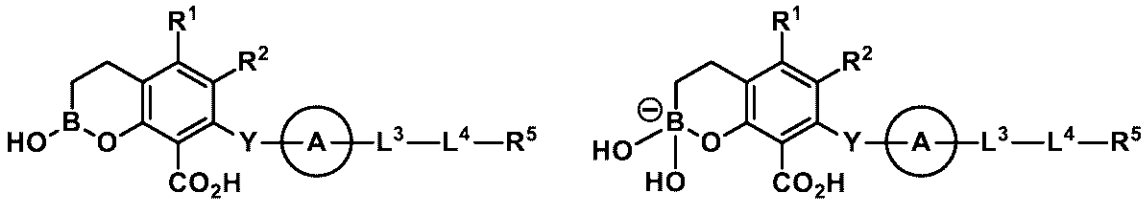
[Item A14]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A13, wherein Y is an oxygen atom.

[Item A15]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A14, wherein the compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), or the compounds of formulas (4a) and (4b) are represented by formulas (5a) and (5b), respectively:

[Chemical Formula 5]



(5a) (5b)

wherein ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Item A16]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A15, wherein L^3 is $-C(=O)-$ or $-S(=O)_2-$.

[Item A17]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A16, wherein L^3 is $-C(=O)-$.

[Item A18]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A17, wherein L^4 is a single bond, $-C(=N-OR^{h1})-$, or an optionally substituted C_{1-6} alkylene group, wherein R^{h1} is an optionally substituted C_{1-6} alkyl group.

[Item A19]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A18, wherein L^4 is a single bond, or a C_{1-6} alkylene group optionally substituted with $-NR^{21}R^{22}$ or $=NOR^{23}$, wherein R^{21}, R^{22}, and R^{23} are each independently a hydrogen atom, an optionally

substituted C_{1-6} alkyl group, or an optionally substituted 4- to 10-membered non-aryl heterocyclyl carbonyl group.

[Item A20]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A19, wherein L^4 is a single bond, $-CH_2-$, $-CH(NH_2)-$, or $-CH(NH_2)-CH_2-$, wherein if an amino group is present in L^4, carbon that attaches to the amino group attaches to L^3.

[Item A21]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A20, wherein R^5 is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted 4- to 10-membered non-aryl heterocycle, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, an optionally substituted C_{1-6} alkylthio group, or $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item A22]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A21, wherein R^5 is optionally substituted 5- or 6-membered heteroaryl or optionally substituted C_{6-10} aryl.

[Item A23]

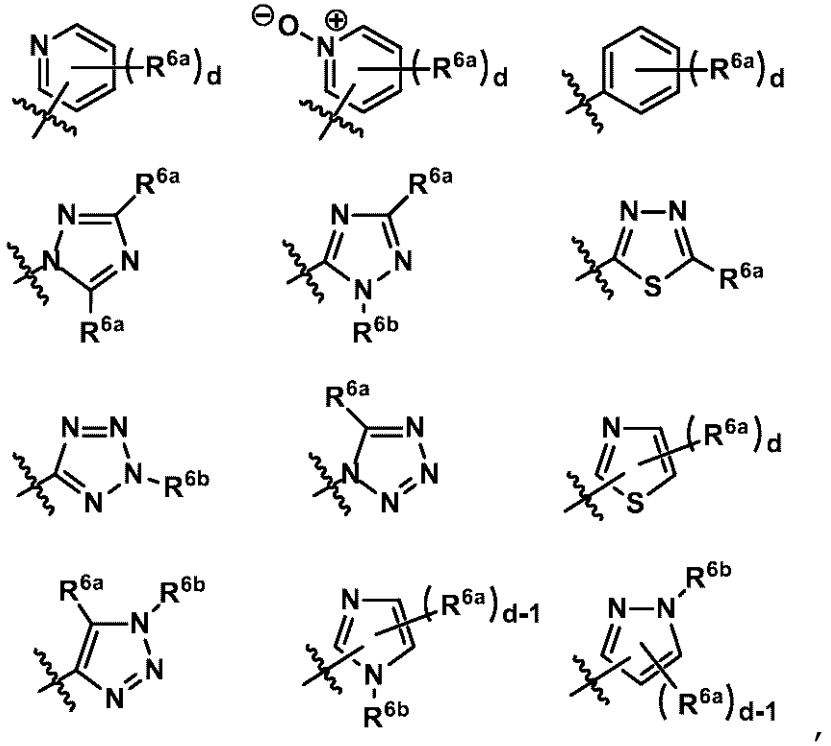
The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A21, wherein L^4 is a single bond, and R^5 is $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item A24]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A22, wherein

R^5 is selected from the group consisting of

[Chemical Formula 6]



subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) halogen,

5) a C_{1-4} alkyl group,

6) a C_{3-10} alicyclic group,

7) a C_{1-4} alkoxy group,

8) a C_{3-10} alicyclic oxy group,

9) a C_{6-10} aryloxy group,

10) a 5- or 6-membered heteroaryloxy group,

11) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 5) to 11) is optionally substituted),

12) $-SO_2-NR^{e2}R^{f2}$,

13) $-NR^{g2}-CR^{e2}(=NR^{f2})$,

14) $-NR^{g2}-CR^{e2}(=N-OR^{f2})$,
15) $-NR^{h2}-C(=NR^{g2})NR^{e2}R^{f2}$,
16) $-NR^{h2}-C(=N-OR^{g2})NR^{e2}R^{f2}$,
17) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
18) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
19) $-C(=NR^{e2})R^{f2}$,
20) $-C(=N-OR^{e2})R^{f2}$,
21) $-C(=NR^{h2})-NR^{e2}R^{f2}$,
22) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
23) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
24) $-NR^{e2}R^{f2}$,
25) $-NR^{g2}-NR^{e2}R^{f2}$,
26) $-NR^{e2}OR^{f2}$,
27) $-NR^{e2}-C(=O)R^{f2}$,
28) $-C(=O)NR^{e2}R^{f2}$,
29) $-C(=O)NR^{e2}OR^{f2}$,
30) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,
31) $-C(=O)R^{e2}$,
32) $-C(=O)OR^{e2}$, and
33) $-C(=N-OR^{h2})NR^{e2}R^{f2}$, and

each R^{6b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted),
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e2})R^{f2}$,
6) $-C(=N-OR^{e2})R^{f2}$,
7) $-SO_2-NR^{e2}R^{f2}$,
8) $-C(=NR^{h2})-NR^{e2}R^{f2}$,
9) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
10) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
11) $-C(=O)NR^{e2}R^{f2}$,
12) $-C(=O)NR^{e2}OR^{f2}$,

13) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,

14) $-C(=O)R^{e2}$, and

15) $-C(=N-OR^{h2})NR^{e2}R^{f2}$.

[Item A25]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A24, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,

2) a halogen atom,

3) a C_{1-6} alkyl group,

4) a C_{1-6} alkoxy group, and

5) a C_{1-6} alkylthio group,

(wherein each substituent from 3) to 5) is optionally substituted).

[Item A26]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A25, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,

2) a halogen atom, and

3) an optionally substituted C_{1-6} alkyl group.

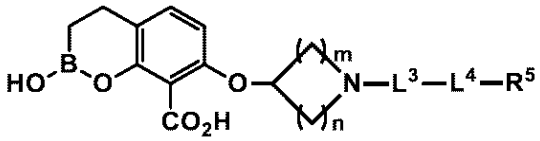
[Item A27]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A26, wherein R^1 and R^2 are both hydrogen atoms.

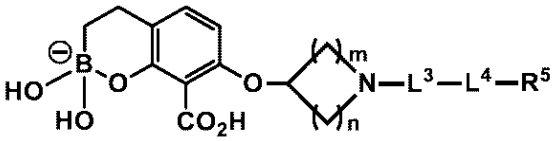
[Item A28]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A27, wherein the compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), the compounds of formulas (4a) and (4b), or the compounds of formulas (5a) and (5b) are represented by formulas (6a) and (6b), respectively:

[Chemical Formula 7]



(6a)



(6b)

wherein

L^3, L^4, and R^5 are defined the same as any one of items A1 to A24,

m is an integer 1, 2, or 3,

n is an integer 1, 2, or 3, and

m + n is 2, 3, or 4.

[Item A29]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A28, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Item A30]

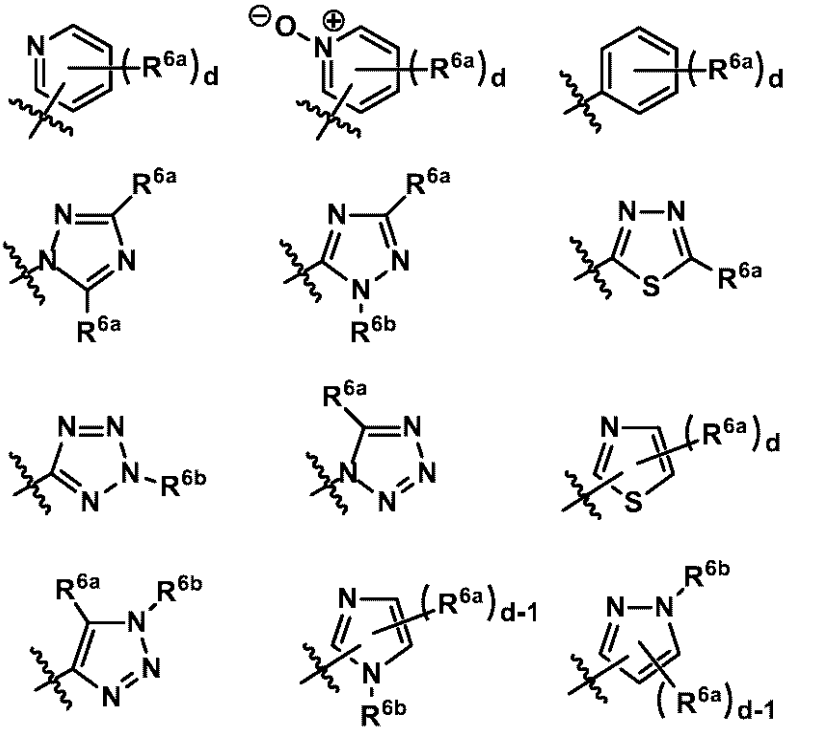
The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A29, wherein m is 1 and n is 1.

[Item A31]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A30, wherein

R^5 is 5- or 6-membered aryl or heteroaryl selected from the group consisting of

[Chemical Formula 8]



subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, $-C(=O)OR^{f2}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e2}R^{f2}$, and

7) $-C(=O)OR^{e2}$, and

each R^{6b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group,

(wherein the alkyl group is optionally substituted with

$NR^{e2}R^{f2}$, $-C(=O)OR^{f2}$, or a hydroxyl group).

[Item A32]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A31, wherein R^{e2}, and R^{f2} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group.

[Item A33]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A32, wherein R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item A34]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A33, wherein R^{e2} and R^{f2} are hydrogen atoms.

[Item A35]

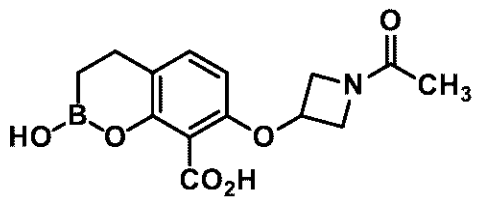
The compound or the pharmaceutically acceptable salt thereof according to any one of items A24 to A33, wherein R^{6a} is $-NR^{e2}R^{f2}$, and one of R^{e2} and R^{f2} is a hydrogen atom and the other is a C_{1-4} alkyl group (wherein the alkyl group is optionally substituted with an amino group or a hydroxyl group).

[Item A36]

The compound or the pharmaceutically acceptable salt thereof of item A1, represented by the following compound name or structural formula:

7-[(1-acetylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 9]

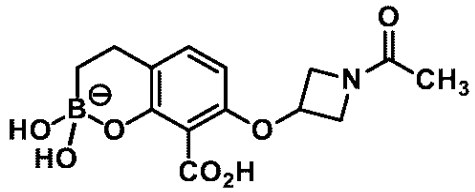


,

8-[(1-acetylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-

boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

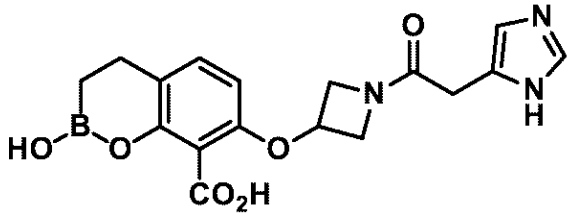
[Chemical Formula 10]



,

2-hydroxy-7-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

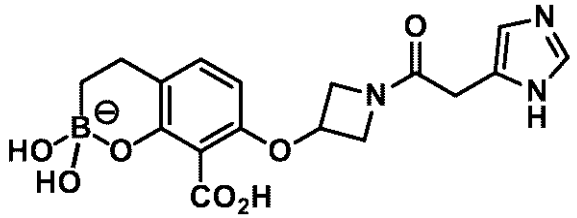
[Chemical Formula 11]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

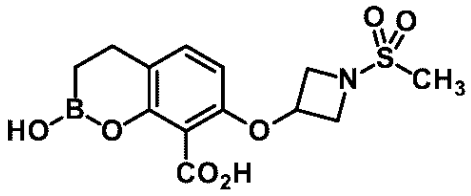
[Chemical Formula 12]



,

2-hydroxy-7-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 13]

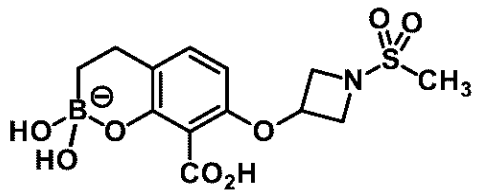


,

4,4-dihydroxy-8-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-

carboxylic acid

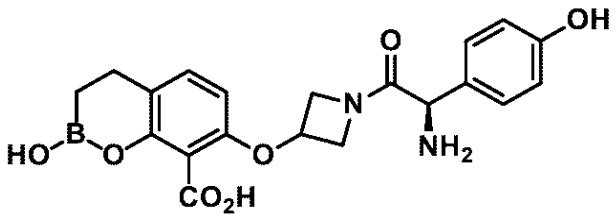
[Chemical Formula 14]



,

7-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

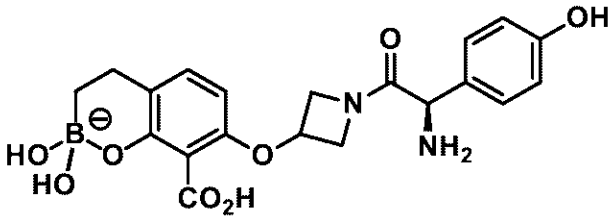
[Chemical Formula 15]



,

8-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

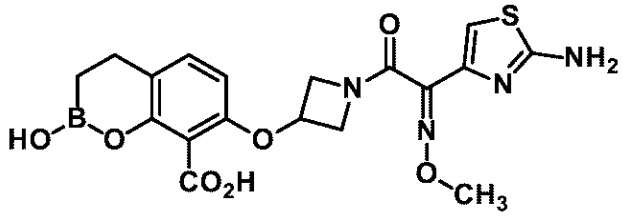
[Chemical Formula 16]



,

7-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 17]

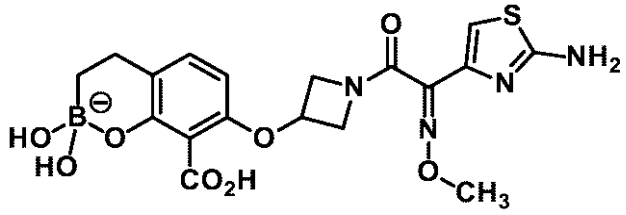


,

8-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-

oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

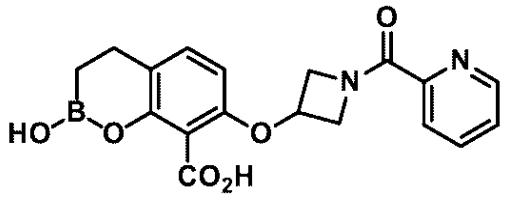
[Chemical Formula 18]



,

2-hydroxy-7-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

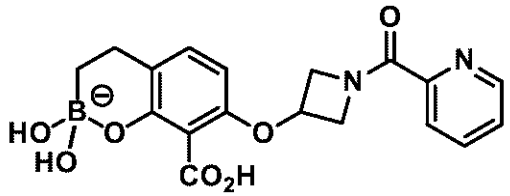
[Chemical Formula 19]



,

4,4-dihydroxy-8-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

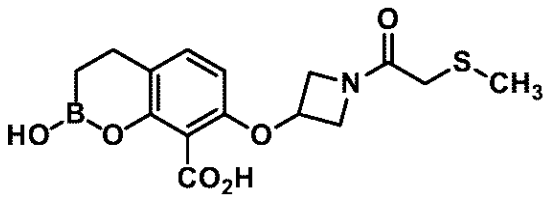
[Chemical Formula 20]



,

2-hydroxy-7-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

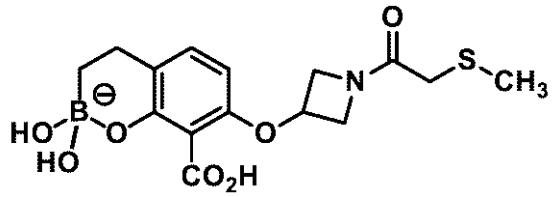
[Chemical Formula 21]



,

4,4-dihydroxy-8-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

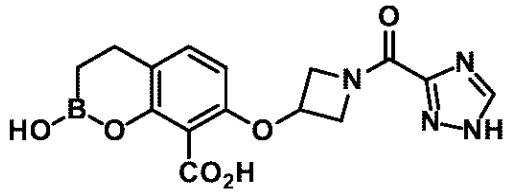
[Chemical Formula 22]



,

2-hydroxy-7-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

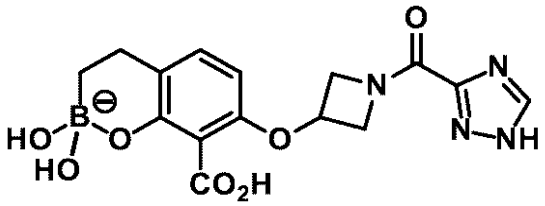
[Chemical Formula 23]



,

4,4-dihydroxy-8-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

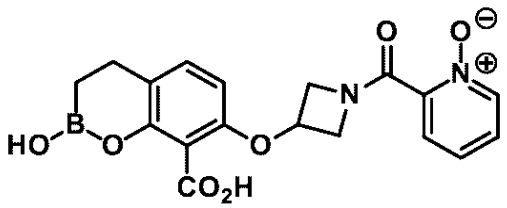
[Chemical Formula 24]



,

2-hydroxy-7-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

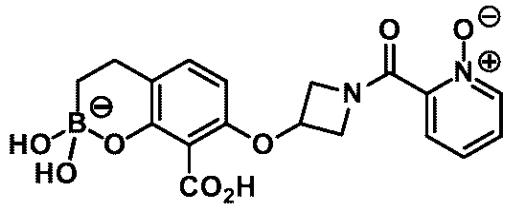
[Chemical Formula 25]



,

4,4-dihydroxy-8-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

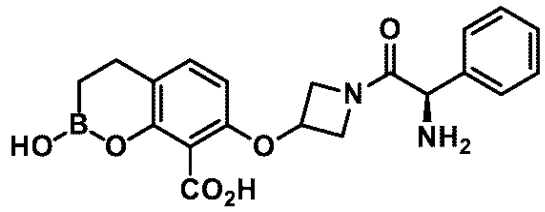
[Chemical Formula 26]



,

7-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

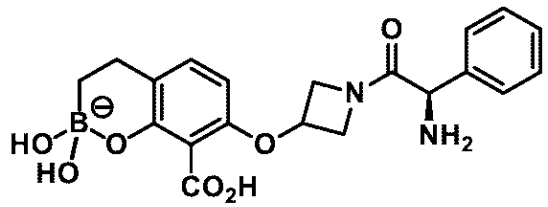
[Chemical Formula 27]



,

8-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

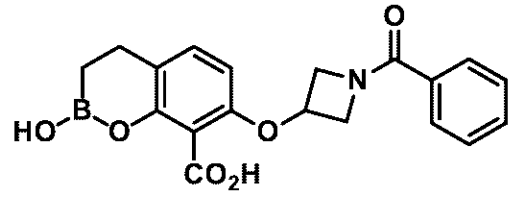
[Chemical Formula 28]



,

7-[(1-benzoylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

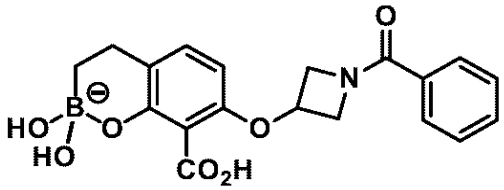
[Chemical Formula 29]



,

8-[(1-benzoylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

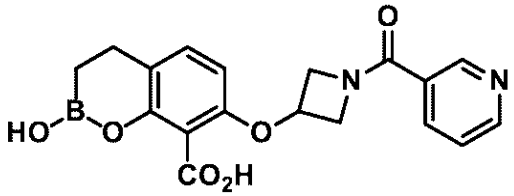
[Chemical Formula 30]



,

2-hydroxy-7-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

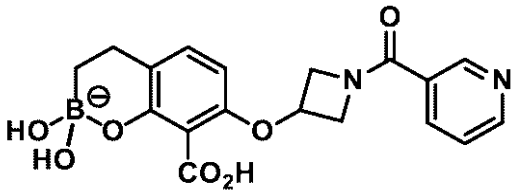
[Chemical Formula 31]



,

4,4-dihydroxy-8-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

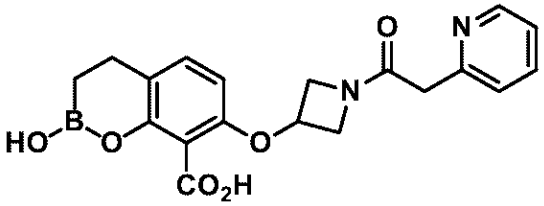
[Chemical Formula 32]



,

2-hydroxy-7-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

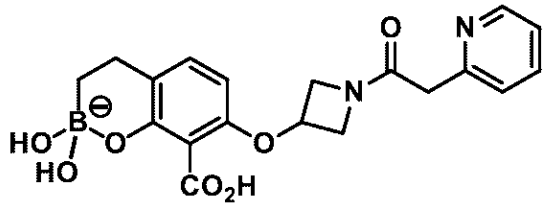
[Chemical Formula 33]



,

4,4-dihydroxy-8-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

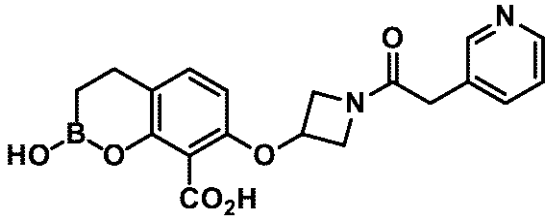
[Chemical Formula 34]



,

2-hydroxy-7-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

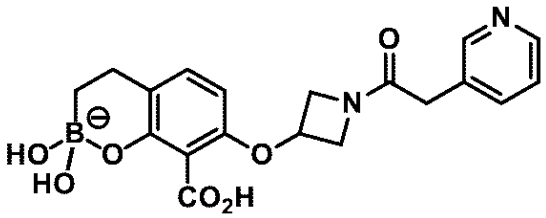
[Chemical Formula 35]



,

4,4-dihydroxy-8-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

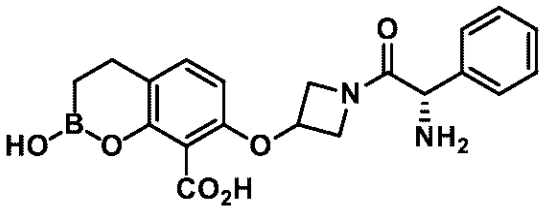
[Chemical Formula 36]



,

7-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

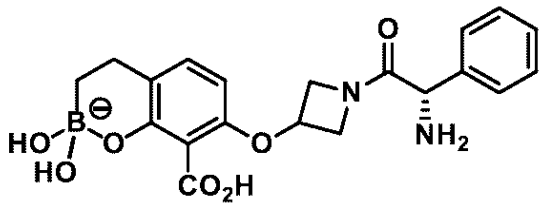
[Chemical Formula 37]



,

8-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

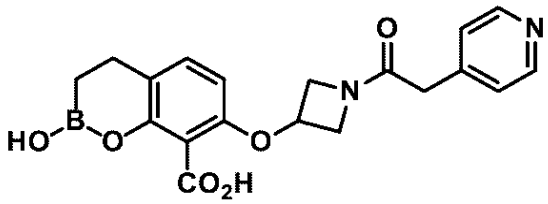
[Chemical Formula 38]



,

2-hydroxy-7-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

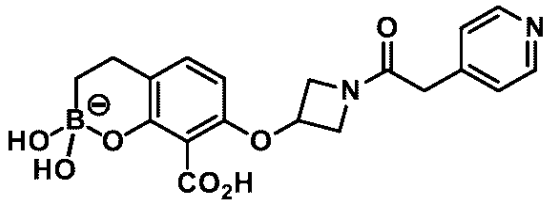
[Chemical Formula 39]



,

4,4-dihydroxy-8-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

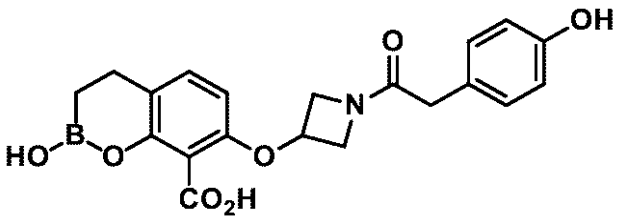
[Chemical Formula 40]



,

2-hydroxy-7-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

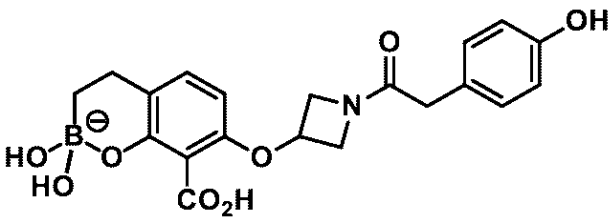
[Chemical Formula 41]



,

4,4-dihydroxy-8-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

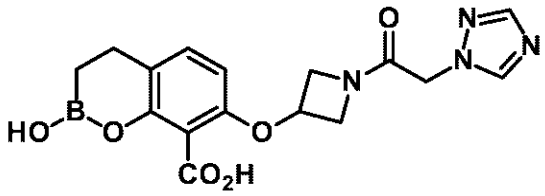
[Chemical Formula 42]



,

2-hydroxy-7-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

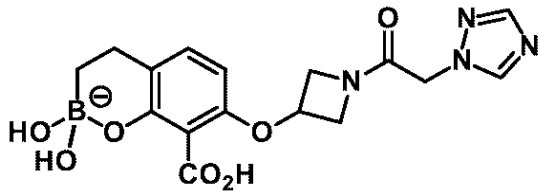
[Chemical Formula 43]



,

4,4-dihydroxy-8-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

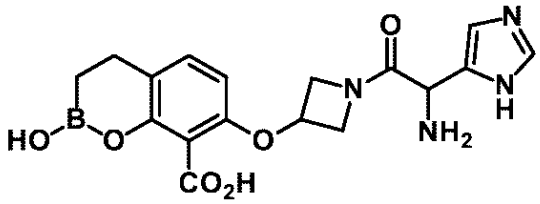
[Chemical Formula 44]



,

7-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 45]

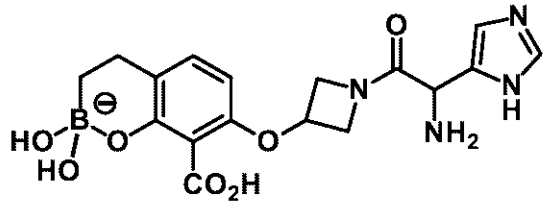


,

8-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-

triene-7-carboxylic acid

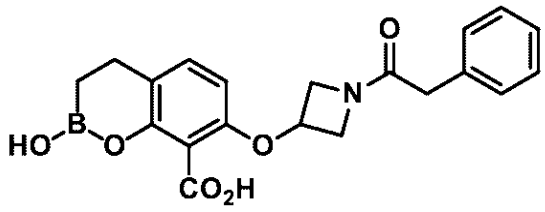
[Chemical Formula 46]



,

2-hydroxy-7-{[1-(phenylacetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

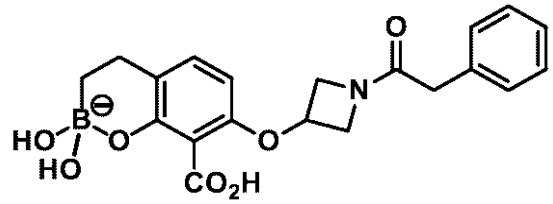
[Chemical Formula 47]



,

4,4-dihydroxy-8-{[1-(phenylacetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

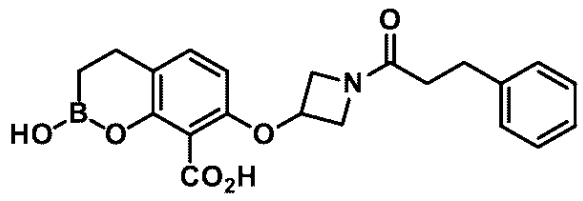
[Chemical Formula 48]



,

2-hydroxy-7-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

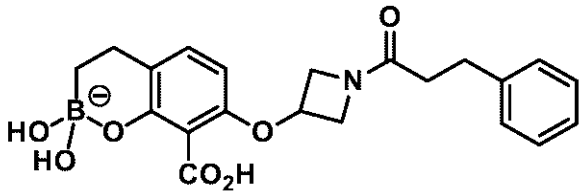
[Chemical Formula 49]



,

4,4-dihydroxy-8-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

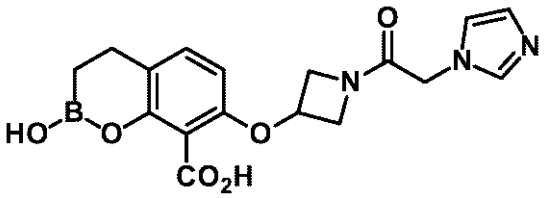
[Chemical Formula 50]



,

2-hydroxy-7-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

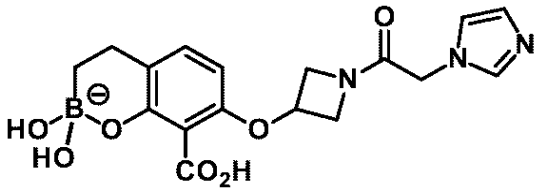
[Chemical Formula 51]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

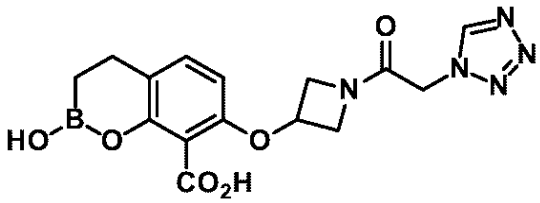
[Chemical Formula 52]



,

2-hydroxy-7-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

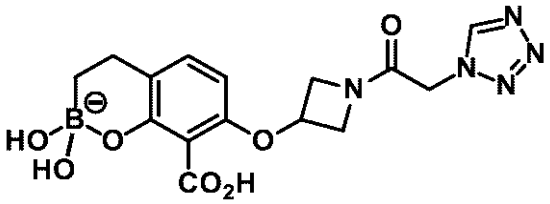
[Chemical Formula 53]



,

4,4-dihydroxy-8-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

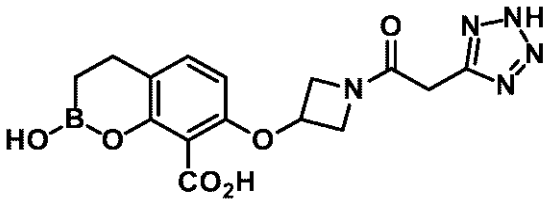
[Chemical Formula 54]



,

2-hydroxy-7-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

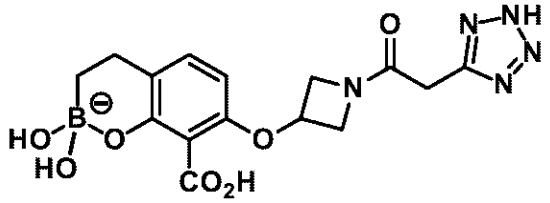
[Chemical Formula 55]



,

4,4-dihydroxy-8-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

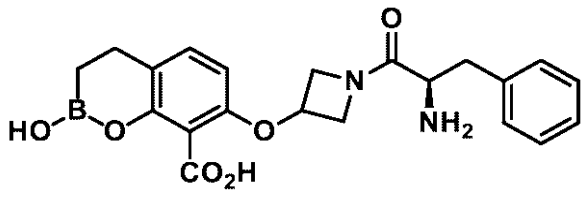
[Chemical Formula 56]



,

2-hydroxy-7-[(1-D-phenylalanylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

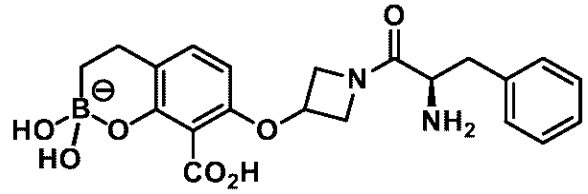
[Chemical Formula 57]



,

4,4-dihydroxy-8-[(1-D-phenylalanylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

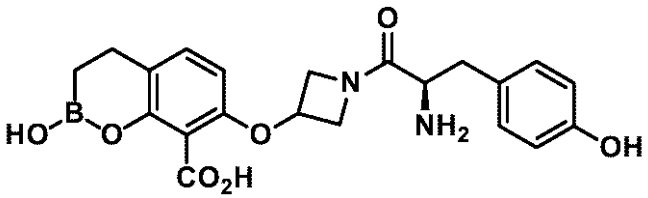
[Chemical Formula 58]



,

2-hydroxy-7-[(1-D-tyrosylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

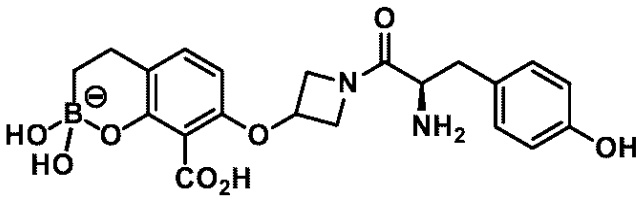
[Chemical Formula 59]



,

4,4-dihydroxy-8-[(1-D-tyrosylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

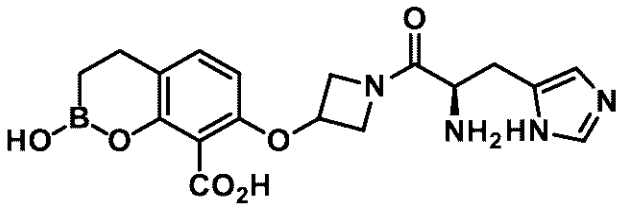
[Chemical Formula 60]



,

7-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

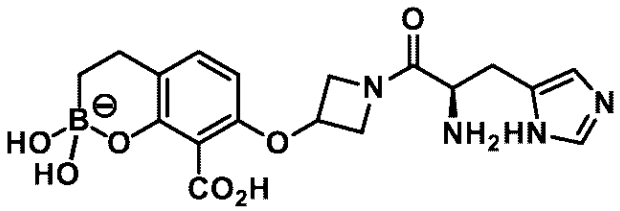
[Chemical Formula 61]



,

8-[(1-D-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

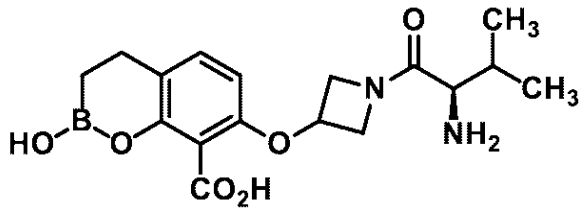
[Chemical Formula 62]



,

2-hydroxy-7-[(1-D-valylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

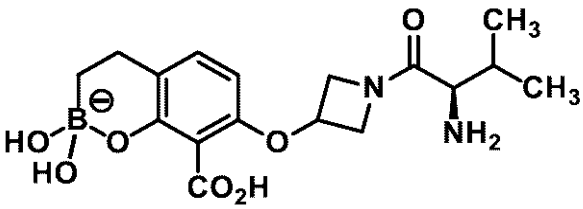
[Chemical Formula 63]



,

4,4-dihydroxy-8-[(1-D-valylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

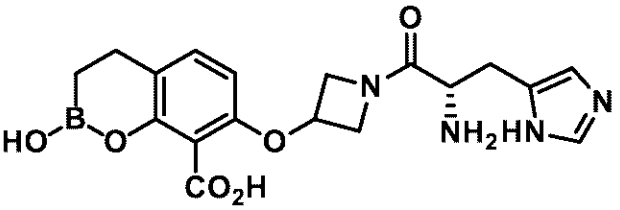
[Chemical Formula 64]



,

7-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

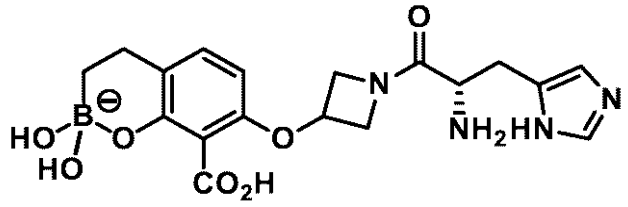
[Chemical Formula 65]



,

8-[(1-L-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

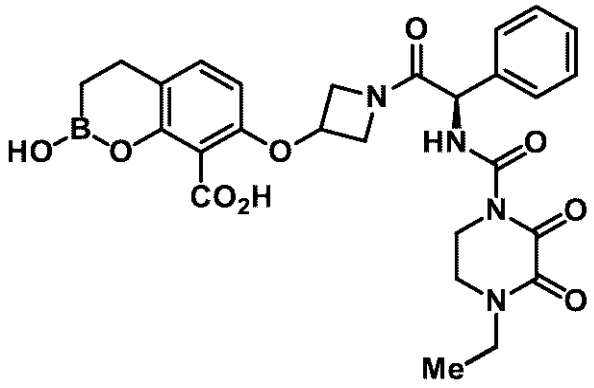
[Chemical Formula 66]



,

7-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

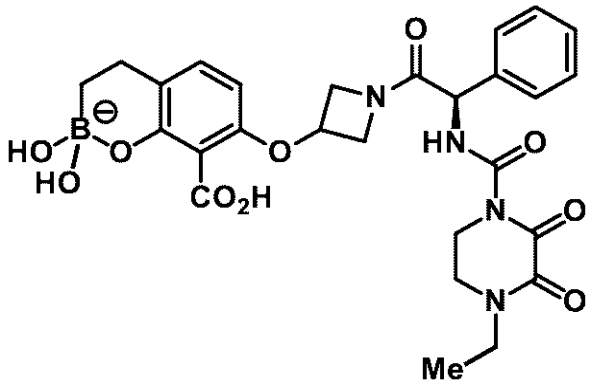
[Chemical Formula 67]



,

8-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

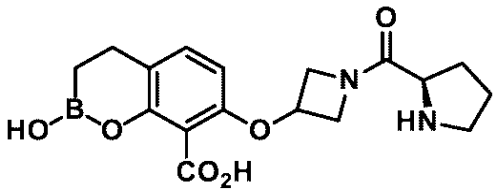
[Chemical Formula 68]



,

2-hydroxy-7-[(1-D-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

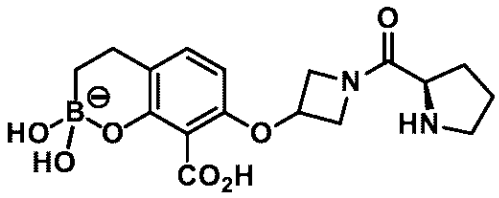
[Chemical Formula 69]



,

4,4-dihydroxy-8-[(1-D-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

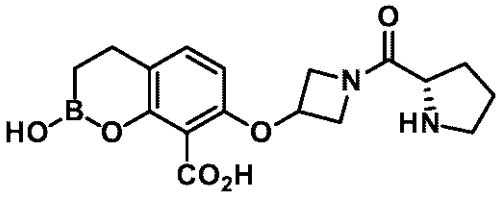
[Chemical Formula 70]



,

2-hydroxy-7-[(1-L-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

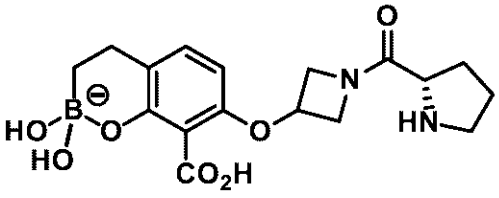
[Chemical Formula 71]



,

4,4-dihydroxy-8-[(1-L-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

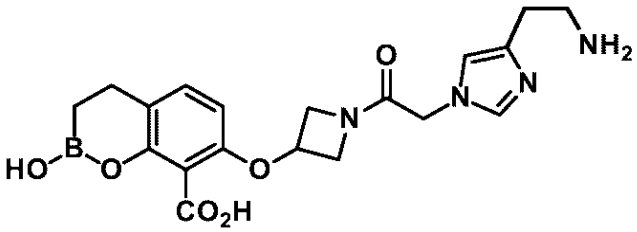
[Chemical Formula 72]



,

7-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

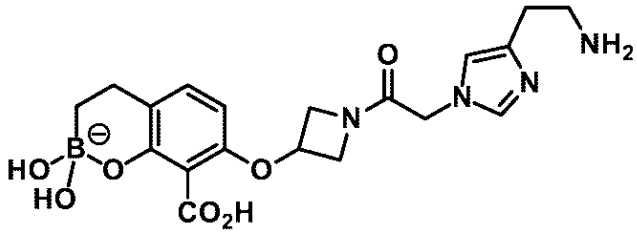
[Chemical Formula 73]



,

8-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

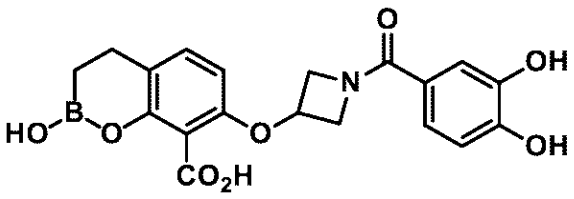
[Chemical Formula 74]



,

7-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

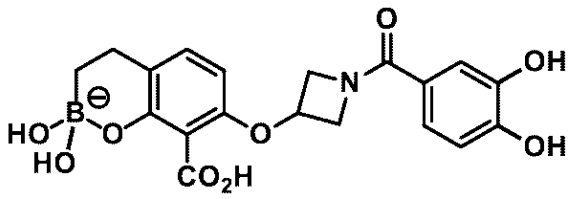
[Chemical Formula 75]



,

8-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 76]

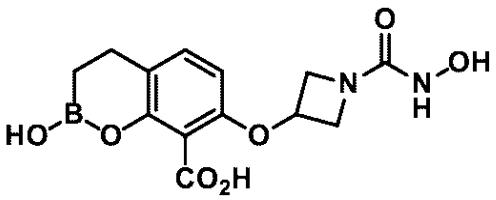


,

2-hydroxy-7-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-3,4-

dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

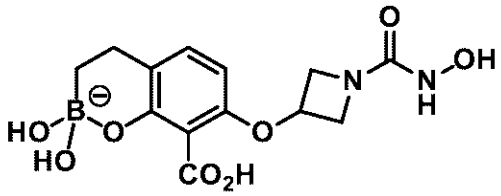
[Chemical Formula 77]



, or

4,4-dihydroxy-8-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

[Chemical Formula 78]



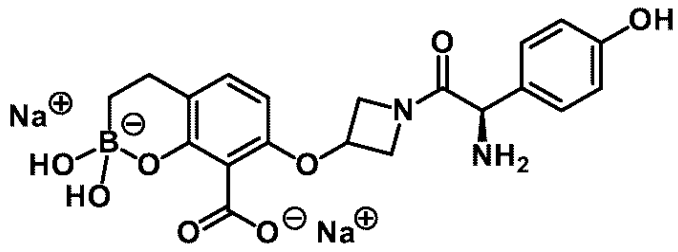
.

[Item A37]

A salt of the compound of item A36, represented by the following compound name or structural formula:

8-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

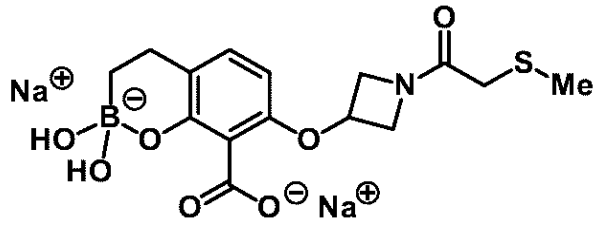
[Chemical Formula 79]



,

4,4-dihydroxy-8-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

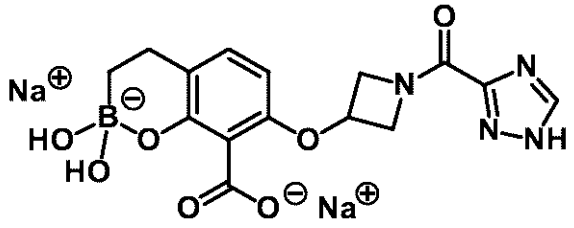
[Chemical Formula 80]



,

4,4-dihydroxy-8-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

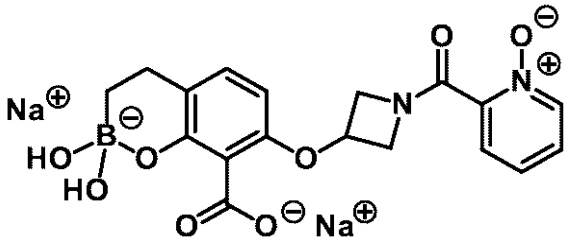
[Chemical Formula 81]



,

4,4-dihydroxy-8-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

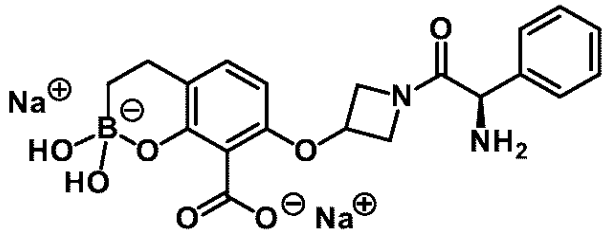
[Chemical Formula 82]



,

8-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

[Chemical Formula 83]

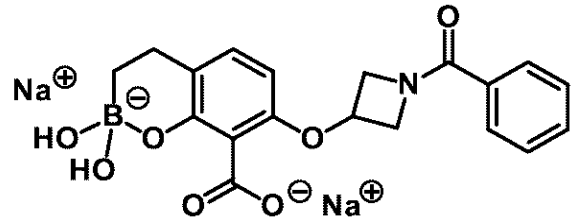


,

8-[(1-benzoylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-

boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

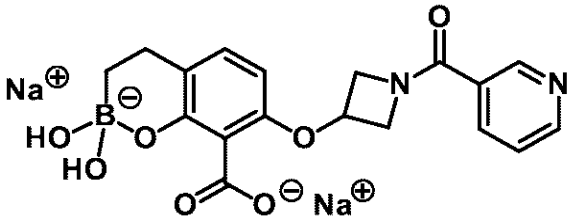
[Chemical Formula 84]



,

4,4-dihydroxy-8-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

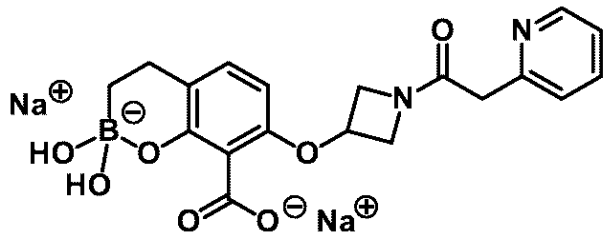
[Chemical Formula 85]



,

4,4-dihydroxy-8-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

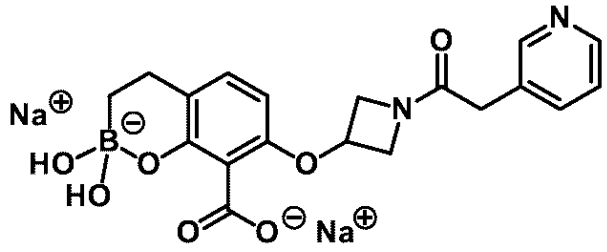
[Chemical Formula 86]



,

4,4-dihydroxy-8-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

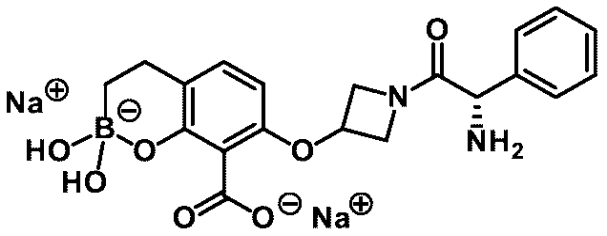
[Chemical Formula 87]



,

8-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

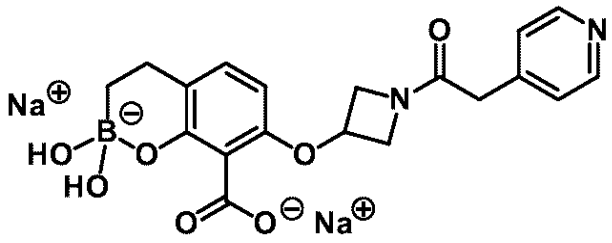
[Chemical Formula 88]



,

4,4-dihydroxy-8-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

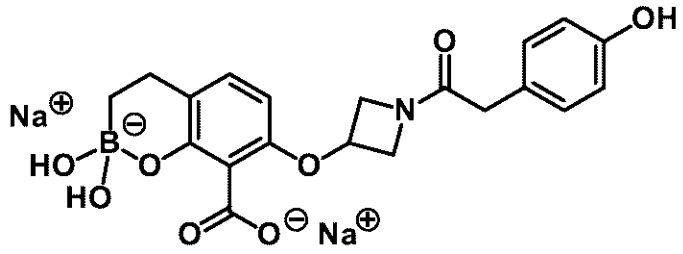
[Chemical Formula 89]



,

4,4-dihydroxy-8-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

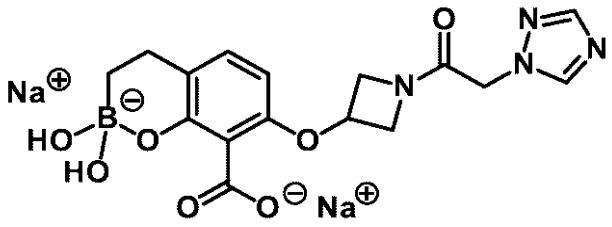
[Chemical Formula 90]



,

4,4-dihydroxy-8-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

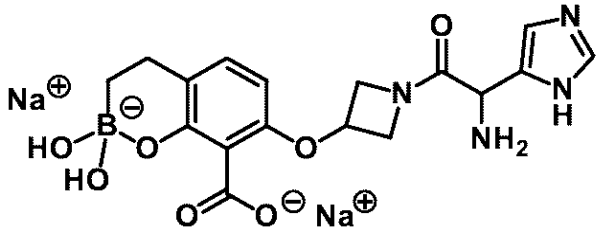
[Chemical Formula 91]



,

8-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

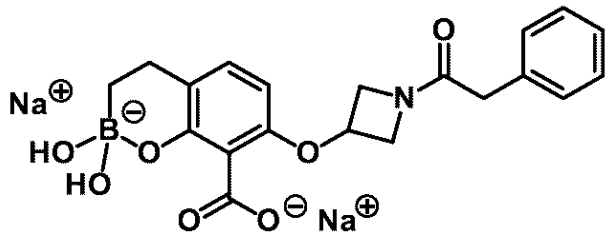
[Chemical Formula 92]



,

4,4-dihydroxy-8-{[1-(phenylacetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

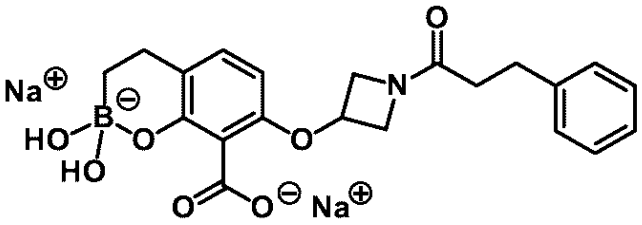
[Chemical Formula 93]



,

4,4-dihydroxy-8-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

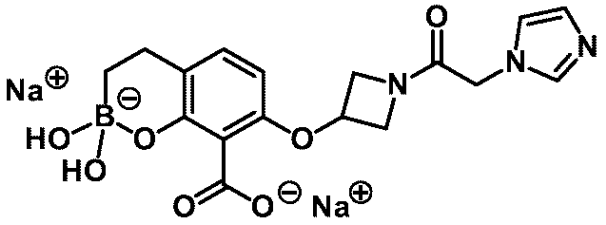
[Chemical Formula 94]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

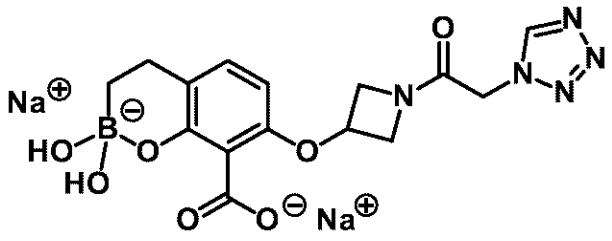
[Chemical Formula 95]



,

4,4-dihydroxy-8-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

[Chemical Formula 96]

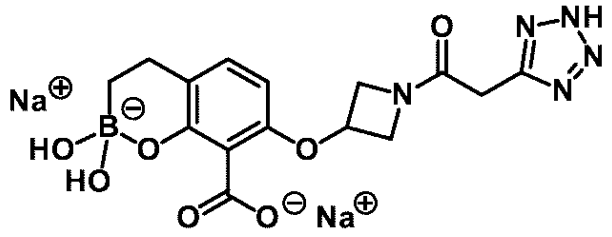


,

4,4-dihydroxy-8-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-

yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

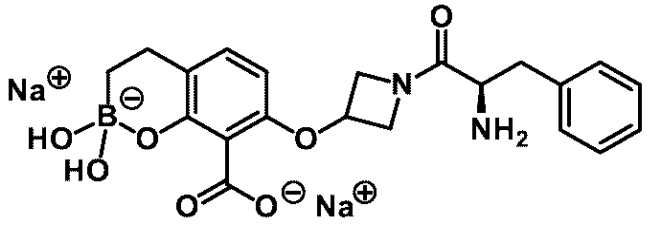
[Chemical Formula 97]



,

4,4-dihydroxy-8-[(1-D-phenylalanylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

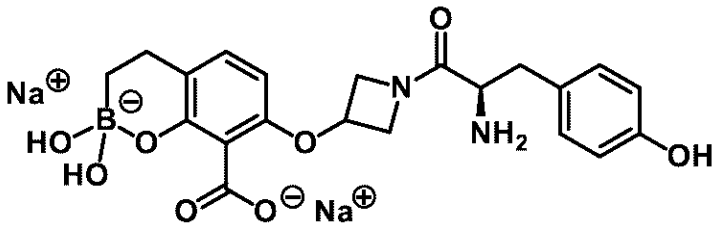
[Chemical Formula 98]



,

4,4-dihydroxy-8-[(1-D-tyrosylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

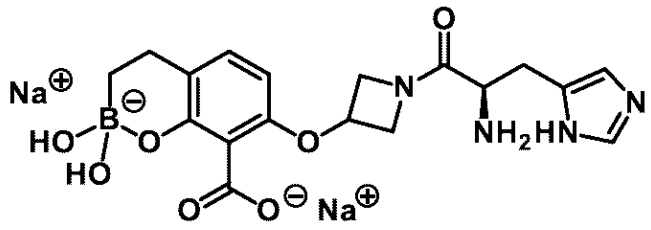
[Chemical Formula 99]



,

8-[(1-D-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

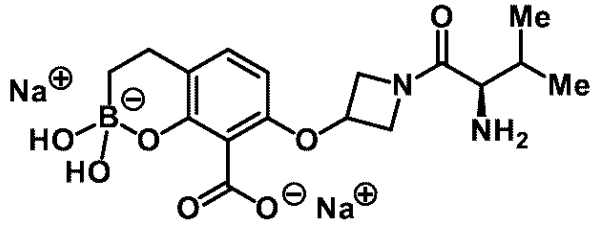
[Chemical Formula 100]



,

4,4-dihydroxy-8-[(1-D-valylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

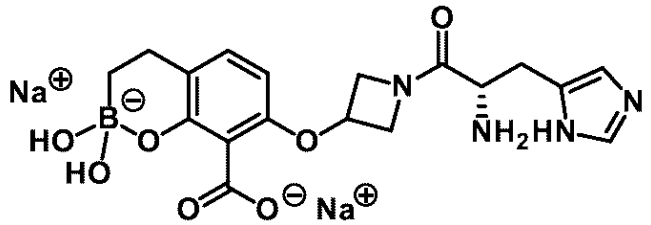
[Chemical Formula 101]



,

8-[(1-L-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

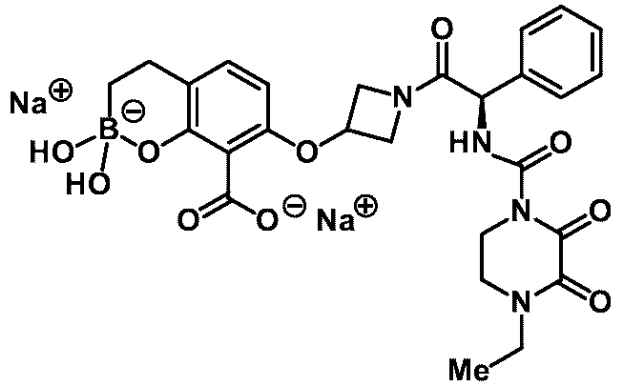
[Chemical Formula 102]



,

8-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

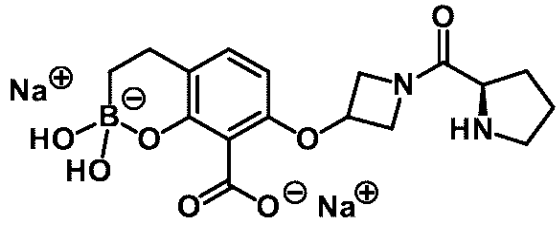
[Chemical Formula 103]



,

4,4-dihydroxy-8-[(1-D-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

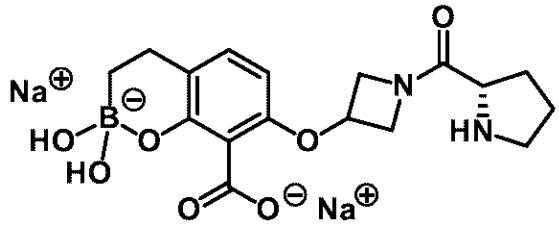
[Chemical Formula 104]



,

4,4-dihydroxy-8-[(1-L-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

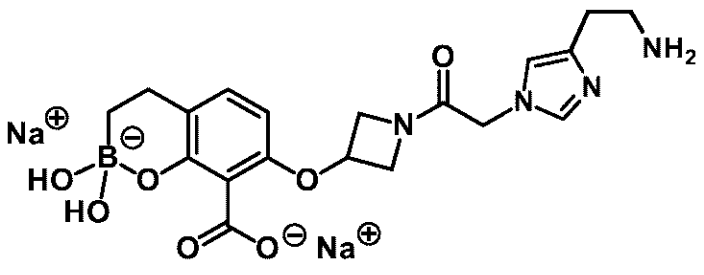
[Chemical Formula 105]



, or

8-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt

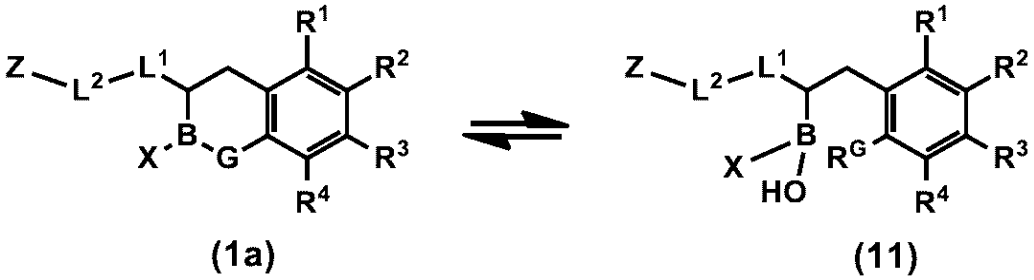
[Chemical Formula 106]



[Item A38]

A compound represented by formula (11):

[Chemical Formula 107]



(1a) (11)

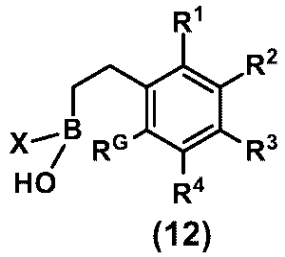
or a pharmaceutically acceptable salt thereof, wherein

R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, R^{a1}, Z, L^1, L^2, X, R^1, R^2, R^3, and R^4 are defined the same as the definition according to item A1, and formula (1a) is defined the same as item A1.

[Item A39]

The compound or the pharmaceutically acceptable salt thereof according to item A38, wherein the compound of formula (11) is represented by formula (12):

[Chemical Formula 108]



(12)

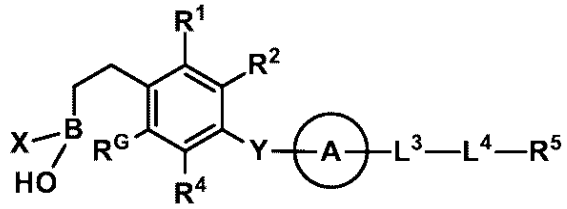
wherein X, R^1, R^2, R^3, and R^4 are defined by the same the definition according to item A8.

[Item A40]

The compound or the pharmaceutically acceptable salt

thereof according to item A38 or A39, wherein the compound of formula (12) is represented by formula (13):

[Chemical Formula 109]



(13)

wherein X, Y, ring A, L^3, L^4, R^1, R^2, R^4, and R^5 are defined the same as the definition according to any one of items A10 to A14 and items A16 to A27.

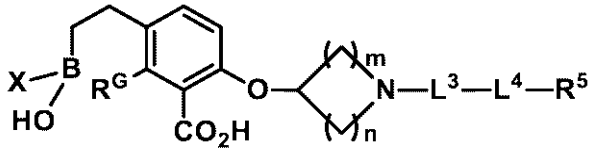
[Item A41]

The compound or the pharmaceutically acceptable salt thereof according to item A40, wherein X and R^G are hydroxyl groups, R^4 is a carboxyl group, and ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Item A42]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A41, wherein the compound of formula (13) is represented by formula (14):

[Chemical Formula 110]



(14)

wherein X, L^3, L^4, m, n, and R^5 are defined the same as the definition according to item A28.

[Item A43]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A42, wherein R^G is a hydroxyl group or a thiol group.

[Item A44]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A43, wherein R^G is a hydroxyl group.

[Item A45]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A44, wherein X is a hydroxyl group or a C_{1-6} alkoxy group.

[Item A46]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A45, wherein X is a hydroxyl group.

[Item A47]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A42 to A46, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Item A48]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A42 to A47, wherein m is 1, and n is 1.

[Item A49]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A48, wherein L^3 is defined the same as the definition according to item A16 or A17.

[Item A50]

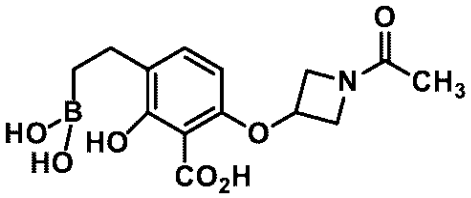
The compound or the pharmaceutically acceptable salt thereof according to any one of items A38 to A49, wherein L^4 is defined the same as the definition according to any one of items A18 to A20.

[Item A51]

The compound or the pharmaceutically acceptable salt thereof according to item A38, selected from the group consisting of the following compounds::

6-[(1-acetylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

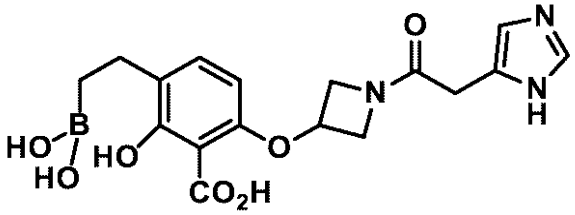
[Chemical Formula 111]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

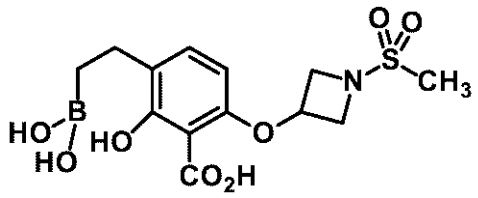
[Chemical Formula 112]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(methanesulfonyl)azetidin-3-yl]oxy}benzoic acid

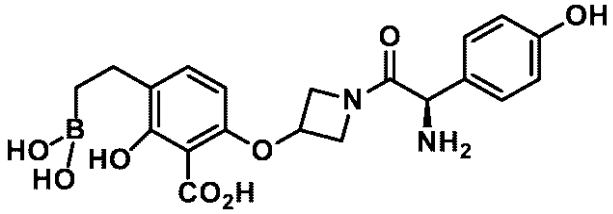
[Chemical Formula 113]



,

6-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

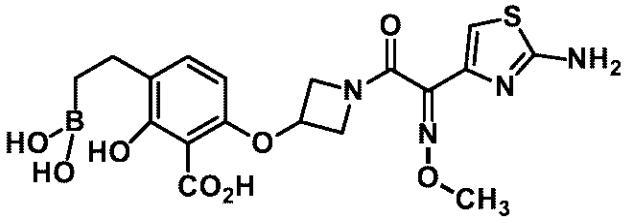
[Chemical Formula 114]



,

6-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

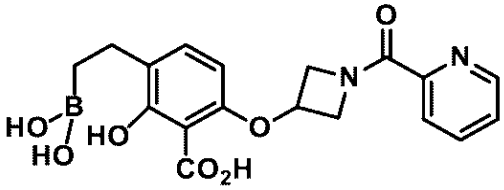
[Chemical Formula 115]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

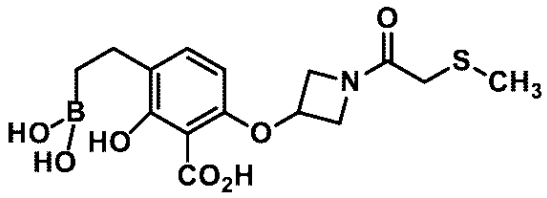
[Chemical Formula 116]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)benzoic acid

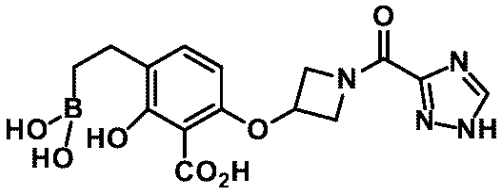
[Chemical Formula 117]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

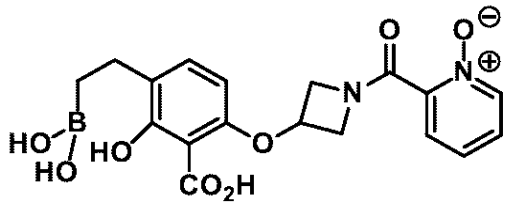
[Chemical Formula 118]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}benzoic acid

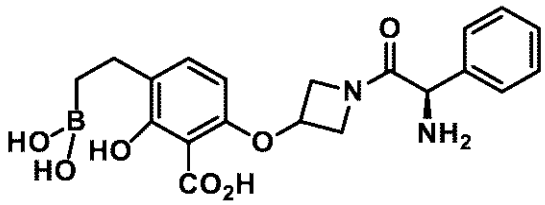
[Chemical Formula 119]



,

6-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

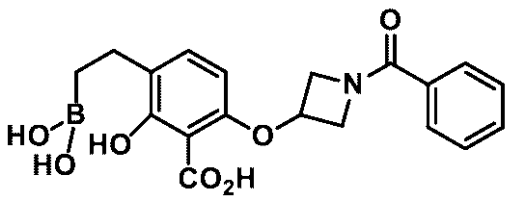
[Chemical Formula 120]



,

6-[(1-benzoylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

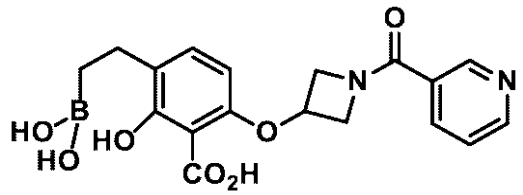
[Chemical Formula 121]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

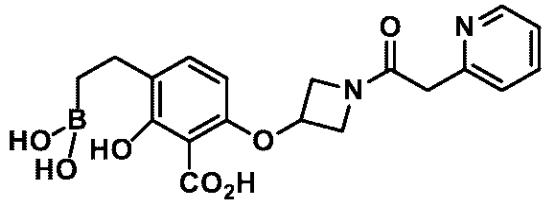
[Chemical Formula 122]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

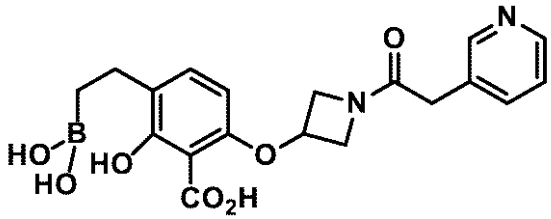
[Chemical Formula 123]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

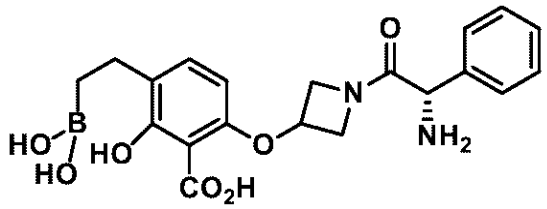
[Chemical Formula 124]



,

6-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

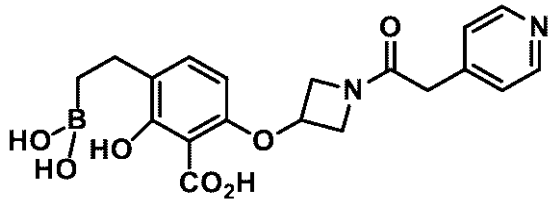
[Chemical Formula 125]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

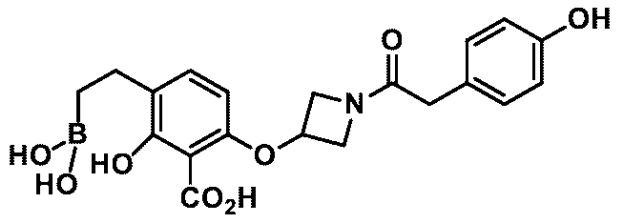
[Chemical Formula 126]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)benzoic acid

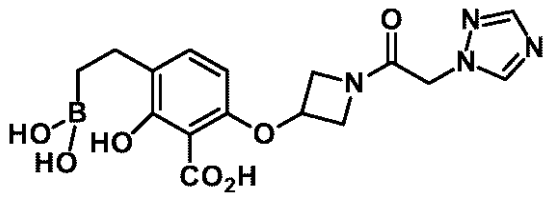
[Chemical Formula 127]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

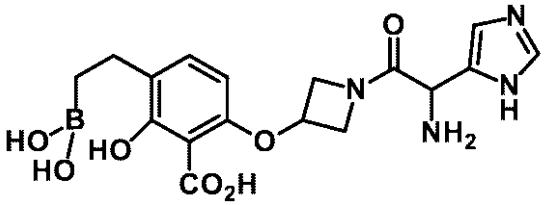
[Chemical Formula 128]



,

6-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

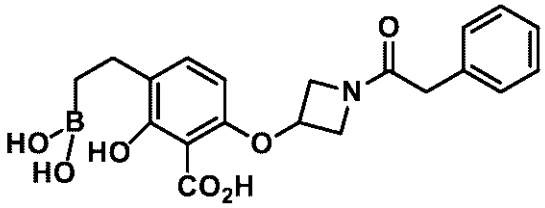
[Chemical Formula 129]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(phenylacetyl)azetidin-3-yl]oxy}benzoic acid

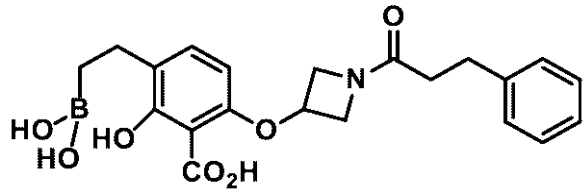
[Chemical Formula 130]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}benzoic acid

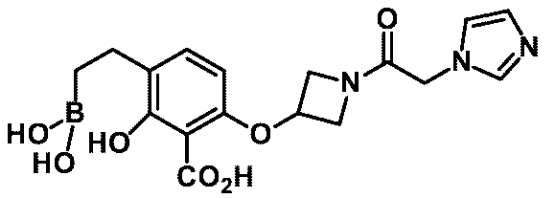
[Chemical Formula 131]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

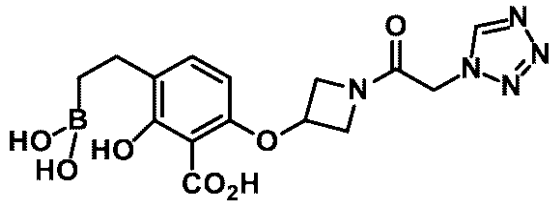
[Chemical Formula 132]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

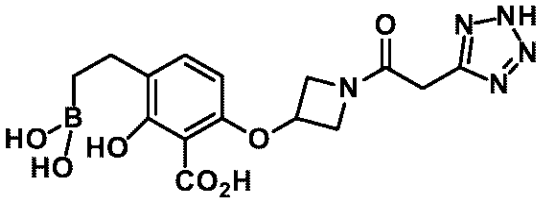
[Chemical Formula 133]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

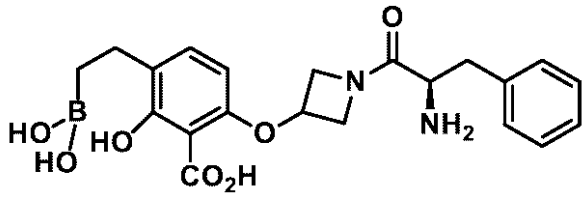
[Chemical Formula 134]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-phenylalanylazetidin-3-yl)oxy]benzoic acid

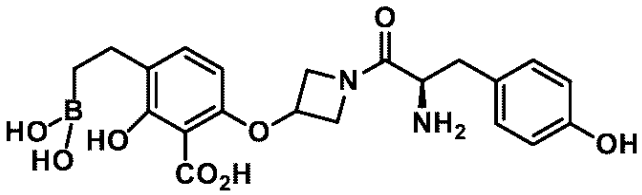
[Chemical Formula 135]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-tyrosylazetidin-3-yl)oxy]benzoic acid

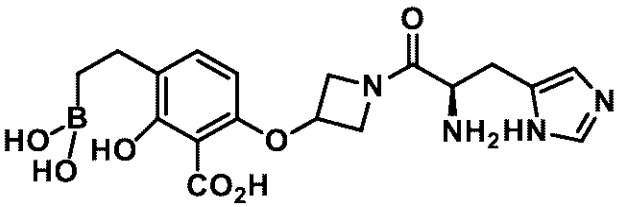
[Chemical Formula 136]



,

3-(2-boronoethyl)-6-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

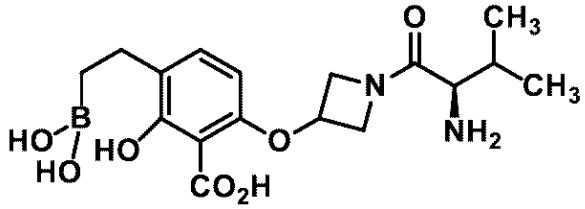
[Chemical Formula 137]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-valylazetidin-3-yl)oxy]benzoic acid

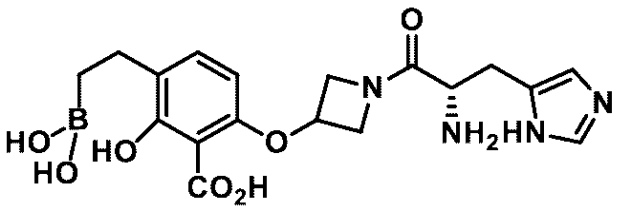
[Chemical Formula 138]



,

3-(2-boronoethyl)-6-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

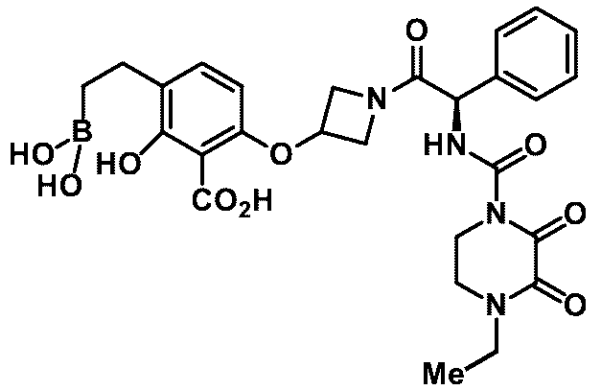
[Chemical Formula 139]



,

3-(2-boronoethyl)-6-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

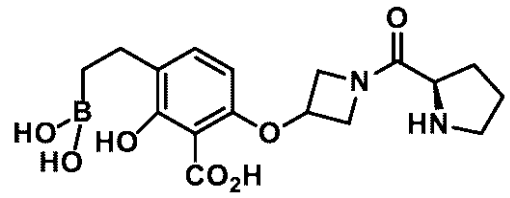
[Chemical Formula 140]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-prolylazetidin-3-yl)oxy]benzoic acid

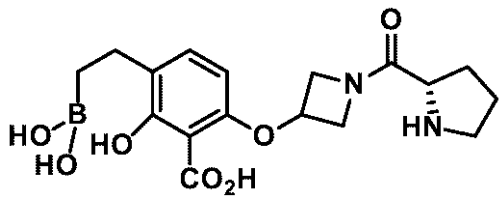
[Chemical Formula 141]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-prolylazetidin-3-yl)oxy]benzoic acid

[Chemical Formula 142]

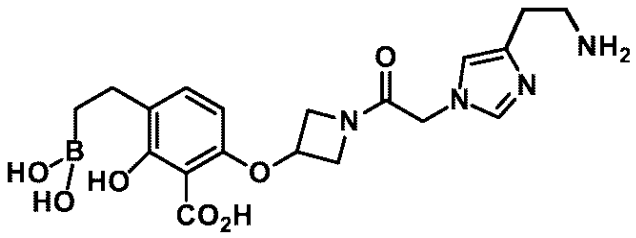


,

6-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-

3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

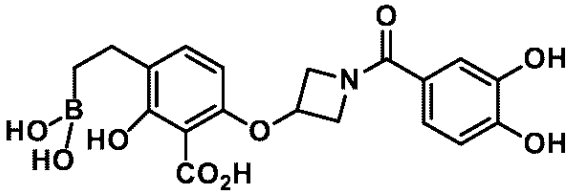
[Chemical Formula 143]



,

3-(2-boronoethyl)-6-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

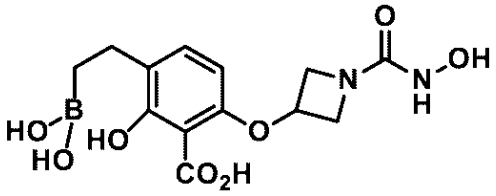
[Chemical Formula 144]



, and

3-(2-boronoethyl)-2-hydroxy-6-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}benzoic acid

[Chemical Formula 145]



.

[Item A52]

A medicament comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51.

[Item A53]

The medicament according to item A52, which is a therapeutic drug or a prophylactic drug for a bacterial infection.

[Item A54]

A β-lactamase inhibiting agent comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51 as an active ingredient.

[Item A55]

A pharmaceutical composition comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51 and a pharmaceutically acceptable carrier.

[Item A56]

The pharmaceutical composition according to item A55, further comprising an additional agent.

[Item A57]

The pharmaceutical composition according to item A56, wherein the additional agent is selected from the group consisting of an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, and an anti-allergic agent.

[Item A58]

The pharmaceutical composition according to item A56 or A57, wherein the additional agent is a β-lactam agent.

[Item A59]

The pharmaceutical composition according to item A57 or A58, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine,

ceftezole, cefaclor, cefamandole, cefminox, cefonicide, ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Item A60]

The pharmaceutical composition according to item A58 or A59, wherein the β-lactam agent is selected from ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, or panipenem.

[Item A61]

The pharmaceutical composition according to item A58 or A59, wherein the β-lactam agent is selected from aztreonam, tigemonam, BAL30072, SYN2416, or carumonam.

[Item A62]

The pharmaceutical composition according to item A55, characterized in that an additional agent is concomitantly administered.

[Item A63]

The pharmaceutical composition according to item A62, wherein the additional agent is selected from an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, or an anti-allergic agent.

[Item A64]

The pharmaceutical composition according to item A62 or A63, wherein the additional agent is a β-lactam agent.

[Item A65]

The pharmaceutical composition according to item A63 or

A64, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide, ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Item A66]

The pharmaceutical composition according to item A64 or A65, wherein the β-lactam agent is selected from the group consisting of ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, and panipenem.

[Item A67]

The pharmaceutical composition according to item A64 or

A65, wherein the β-lactam agent is selected from the group consisting of aztreonam, tigemonam, BAL30072, SYN2416, and carumonam.

[Item A68]

The compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51 for treating a bacterial infection.

[Item A69]

The compound or the pharmaceutically acceptable salt thereof according to item A68, wherein the bacterial infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Item A70]

The compound or the pharmaceutically acceptable salt thereof according to item A68 or A69, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Item A71]

A medicament comprised of a combination of the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51 and at least one agent selected from the group consisting of therapeutic agents for sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep

skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, and an odontogenic infection.

[Item A72]

A pharmaceutical composition comprising a β-lactam agent, wherein the pharmaceutical composition is administered with the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51.

[Item A73]

A method for treating a bacterial infection, characterized in that a therapeutically effective amount of the compound or the pharmaceutically acceptable salt thereof according to any one of items A1 to A51 is administered to a patient in need thereof.

[Item A74]

The method according to item A73, wherein the bacterial infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Item A75]

The method according to item A73 or A74, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Item A76]

The method according to any one of items A73 to A75, characterized in that an additional agent is concomitantly

administered.

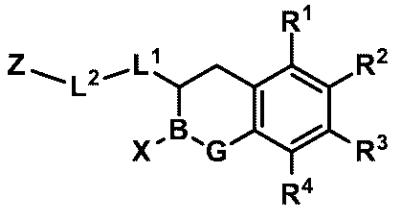
[0010]

The present invention also provides the following.

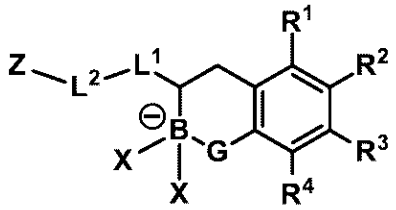
[Item 1]

A compound represented by formula (1a) or (1b):

[Chemical Formula 146]



(1a)



(1b)

or a pharmaceutically acceptable salt thereof,

wherein

G is an oxygen atom, a sulfur atom, or $-NR^{a1}-$,

X is a hydroxyl group, an optionally substituted C_{1-6} alkoxy group, or $-NR^{a2}R^{b1}$,

R^{a1}, R^{a2}, and R^{b1} are the same or different, each independently

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl
5) 5- or 6-membered heteroaryl,
6) a 4- to 10-membered non-aryl heterocycle,
7) a C_{1-6} alkylcarbonyl group,
8) a C_{3-10} alicyclic carbonyl group,
9) a C_{6-10} arylcarbonyl group,
10) a 5- or 6-membered heteroarylcarbonyl group,
11) a C_{1-6} alkylsulfonyl group,
12) a C_{3-10} alicyclic sulfonyl group,
13) a C_{6-10} arylsulfonyl group,
14) a 5- or 6-membered heteroarylsulfonyl group, or
15) $-OR^{c1}$,

(wherein each substituent from 2) to 14) is optionally substituted),

wherein R^{a2} and R^{b1} together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{c1} is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl, or
6) a 4- to 10-membered non-aryl heterocycle,

(wherein each substituent from 2) to 6) is optionally substituted),

L^1 is a single bond, an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-NR^d-$, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group,

Z is

1) a hydrogen atom,
2) a hydroxyl group,
3) a cyano group,
4) a carboxyl group,
5) a C_{3-10} alicyclic group,
6) C_{6-10} aryl,
7) 5- or 6-membered heteroaryl,
8) a 4- to 10-membered non-aryl heterocycle,
9) a C_{1-6} alkoxy group,
10) a C_{3-10} alicyclic oxy group,
11) a C_{6-10} aryloxy group,
12) a 5- or 6-membered heteroaryloxy group,
13) a 4- to 10-membered non-aryl heterocyclyl oxy group,
14) a C_{1-6} alkylthio group,
15) a C_{3-10} alicyclic thio group,
16) a C_{6-10} arylthio group,
17) a 5- or 6-membered heteroarylthio group,
18) a 4- to 10-membered non-aryl heterocyclyl thio group,

(wherein each substituent from 5) to 18) is optionally

substituted),

19) $-SO_2-NR^{e1}R^{f1}$,

20) $-NR^{e1}-C(=O)OR^{f1}$,

21) $-NR^{g1}-C(=O)NR^{e1}R^{f1}$,

22) $-NR^{e1}-C(=S)R^{f1}$,

23) $-NR^{e1}-C(=S)OR^{f1}$,

24) $-NR^{g1}-C(=S)NR^{e1}R^{f1}$,

25) $-NR^{g1}-CR^{e1}(=NR^{f1})$,

26) $-NR^{g1}-CR^{e1}(=N-OR^{f1})$,

27) $-NR^{h1}-C(=NR^{g1})NR^{e1}R^{f1}$,

28) $-NR^{h1}-C(=N-OR^{g1})NR^{e1}R^{f1}$,

29) $-NR^{i1}-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

30) $-NR^{i1}-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

31) $-NR^{e1}-SO_2-R^{f1}$,

32) $-NR^{g1}-SO_2-NR^{e1}R^{f1}$,

33) $-C(=O)OR^{e1}$,

34) $-C(=S)OR^{e1}$,

35) $-C(=S)NR^{e1}R^{f1}$,

36) $-C(=S)NR^{e1}OR^{f1}$,

37) $-C(=S)NR^{g1}-NR^{e1}R^{f1}$,

38) $-C(=NR^{e1})R^{f1}$,

39) $-C(=N-OR^{e1})R^{f1}$,

40) $-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

41) $-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

42) $-NR^{e1}R^{f1}$,

43) $-NR^{g1}-NR^{e1}R^{f1}$,

44) $-NR^{e1}OR^{f1}$,

45) $-NR^{e1}-C(=O)R^{f1}$,

46) $-C(=O)NR^{e1}R^{f1}$,

47) $-C(=O)NR^{e1}OR^{f1}$,

48) $-C(=O)NR^{g1}-NR^{e1}R^{f1}$,

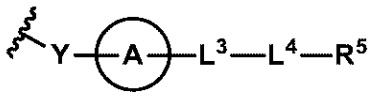
49) $-C(=O)R^{e1}$,

50) $-C(=NR^{g1})NR^{e1}R^{f1}$, or

51) $-C(=N-OR^{h1})NR^{e1}R^{f1}$,

one of R^1, R^2, and R^3 is a group represented by formula (2):

[Chemical Formula 147]



(2)

wherein

Y is an oxygen atom, a sulfur atom, or $-NR^j-$,

ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle,

L^3 is $-C(=O)-$, $-S(=O)-$, or $-S(=O)_2-$,

L^4 is

1) a single bond,
2) a C_{1-6} alkylene group,
3) a C_{3-10} cycloalkylene group,
4) a C_{6-10} arylene group,
5) a 5- or 6-membered heteroarylene group,
6) a 4- to 10-membered non-aryl heterocyclylene group, or
7) $-C(=N-OR^{h1})-$,

(wherein each substituent from 2) to 6) is optionally substituted), and

R^5 is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) a 4- to 10-membered non-aryl heterocycle,
5) C_{6-10} aryl,
6) 5- or 6-membered heteroaryl,
7) a C_{1-6} alkylthio group,

(wherein each substituent from 2) to 7) is optionally substituted), or

8) $-NR^{e1}OH$,

the remaining two (without the structure of formula (2) among R^1, R^2, and R^3) are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6}

alkylthio group, an optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$,

R^{d}, R^{e1}, R^{e2}, R^{f1}, R^{f2}, R^{g1}, R^{g2}, R^{h1}, R^{h2}, R^{i1}, R^{i2}, and R^{j} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{3-10} alicyclic group, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, or an optionally substituted 4- to 10-membered non-aryl heterocycle,

a combination of R^{e1} and R^{f1} or R^{e2} and R^{f2}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{4} is

1) $-C(=O)R^{8}$,

2) $-SO_2-L^{6}-R^{8}$,

(wherein R^{8} in 1) and 2) is $-NR^{a5}R^{b4}$, $-NR^{a5}-L^{7}-B(OR^{m1})_2$, $-OR^{m1}$, or an optionally substituted C_{1-6} alkyl group, and L^{6} is a single bond or $-NR^{a6}-$),

3) $-NR^{a4}R^{b3}$,

4) $-B(OR^{m1})_2$,

5) $-PO(OR^{m1})(OR^{m2})$,

6) optionally substituted 5-membered heteroaryl,

7) an optionally substituted 5-membered non-aryl heterocycle, or

8) a bioisostere of one of 1) to 7),

(wherein the formulas of 2), 4), 5), and 6) include a carboxylic acid isostere, and 8) may include them in duplicates),

R^{a3}, R^{a4}, R^{a5}, R^{a6}, R^{b2}, R^{b3}, and R^{b4} are the same or different, each independently having the same definition as R^{a1}, R^{a2}, and R^{b1}, wherein a combination of R^{a3} and R^{b2}, R^{a4} and R^{b3}, or R^{a5} and R^{b4}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{m1} is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl, or
6) a 4- to 10-membered non-aryl heterocycle,
(wherein each substituent from 2) to 6) is optionally substituted),

wherein if R^{m1} is attached to a boron atom via an oxygen atom, two R^{m1}, as C_{2-4} alkylene, together with the boron atom and two oxygen atoms, may form a 5- to 7-membered non-aryl heterocycle (wherein an alkylene moiety is optionally substituted in the non-aryl heterocycle),

R^{m2} is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group, and

L^7 is an optionally substituted C_{1-3} alkylene group.

[Item 2]

The compound or the pharmaceutically acceptable salt thereof according to item 1, wherein

L^1 is a single bond, a sulfur atom, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group, and

Z is
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl,
6) a 4- to 10-membered non-aryl heterocycle,
7) $-C(=N-OR^{e1})R^{f1}$, or
8) $-NR^{e1}R^{f1}$.

[Item 3]

The compound or the pharmaceutically acceptable salt thereof according to item 1 or 2, wherein

$Z\text{-}L^2\text{-}L^1$ is a hydrogen atom, an optionally substituted $C_{1\text{-}6}$ alkyl group, or an optionally substituted $C_{1\text{-}6}$ alkylthio group.

[Item 4]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein $Z\text{-}L^2\text{-}L^1$ is a hydrogen atom.

[Item 5]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein G is an oxygen atom.

[Item 6]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein X is a hydroxyl group or an optionally substituted $C_{1\text{-}6}$ alkoxy group.

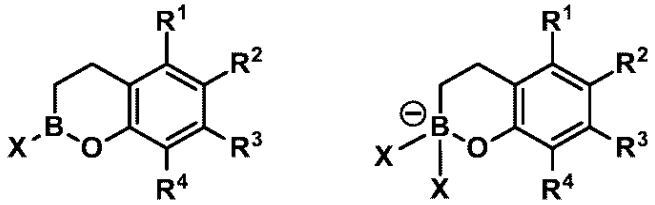
[Item 7]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein X is a hydroxyl group.

[Item 8]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein the compounds of formulas (1a) and (1b) are represented by formulas (3a) and (3b), respectively:

[Chemical Formula 148]



wherein X, R^1, R^2, and R^3 are defined the same as any one of the preceding items, and

R^4 is selected from the group consisting of

1) $-COOR^{m1}$ (wherein R^{m1} is a hydrogen atom, a C_{1-6} alkyl group, a C_{3-10} alicyclic group, C_{6-10} aryl, 5- or 6-membered heteroaryl, or a 4- to 10-membered non-aryl heterocycle, wherein the C_{1-6} alkyl group, the C_{3-10} alicyclic group, the C_{6-10} aryl, the 5- or 6-membered heteroaryl, and the 4- to 10-membered non-aryl heterocycle are each optionally substituted), and

2) a bioisostere of 1).

[Item 9]

The compound or the pharmaceutically acceptable salt thereof according to item 8, wherein R^4 is

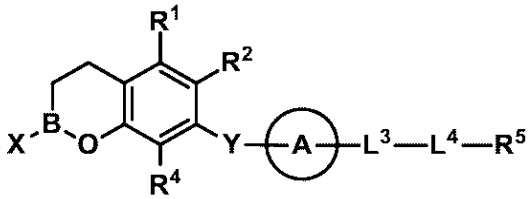
1) –COOH (i.e., a carboxyl group), or

2) a carboxylic acid isostere.

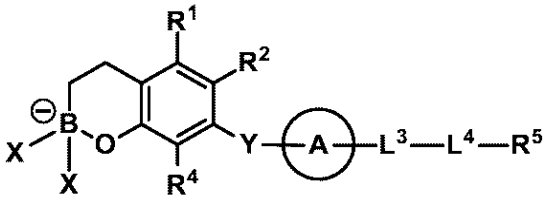
[Item 10]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein the compounds of formulas (1a) and (1b) or the compounds of formulas (3a) and (3b) are represented by formulas (4a) and (4b), respectively:

[Chemical Formula 149]



(4a)



(4b)

wherein X, R^4, Y, ring A, L^3, L^4, and R^5 are defined the same as any one of the preceding items, and

R^1 and R^2 are the same or different, each independently a hydrogen atom, a halogen atom, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group (wherein the C_{1-6} alkyl group and the C_{1-6} alkoxy group are optionally substituted with 1 to 5 halogen atoms).

[Item 11]

The compound or the pharmaceutically acceptable salt

thereof according to any one of the preceding items, wherein ring A is an optionally substituted 4- to 10-membered non-aryl heterocycle.

[Item 12]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein ring A is an optionally substituted 4- to 7-membered non-aryl heterocycle.

[Item 13]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein Y is an oxygen atom or a sulfur atom.

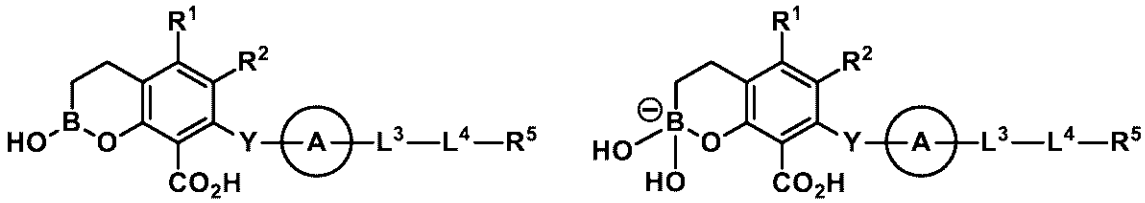
[Item 14]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein Y is an oxygen atom.

[Item 15]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein the compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), or the compounds of formulas (4a) and (4b) are represented by formulas (5a) and (5b), respectively:

[Chemical Formula 150]



(5a) (5b)

wherein ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Item 16]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^3 is $-C(=O)-$ or $-S(=O)_2-$.

[Item 17]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^3 is -C(=O)-.

[Item 18]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is a single bond, -C(=N-OR^{h1})-, or an optionally substituted C_{1-6} alkylene group, wherein R^{h1} is an optionally substituted C_{1-6} alkyl group.

[Item 19]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom,
3) a C_{1-6} alkyl group,
4) a C_{1-6} alkoxy group, and
5) a C_{1-6} alkylthio group,

(wherein each substituent from 3) to 5) is optionally substituted).

[Item 20]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom, and
3) an optionally substituted C_{1-6} alkyl group.

[Item 21]

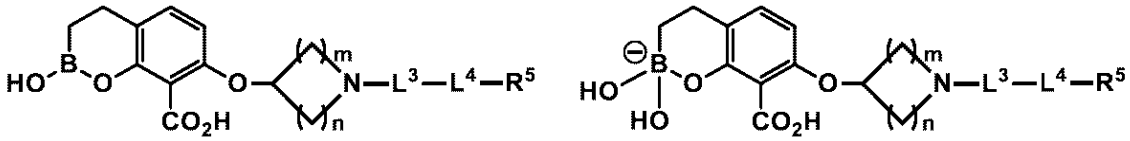
The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^1 and R^2 are both hydrogen atoms.

[Item 22]

The compound or the pharmaceutically acceptable salt

thereof according to any one of the preceding items, wherein the compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), the compounds of formulas (4a) and (4b), or the compounds of formulas (5a) and (5b) are represented by formulas (6a) and (6b), respectively:

[Chemical Formula 151]



(6a) (6b)

wherein L^3, L^4, and R^5 are defined the same as any one of the preceding items,

m is an integer 1, 2, or 3,

n is an integer 1, 2, or 3, and

m + n is 2, 3, or 4.

[Item 23]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Item 24]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein m is 1 and n is 1.

[Item 25]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is a single bond, or a C_{1-6} alkylene group optionally substituted with $-NR^{21}R^{22}$ or $=NOR^{23}$, wherein R^{21}, R^{22}, and R^{23} are each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted 4- to 10-membered non-aryl heterocyclyl carbonyl group.

[Item 26]

The compound or the pharmaceutically acceptable salt

thereof according to any one of the preceding items, wherein L^4 is a single bond, $-CH_2-$, $-CH(NH_2)-$, or $-CH(NH_2)-CH_2-$, wherein if an amino group is present in L^4, carbon that attaches to the amino group attaches to L^3.

[Item 27]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is a single bond, $-CH_2-$, $-CMe(NH_2)-$, $-CH(NHMe)-$, $-CD(NH_2)-$(wherein D represents a heavy hydrogen atom), $-CH(NH_2)-$, or $-CH_2CH_2-$.

[Item 28]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is a single bond, $-CH_2-$, or $-CH(NH_2)-$.

[Item 29]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^5 is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted 4- to 10-membered non-aryl heterocycle, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, an optionally substituted C_{1-6} alkylthio group, or $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item 30]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^5 is optionally substituted 5- or 6-membered heteroaryl or optionally substituted C_{6-10} aryl.

[Item 31]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^5 is optionally substituted 5- or 6-membered heteroaryl.

[Item 32]

The compound or the pharmaceutically acceptable salt

thereof according to any one of the preceding items, wherein R^5 is an optionally substituted 4- to 10-membered non-aryl heterocycle.

[Item 33]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is a single bond, and R^5 is $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item 34]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is

1) $-(CH_2)_p-CR^{10}(NHR^{11})-$,
2) $-(CH_2)_q-CR^{12}R^{13}-$, or
3) $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CR^{12}R^{13}-$ (wherein p and q are independently 0 or 1),

R^{10} is

1) a hydrogen atom,
2) a carboxyl group, or
3) $-C(=O)NR^{10a}R^{10b}$,

R^{11} is

1) a hydrogen atom,
2) $-C(=O)R^{11a}$, or
3) an optionally substituted 5- or 6-membered non-aryl heterocyclyl carbonyl group,

wherein if R^{10} is $-C(=O)NR^{10a}R^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$,

R^{12} is

1) a hydrogen atom, or
2) an optionally substituted C_{1-4} alkyl group,

R^{13} is

1) a hydrogen atom,
2) a hydroxyl group,
3) an optionally substituted C_{1-4} alkyl group,
4) a sulfanyl group,

5) a carboxyl group,

6) an optionally substituted C_{1-4} alkylthio group,

7) $-NR^{13a}R^{13b}$,

8) $-NR^{13a}-C(=O)R^{13b}$,

9) an optionally substituted 5- or 6-membered non-aryl heterocyclyl carbonylamino group,

10) $-NR^{13a}-C(=O)NR^{13b}R^{13c}$,

11) $-C(=O)NR^{13a}R^{13b}$,

12) $-C(=O)NR^{13a}OR^{13b}$,

13) $-S(=O)_2-R^{13a}$,

14) $-S(=O)_2-NR^{13a}R^{13b}$,

15) $-C(=O)NR^{13a}-S(=O)_2-R^{13b}$, or

16) $-C(=O)NR^{13a}-S(=O)_2-NR^{13b}R^{13c}$, and

R^{10a}, R^{10b}, R^{11a}, R^{13a}, R^{13b}, and R^{13c} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Item 35]

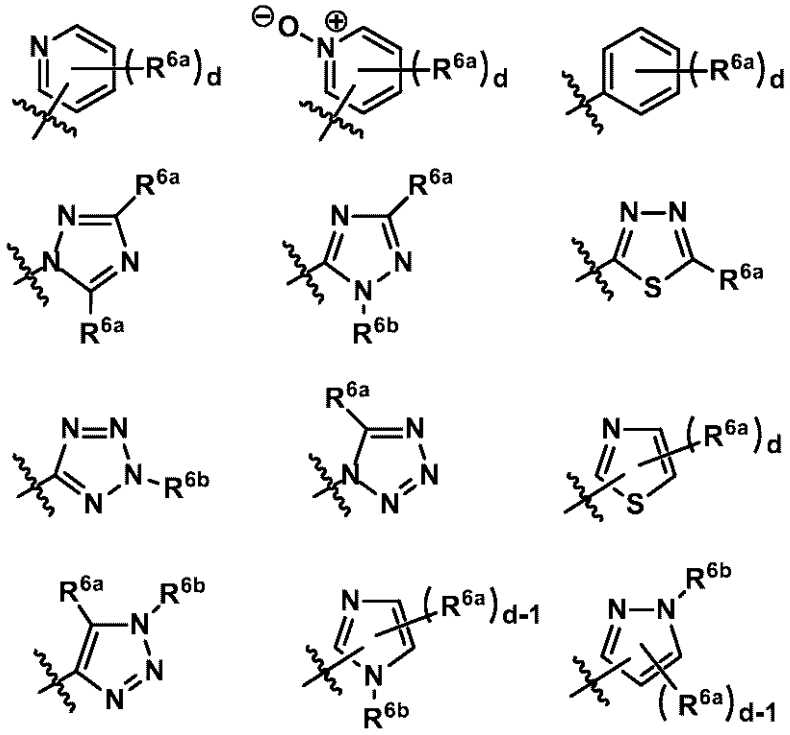
The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein R^5 is a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Item 36]

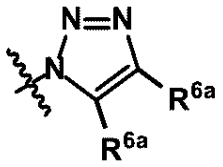
The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 31, wherein

R^5 is selected from the group consisting of

[Chemical Formula 152]



[Chemical Formula 153]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) a nitro group,

5) halogen,

6) a C_{1-4} alkyl group,

7) a C_{3-10} alicyclic group,

8) a C_{1-4} alkoxy group,

9) a C_{3-10} alicyclic oxy group,

10) a C_{6-10} aryloxy group,

11) a 5- or 6-membered heteroaryloxy group,

12) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 6) to 12) is optionally substituted),

13) $-SO_2-NR^{e2}R^{f2}$,

14) $-NR^{g2}-CR^{e2}(=NR^{f2})$,

15) $-NR^{g2}-CR^{e2}(=N-OR^{f2})$,

16) $-NR^{h2}-C(=NR^{g2})NR^{e2}R^{f2}$,

17) $-NR^{h2}-C(=N-OR^{g2})NR^{e2}R^{f2}$,

18) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

19) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

20) $-C(=NR^{e2})R^{f2}$,

21) $-C(=N-OR^{e2})R^{f2}$,

22) $-C(=NR^{h2})-NR^{e2}R^{f2}$,

23) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

24) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

25) $-NR^{e2}R^{f2}$,

26) $-NR^{g2}-NR^{e2}R^{f2}$,

27) $-NR^{e2}OR^{f2}$,

28) $-NR^{e2}-C(=O)R^{f2}$,

29) $-C(=O)NR^{e2}R^{f2}$,

30) $-C(=O)NR^{e2}OR^{f2}$,

31) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,

32) $-C(=O)R^{e2}$,

33) $-C(=O)OR^{e2}$, and

34) $-C(=N-OR^{h2})NR^{e2}R^{f2}$, and

each R^{6b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted)

4) a C_{3-10} alicyclic group

(wherein the alicyclic group is optionally substituted),

5) $-C(=NR^{e2})R^{f2}$,

6) $-C(=N-OR^{e2})R^{f2}$,

7) $-SO_2-NR^{e2}R^{f2}$,

8) $-C(=NR^{h2})-NR^{e2}R^{f2}$,

9) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

10) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

11) $-C(=O)NR^{e2}R^{f2}$,

12) $-C(=O)NR^{e2}OR^{f2}$,

13) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,

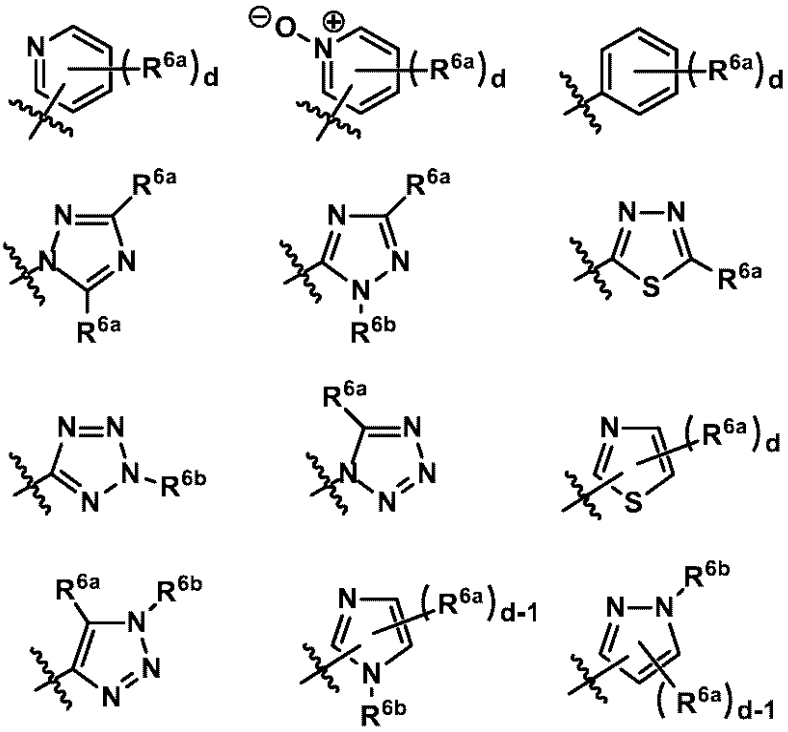
14) $-C(=O)R^{e2}$, and

15) $-C(=N-OR^{h2})NR^{e2}R^{f2}$.

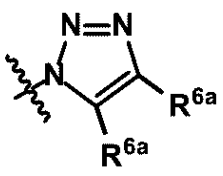
[Item 37]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 31 and 36, wherein R^5 is 5- or 6-membered aryl or heteroaryl selected from the group consisting of

[Chemical Formula 154]



[Chemical Formula 155]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f2}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e2}R^{f2}$, and

7) $-C(=O)OR^{e2}$, and

each R^{6b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, $-C(=O)NR^{e2}R^{f2}$, $-C(=O)OR^{f2}$, or a hydroxyl group).

[Item 38]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 31, 36, and 37, wherein R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group.

[Item 39]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 31 and 36 to 38, wherein R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Item 40]

The compound or the pharmaceutically acceptable salt

thereof according to any one of items 1 to 31 and 36 to 39, wherein R^{e2} and R^{f2} are hydrogen atoms.

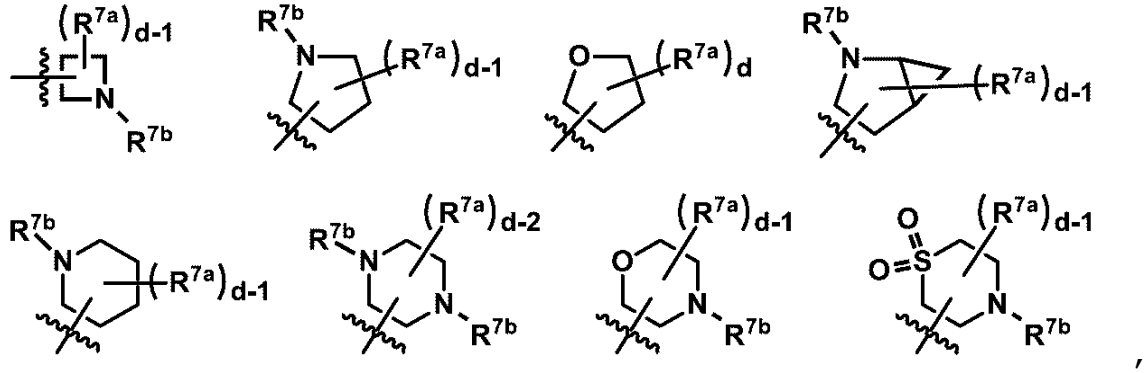
[Item 41]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 36 to 39, wherein R^{6a} is $-NR^{e2}R^{f2}$, and one of R^{e2} and R^{f2} is a hydrogen atom and the other is a C_{1-4} alkyl group (wherein the alkyl group is optionally substituted with an amino group or a hydroxyl group).

[Item 42]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 29 and 32, wherein R^5 is a 4- to 6-membered non-aryl heterocycle selected from the group consisting of

[Chemical Formula 156]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,
2) a hydroxyl group,
3) a cyano group,
4) halogen,
5) a C_{1-4} alkyl group,
6) a C_{3-10} alicyclic group,
7) a C_{1-4} alkoxy group,
8) a C_{3-10} alicyclic oxy group,
9) a C_{6-10} aryloxy group,

10) a 5- or 6-membered heteroaryloxy group,
11) a 4- to 10-membered non-aryl heterocyclyl oxy group,
(wherein each substituent from 5) to 11) is optionally substituted),
12) $-SO_2-NR^{e3}R^{f3}$,
13) $-NR^{g2}-CR^{e3}(=NR^{f3})$,
14) $-NR^{g2}-CR^{e3}(=N-OR^{f3})$,
15) $-NR^{h2}-C(=NR^{g2})NR^{e3}R^{f3}$,
16) $-NR^{h2}-C(=N-OR^{g2})NR^{e3}R^{f3}$,
17) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
18) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
19) $-C(=NR^{e3})R^{f3}$,
20) $-C(=N-OR^{e3})R^{f3}$,
21) $-C(=NR^{h2})-NR^{e3}R^{f3}$,
22) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
23) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
24) $-NR^{e3}R^{f3}$,
25) $-NR^{g2}-NR^{e3}R^{f3}$,
26) $-NR^{e3}OR^{f3}$,
27) $-NR^{e3}-C(=O)R^{f3}$,
28) $-C(=O)NR^{e3}R^{f3}$,
29) $-C(=O)NR^{e3}OR^{f3}$,
30) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,
31) $-C(=O)R^{e3}$,
32) $-C(=O)OR^{e3}$, and
33) $-C(=N-OR^{h2})NR^{e3}R^{f3}$,

each R^{7b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted),
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e3})R^{f3}$,
6) $-C(=N-OR^{e3})R^{f3}$,

7) $-SO_2-NR^{e3}R^{f3}$,

8) $-C(=NR^{h2})-NR^{e3}R^{f3}$,

9) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,

10) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,

11) $-C(=O)NR^{e3}R^{f3}$,

12) $-C(=O)NR^{e3}OR^{f3}$,

13) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,

14) $-C(=O)R^{e3}$, and

15) $-C(=N-OR^{h2})NR^{e3}R^{f3}$, and

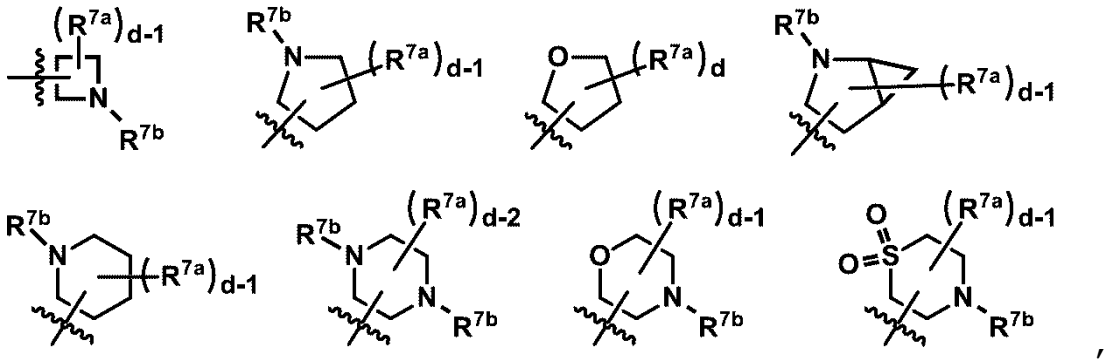
R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to item 1.

[Item 43]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 29, 32, and 42, wherein

R^5 is a 4- to 6-membered non-aryl heterocycle selected from the group consisting of

[Chemical Formula 157]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e3}R^{f3}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f3}$,

or a hydroxyl group),
5) a C_{1-4} alkoxy group
6) $-NR^{e3}R^{f3}$,
7) $-C(=O)OR^{e3}$,
8) C_{6-10} aryl, and
9) $-C(=O)NR^{e3}R^{f3}$,

each R^{7b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group, and
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted with $NR^{e3}R^{f3}$, $-C(=O)OR^{f3}$, or a hydroxyl group), and

R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to any one of items 38 to 40.

[Item 44]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CH(NH_2)-CHR^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom, and

R^{13} is
1) $-NH-C(=O)CH_3$,
2) $-NH-C(=O)NH_2$,
3) $-NH-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
4) $-NH-C(=O)CH_2-NH_2$,
5) $-NH-C(=O)CH(NH_2)-CH_2OH$, or
6) a pyrrolidin-2-ylcarbonylamino group.

[Item 45]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is $-CH(NH_2)-CR^{12}R^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom or methyl,

R^{12} is a hydrogen atom or methyl, and

R^{13} is a benzylthio group or a sulfanyl group.

[Item 46]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein L^4 is $-CH(NH_2)-(CH_2)_q-CHR^{13}-$, wherein q is 0 or 1, and carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom, and

R^{13} is

1) a carboxyl group,
2) $-C(=O)NH_2$,
3) $-C(=O)NH(CH_3)$,
4) $-C(=O)N(CH_3)_2$,
5) $-C(=O)NH-(CH_2)_2-OH$,
6) $-C(=O)NH-(CH_2)_2-NH_2$,
7) $-C(=O)NH-S(=O)_2-CH_3$,
8) $-C(=O)NHOH$,
9) $-S(=O)_2-NH_2$,
10) $-S(=O)_2-CH_3$, or
11) a hydroxyl group.

[Item 47]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CH(NHR^{11})-CH_2-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,

R^5 is hydrogen, and

R^{11} is

1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
2) $-C(=O)CH_2-NH_2$,
3) $-C(=O)CH(CH_3)-NH_2$,
4)- $C(=O)CH(NH_2)-CH_2OH$, or
5) pyrrolidin-2-ylcarbonyl.

[Item 48]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CH(NHR^{11})-CH(COOH)-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,

R^5 is hydrogen, and

R^{11} is

1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,

2) $-C(=O)CH_2-NH_2$,

3) $-C(=O)CH(CH_3)-NH_2$,

4) $-C(=O)CH(NH_2)-CH_2OH$, or

5) pyrrolidin-2-ylcarbonyl.

[Item 49]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CHR^{13}-$ or $-CH_2-CHR^{13}-$,

R^5 is hydrogen, and

R^{13} is $-C(=O)NH_2$ or $-C(=O)NHOH$.

[Item 50]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CH_2-CR^{10}(NH_2)-$, wherein the CH_2 attaches to L^3,

R^5 is hydrogen, and

R^{10} is a carboxy group or $-C(=O)NH_2$.

[Item 51]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$ or $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$, wherein q is 0 or 1,

R^5 is hydrogen,

(1) if L^4 is $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$,

carbon of the $-CHR^{13}-$ group attaches to L^3,

p is 0,

R^{10} is a hydrogen atom, a carboxyl group, or $-C(=O)NHR^{10b}$,

R^{11} is a hydrogen atom,

R^{10b} is a hydrogen atom,

wherein if R^{10} is $-C(=O)NHR^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$, and

R^{13} is a hydrogen atom, and

(2) if L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$,

carbon of the $-(CH_2)_p-$ group attaches to L^3,

p is 1,

R^{10} and R^{11} are both hydrogen atoms,

R^{13} is a carboxyl group or $-C(=O)NR^{13a}R^{13b}$, and

R^{13a} and R^{13b} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Item 52]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein

L^4 is $-CR^{12}(NH_2)-$,

R^{12} is a hydrogen atom or a methyl group, and

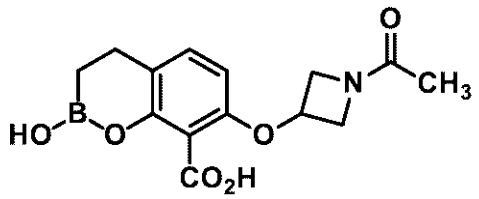
R^5 is a C_{1-4} alkyl group optionally substituted with a hydroxyl group.

[Item 53]

The compound or the pharmaceutically acceptable salt thereof according to item 1, represented by the following compound name or structural formula:

7-[(1-acetylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

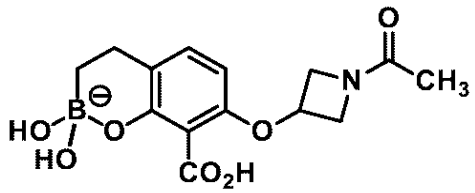
[Chemical Formula 158]



,

8-[(1-acetylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

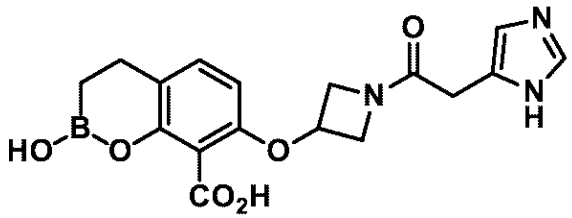
[Chemical Formula 159]



,

2-hydroxy-7-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

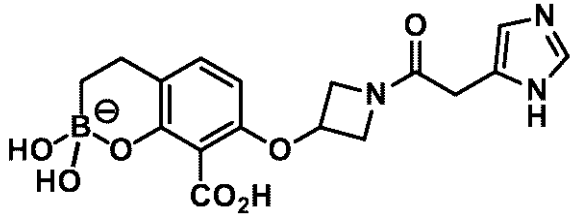
[Chemical Formula 160]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

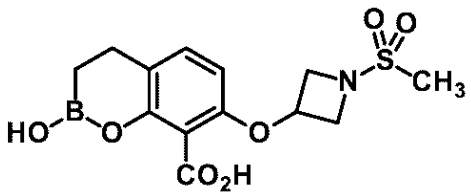
[Chemical Formula 161]



,

2-hydroxy-7-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

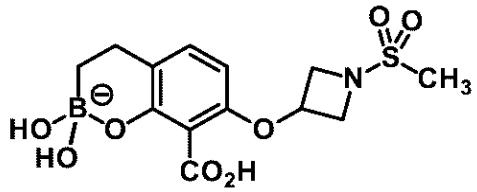
[Chemical Formula 162]



,

4,4-dihydroxy-8-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

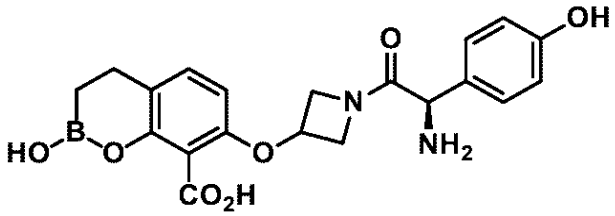
[Chemical Formula 163]



,

7-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

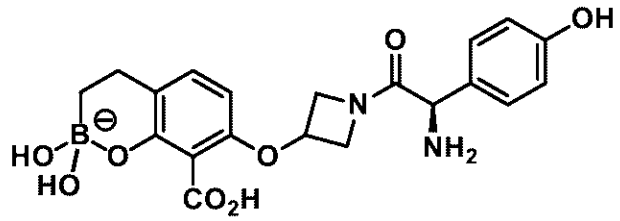
[Chemical Formula 164]



,

8-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

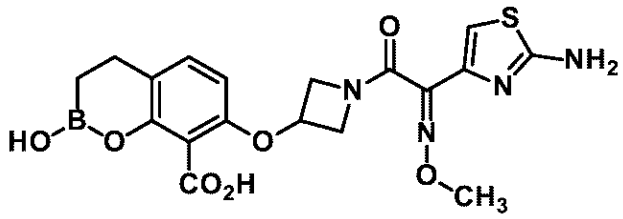
[Chemical Formula 165]



,

7-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 166]

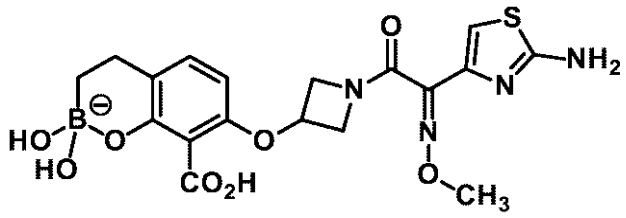


,

8-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-

carboxylic acid

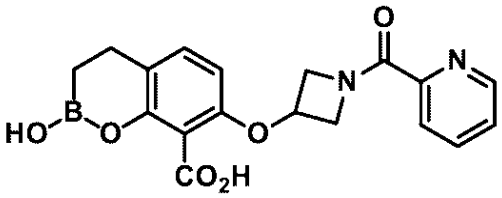
[Chemical Formula 167]



,

2-hydroxy-7-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

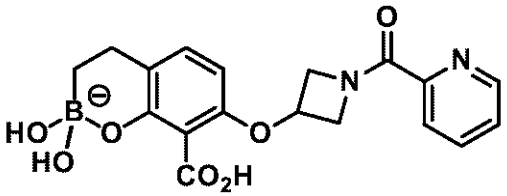
[Chemical Formula 168]



,

4,4-dihydroxy-8-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

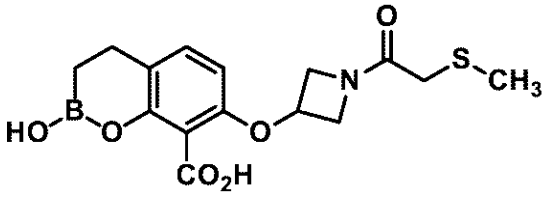
[Chemical Formula 169]



,

2-hydroxy-7-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

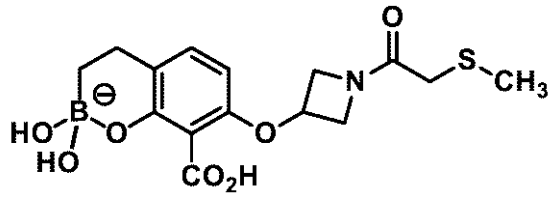
[Chemical Formula 170]



,

4,4-dihydroxy-8-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

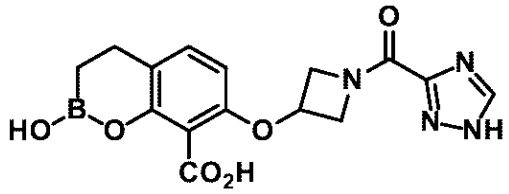
[Chemical Formula 171]



,

2-hydroxy-7-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

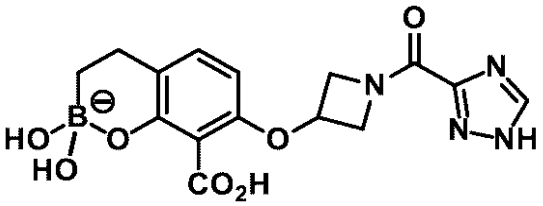
[Chemical Formula 172]



,

4,4-dihydroxy-8-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

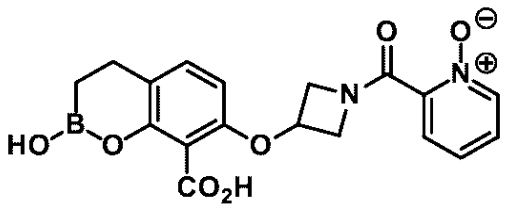
[Chemical Formula 173]



,

2-hydroxy-7-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

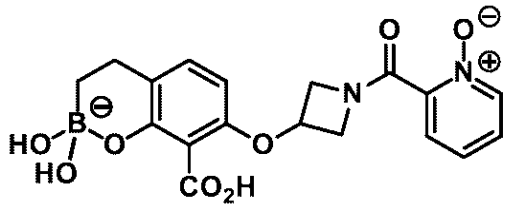
[Chemical Formula 174]



,

4,4-dihydroxy-8-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

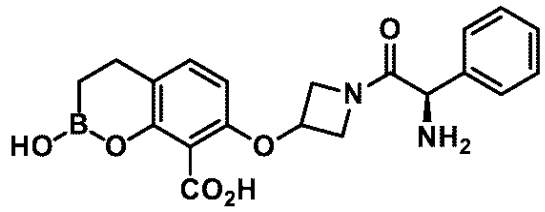
[Chemical Formula 175]



,

7-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

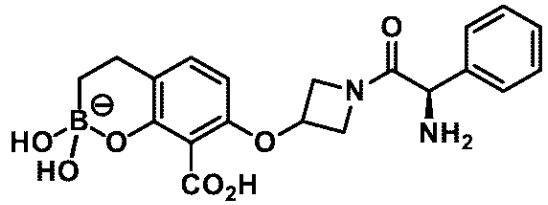
[Chemical Formula 176]



,

8-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

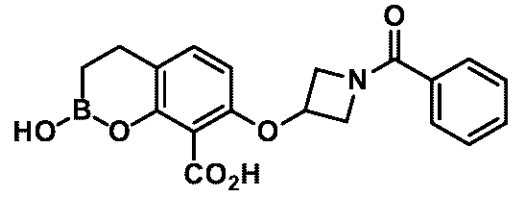
[Chemical Formula 177]



,

7-[(1-benzoylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

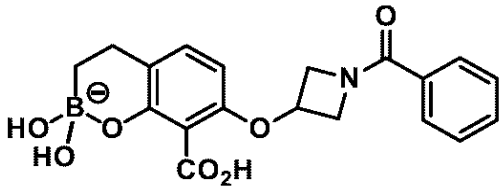
[Chemical Formula 178]



,

8-[(1-benzoylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

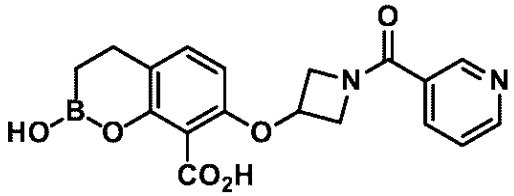
[Chemical Formula 179]



,

2-hydroxy-7-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

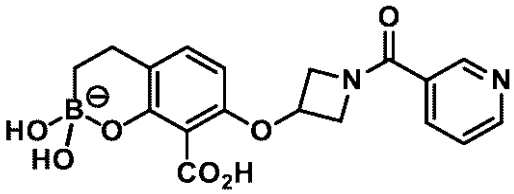
[Chemical Formula 180]



,

4,4-dihydroxy-8-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

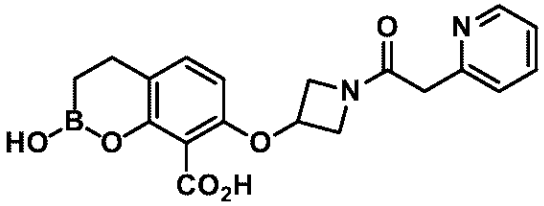
[Chemical Formula 181]



,

2-hydroxy-7-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

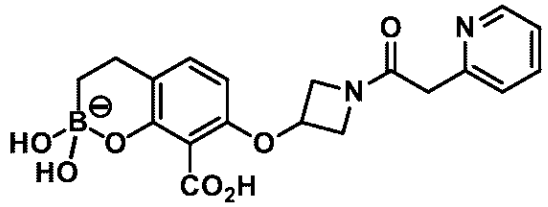
[Chemical Formula 182]



,

4,4-dihydroxy-8-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

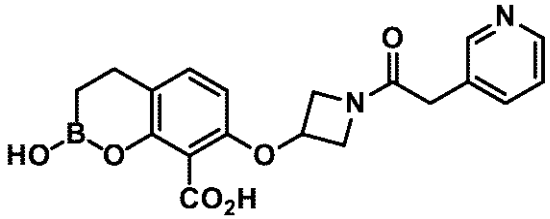
[Chemical Formula 183]



,

2-hydroxy-7-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

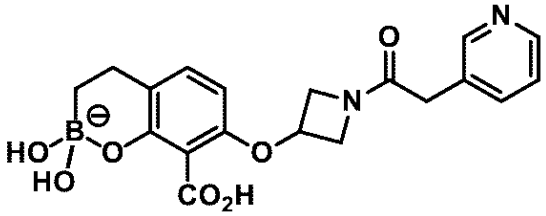
[Chemical Formula 184]



,

4,4-dihydroxy-8-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

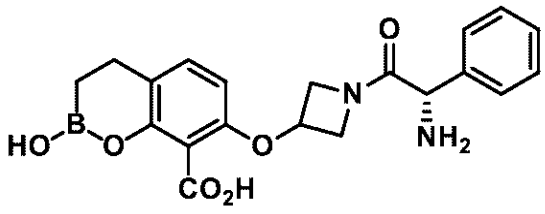
[Chemical Formula 185]



,

7-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

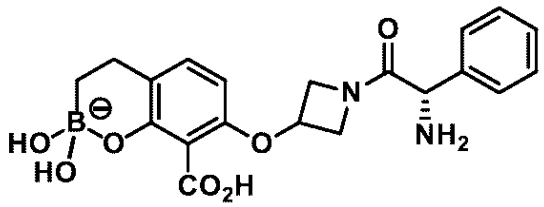
[Chemical Formula 186]



,

8-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

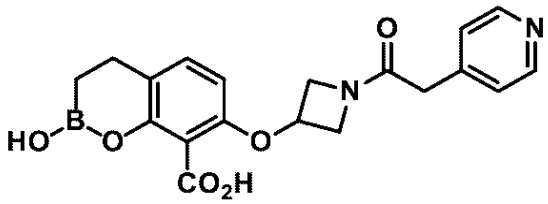
[Chemical Formula 187]



,

2-hydroxy-7-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

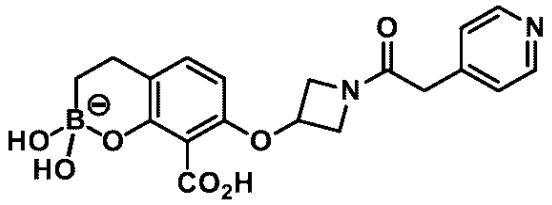
[Chemical Formula 188]



,

4,4-dihydroxy-8-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

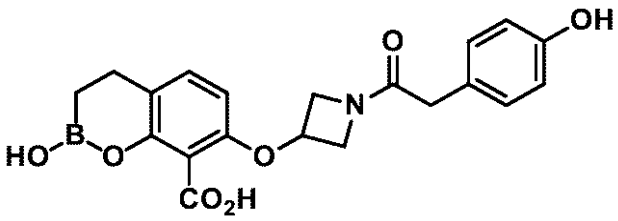
[Chemical Formula 189]



,

2-hydroxy-7-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

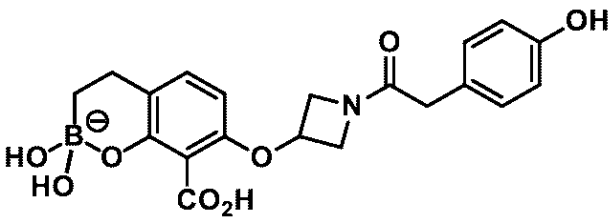
[Chemical Formula 190]



,

4,4-dihydroxy-8-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

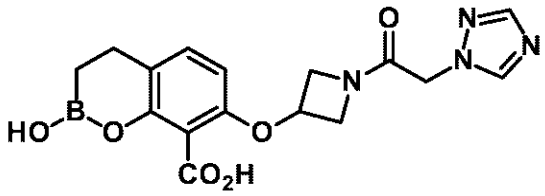
[Chemical Formula 191]



,

2-hydroxy-7-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

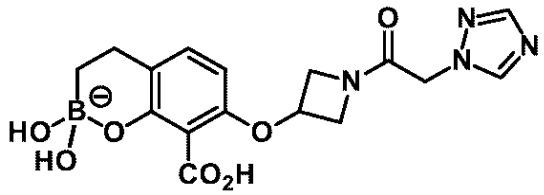
[Chemical Formula 192]



,

4,4-dihydroxy-8-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

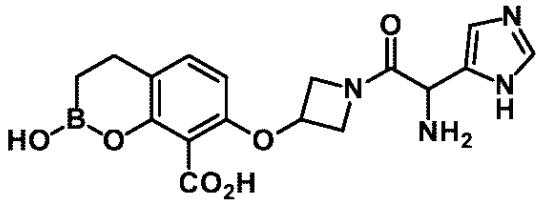
[Chemical Formula 193]



,

7-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 194]

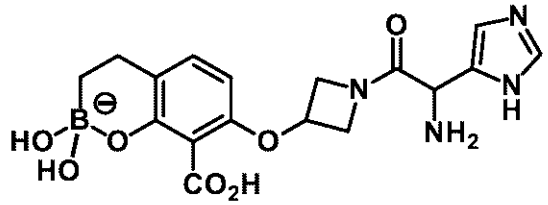


,

8-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-

triene-7-carboxylic acid

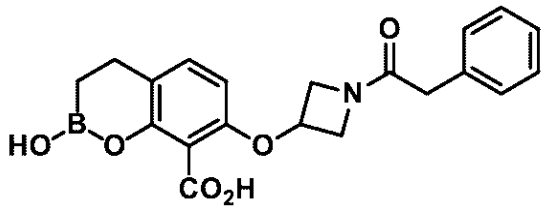
[Chemical Formula 195]



,

2-hydroxy-7-{[1-(phenylacetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

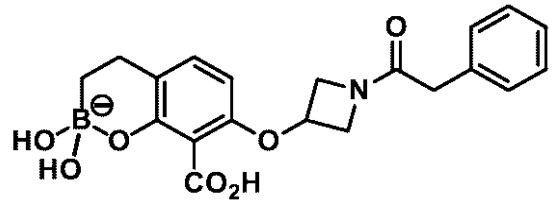
[Chemical Formula 196]



,

4,4-dihydroxy-8-{[1-(phenylacetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

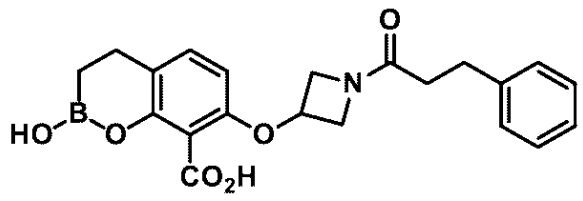
[Chemical Formula 197]



,

2-hydroxy-7-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

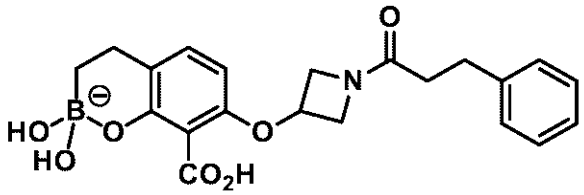
[Chemical Formula 198]



,

4,4-dihydroxy-8-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

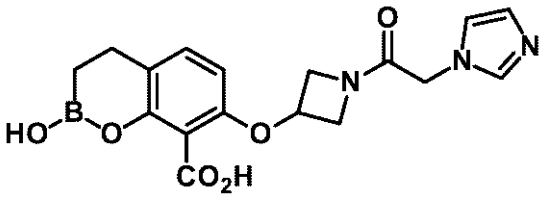
[Chemical Formula 199]



,

2-hydroxy-7-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

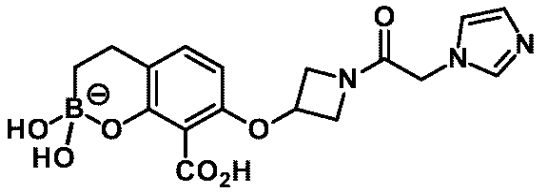
[Chemical Formula 200]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

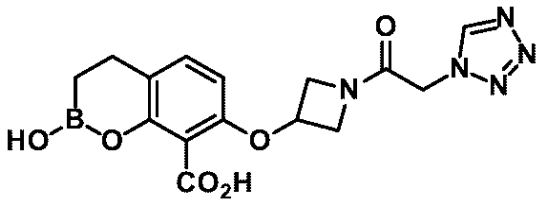
[Chemical Formula 201]



,

2-hydroxy-7-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

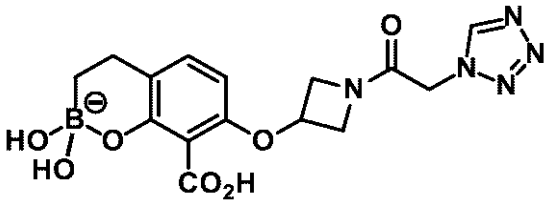
[Chemical Formula 202]



,

4,4-dihydroxy-8-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

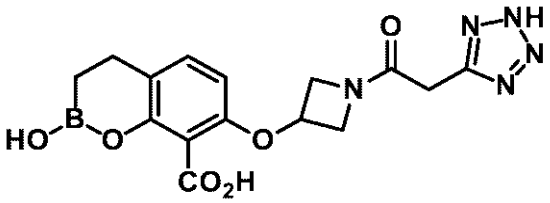
[Chemical Formula 203]



,

2-hydroxy-7-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

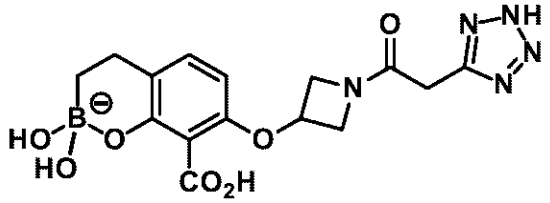
[Chemical Formula 204]



,

4,4-dihydroxy-8-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

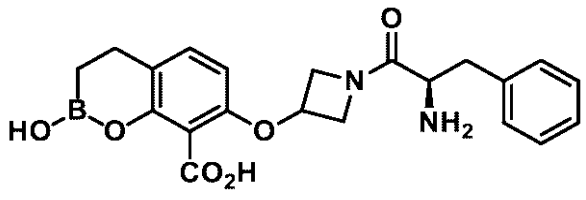
[Chemical Formula 205]



,

2-hydroxy-7-[(1-D-phenylalanylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

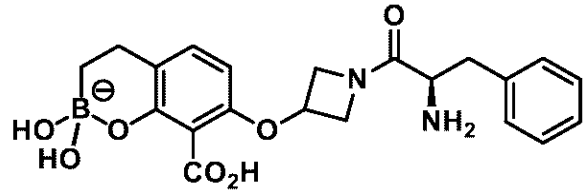
[Chemical Formula 206]



,

4,4-dihydroxy-8-[(1-D-phenylalanylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

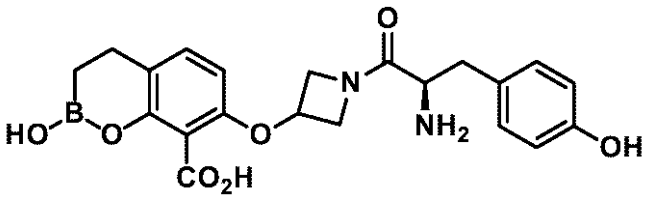
[Chemical Formula 207]



,

2-hydroxy-7-[(1-D-tyrosylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

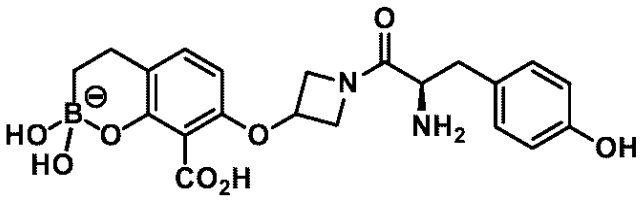
[Chemical Formula 208]



,

4,4-dihydroxy-8-[(1-D-tyrosylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

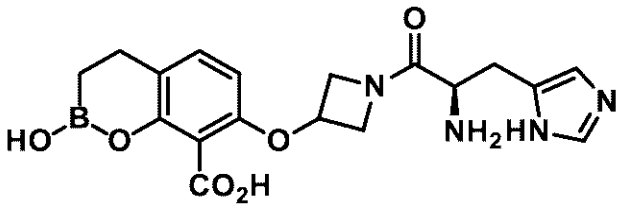
[Chemical Formula 209]



,

7-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

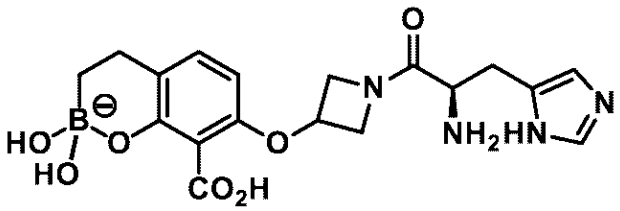
[Chemical Formula 210]



,

8-[(1-D-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

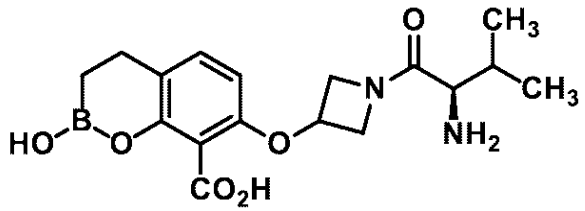
[Chemical Formula 211]



,

2-hydroxy-7-[(1-D-valylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

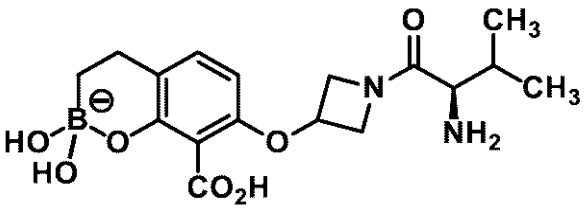
[Chemical Formula 212]



,

4,4-dihydroxy-8-[(1-D-valylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

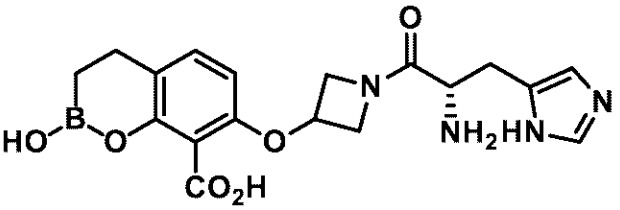
[Chemical Formula 213]



,

7-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

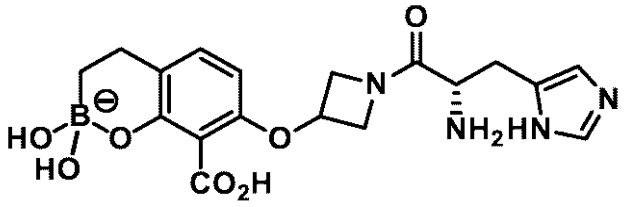
[Chemical Formula 214]



,

8-[(1-L-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

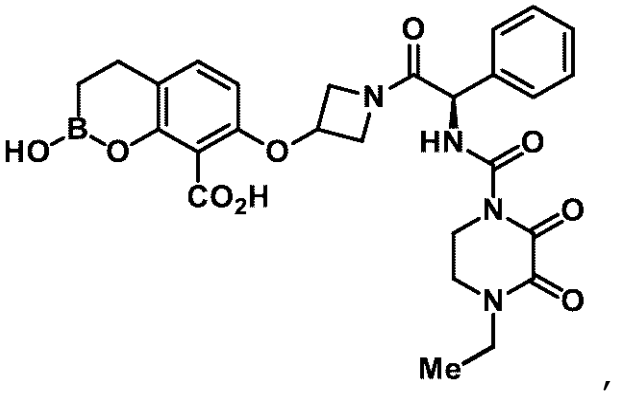
[Chemical Formula 215]



,

7-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

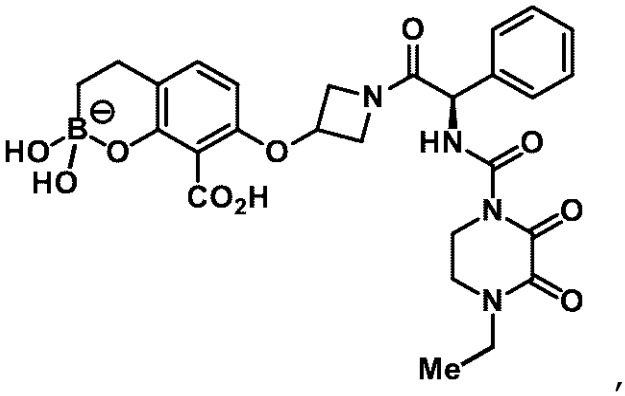
[Chemical Formula 216]



,

8-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

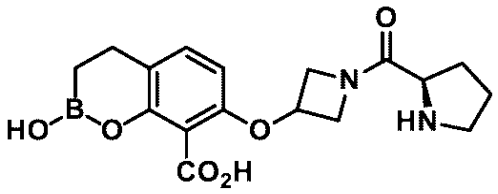
[Chemical Formula 217]



,

2-hydroxy-7-[(1-D-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

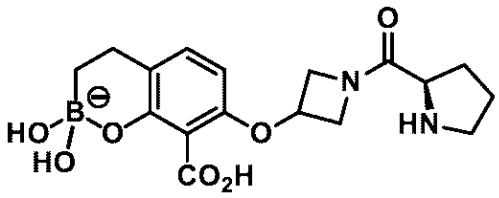
[Chemical Formula 218]



,

4,4-dihydroxy-8-[(1-D-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

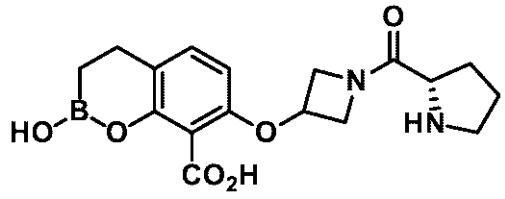
[Chemical Formula 219]



,

2-hydroxy-7-[(1-L-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

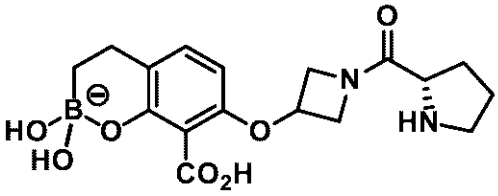
[Chemical Formula 220]



,

4,4-dihydroxy-8-[(1-L-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

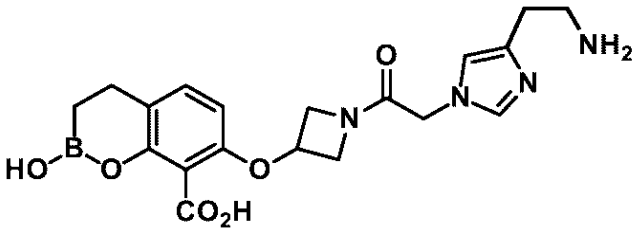
[Chemical Formula 221]



,

7-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

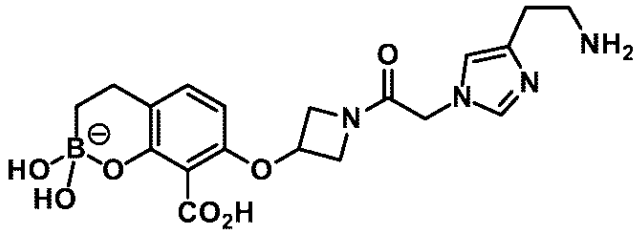
[Chemical Formula 222]



,

8-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

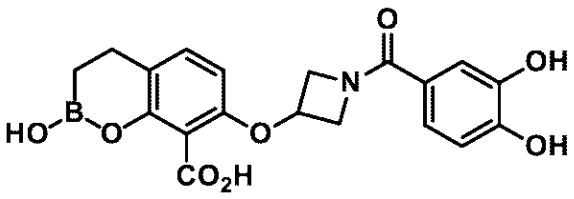
[Chemical Formula 223]



,

7-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

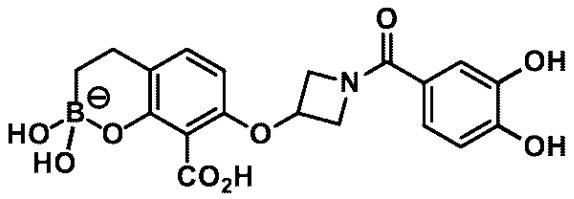
[Chemical Formula 224]



,

8-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 225]

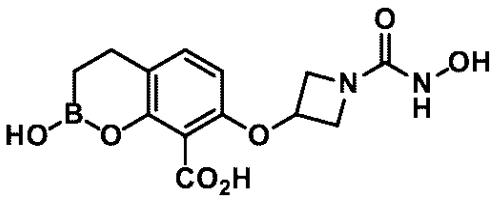


,

2-hydroxy-7-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-3,4-

dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

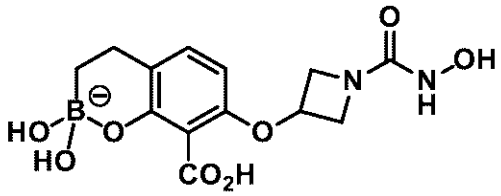
[Chemical Formula 226]



, or

4,4-dihydroxy-8-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 227]



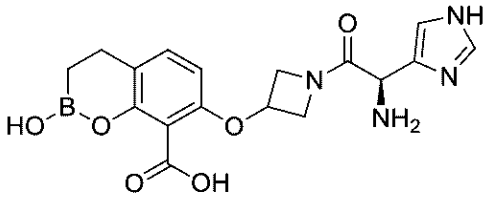
.

[Item 54]

The compound or the pharmaceutically acceptable salt thereof of item 1, represented by the following compound name or structural formula:

7-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

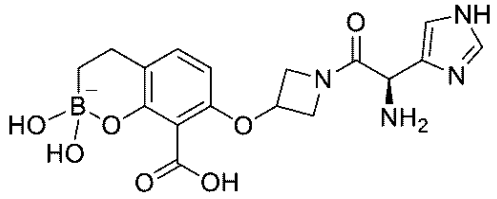
[Chemical Formula 228]



,

8-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

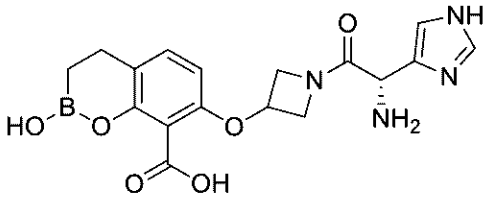
[Chemical Formula 229]



,

7-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

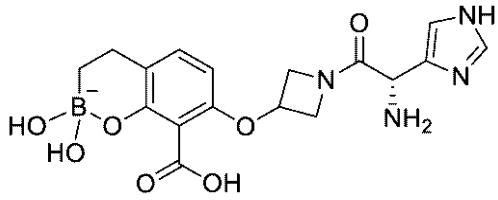
[Chemical Formula 230]



,

8-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

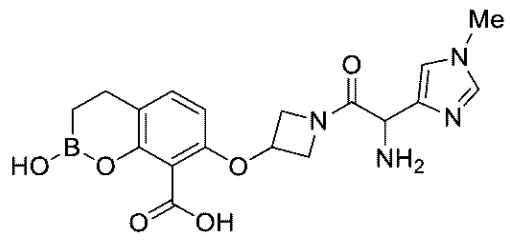
[Chemical Formula 231]



,

7-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 232]

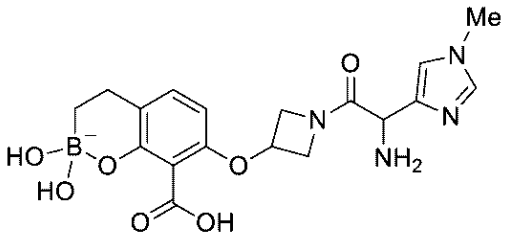


,

8-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-

l(6),7,9-triene-7-carboxylic acid

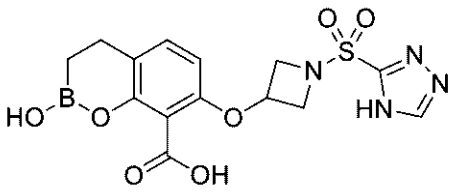
[Chemical Formula 233]



,

2-hydroxy-7-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

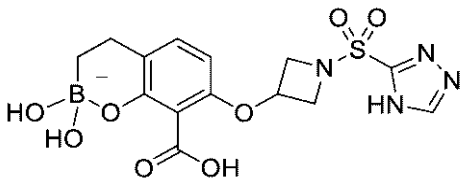
[Chemical Formula 234]



,

4,4-dihydroxy-8-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

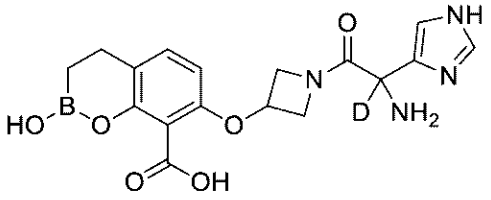
[Chemical Formula 235]



,

7-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 236]

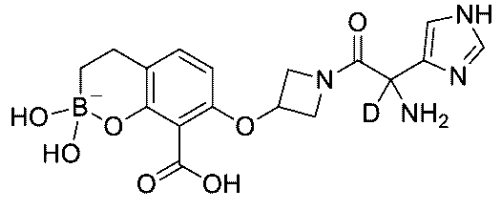


,

8-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-

yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

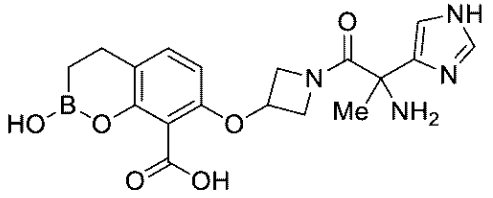
[Chemical Formula 237]



,

7-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

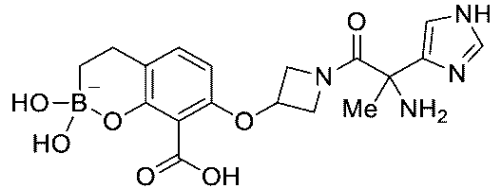
[Chemical Formula 238]



,

8-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

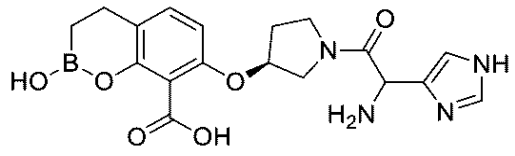
[Chemical Formula 239]



,

7-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 240]

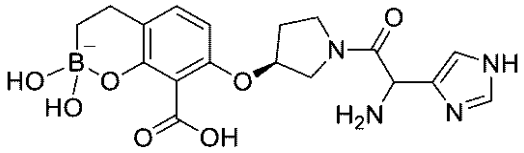


,

8-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-

l(6),7,9-triene-7-carboxylic acid

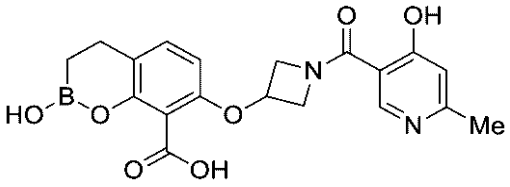
[Chemical Formula 241]



,

2-hydroxy-7-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

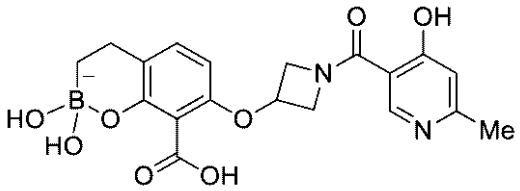
[Chemical Formula 242]



,

4,4-dihydroxy-8-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

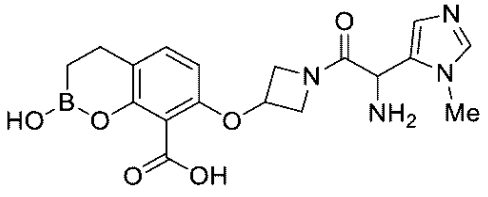
[Chemical Formula 243]



,

7-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 244]

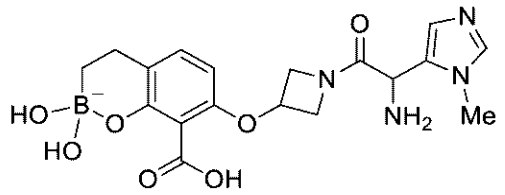


,

8-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-

l(6),7,9-triene-7-carboxylic acid

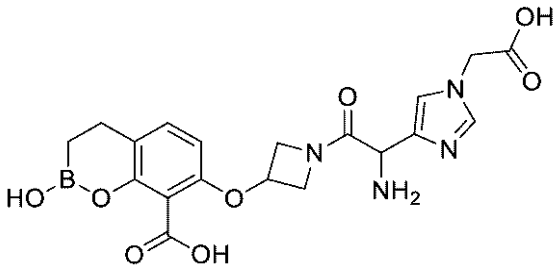
[Chemical Formula 245]



,

7-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

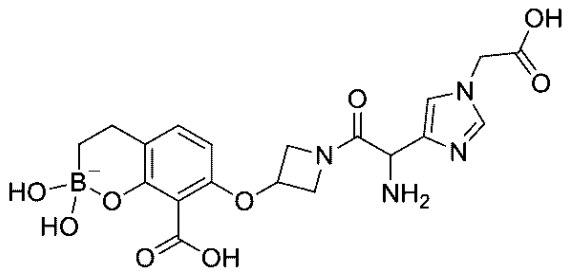
[Chemical Formula 246]



,

8-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

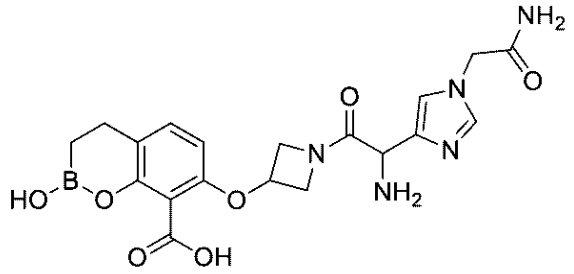
[Chemical Formula 247]



,

7-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

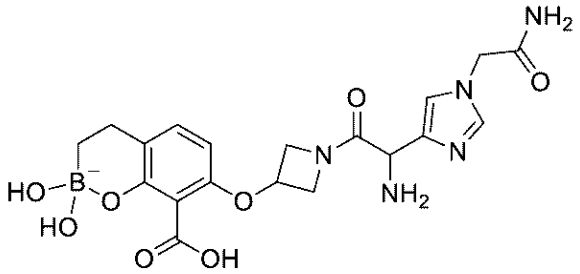
[Chemical Formula 248]



,

8-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

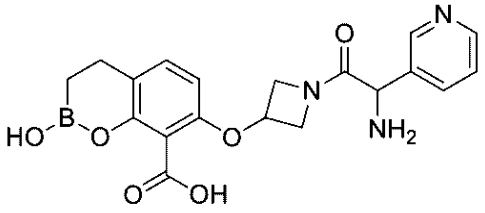
[Chemical Formula 249]



,

7-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

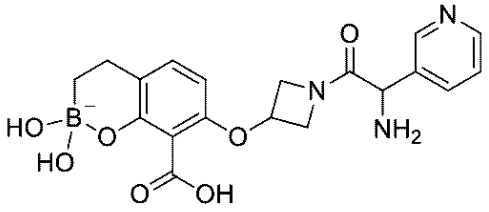
[Chemical Formula 250]



,

8-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

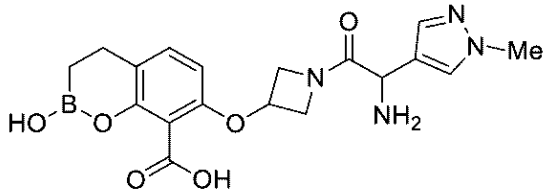
[Chemical Formula 251]



,

7-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

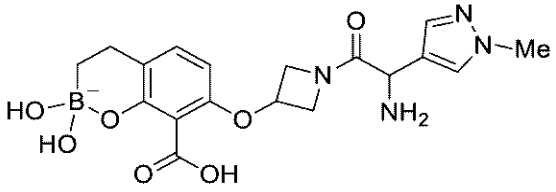
[Chemical Formula 252]



,

8-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

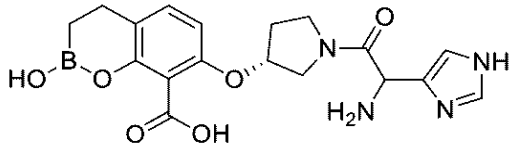
[Chemical Formula 253]



,

7-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

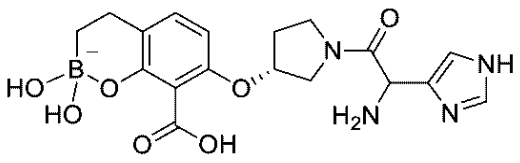
[Chemical Formula 254]



,

8-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

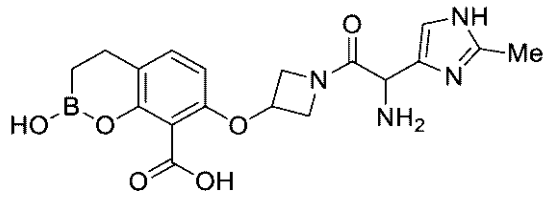
[Chemical Formula 255]



,

7-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

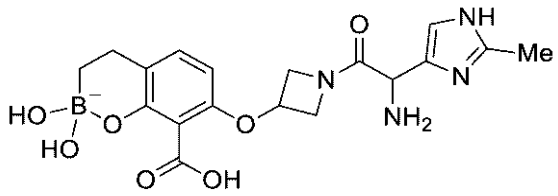
[Chemical Formula 256]



,

8-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

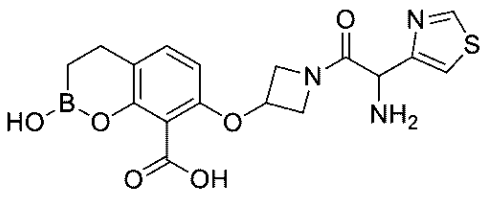
[Chemical Formula 257]



,

7-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

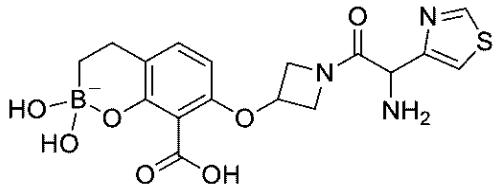
[Chemical Formula 258]



,

8-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

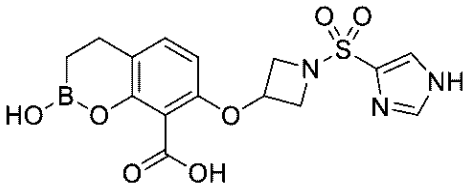
[Chemical Formula 259]



,

2-hydroxy-7-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

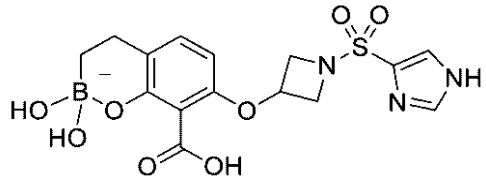
[Chemical Formula 260]



,

4,4-dihydroxy-8-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

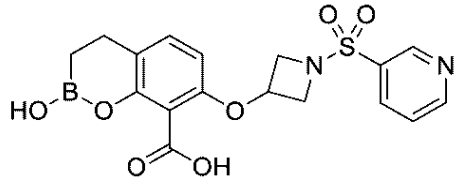
[Chemical Formula 261]



,

2-hydroxy-7-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

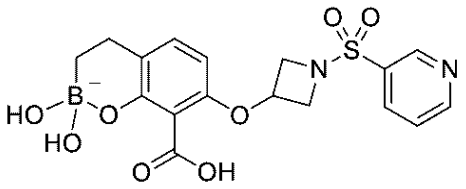
[Chemical Formula 262]



,

4,4-dihydroxy-8-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

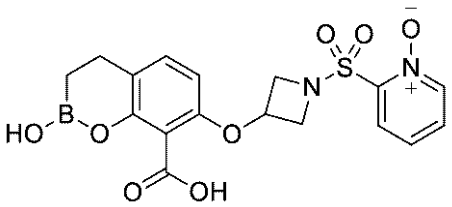
[Chemical Formula 263]



,

2-hydroxy-7-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

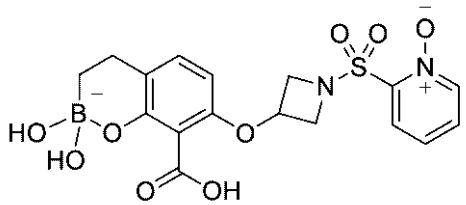
[Chemical Formula 264]



,

4,4-dihydroxy-8-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

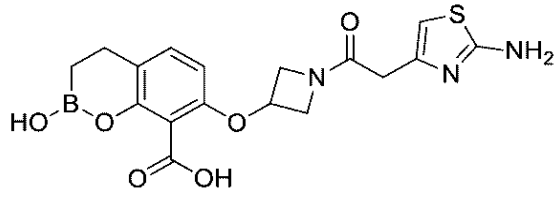
[Chemical Formula 265]



,

7-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 266]

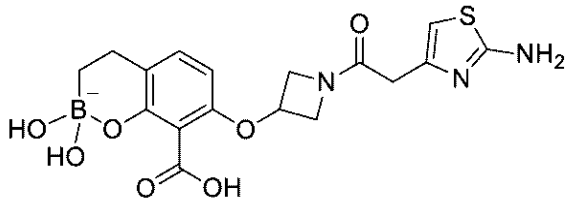


,

8-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-

triene-7-carboxylic acid

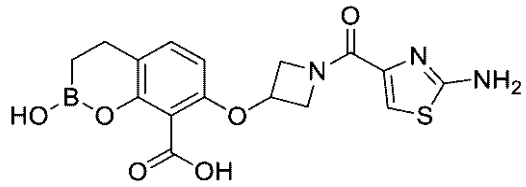
[Chemical Formula 267]



,

7-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

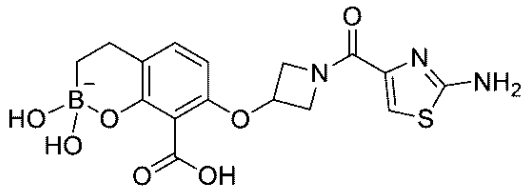
[Chemical Formula 268]



,

8-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

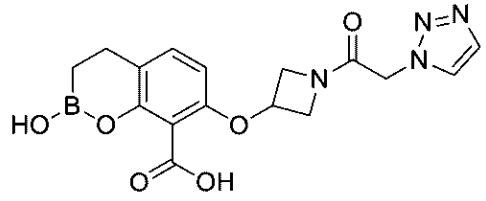
[Chemical Formula 269]



,

2-hydroxy-7-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 270]

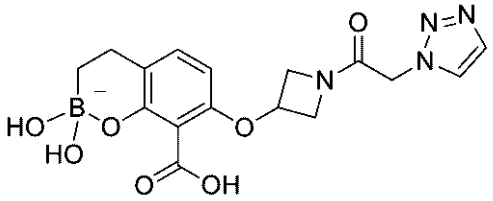


,

4,4-dihydroxy-8-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-

boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

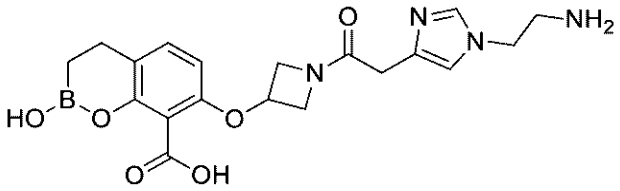
[Chemical Formula 271]



,

7-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

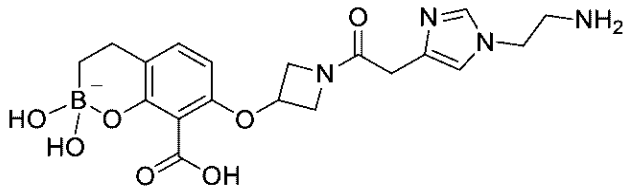
[Chemical Formula 272]



,

8-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

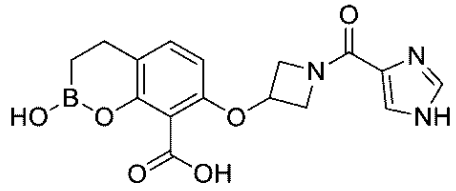
[Chemical Formula 273]



,

2-hydroxy-7-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

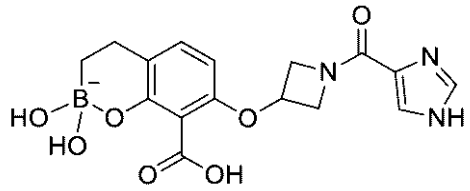
[Chemical Formula 274]



,

4,4-dihydroxy-8-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

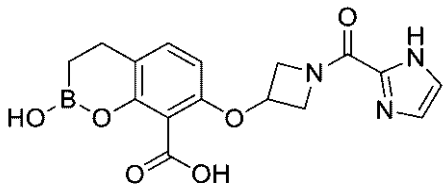
[Chemical Formula 275]



,

2-hydroxy-7-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

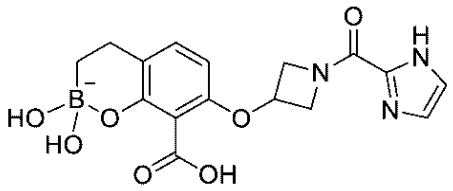
[Chemical Formula 276]



,

4,4-dihydroxy-8-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

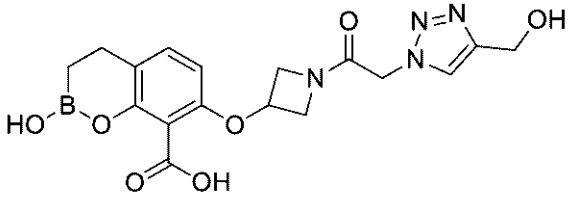
[Chemical Formula 277]



,

2-hydroxy-7-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

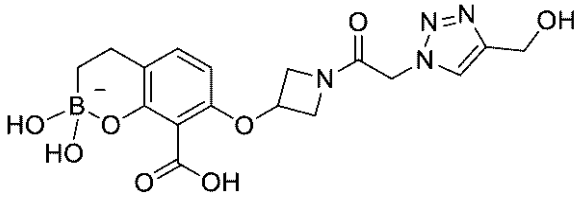
[Chemical Formula 278]



,

4,4-dihydroxy-8-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

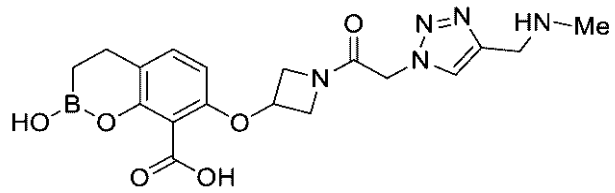
[Chemical Formula 279]



,

2-hydroxy-7-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

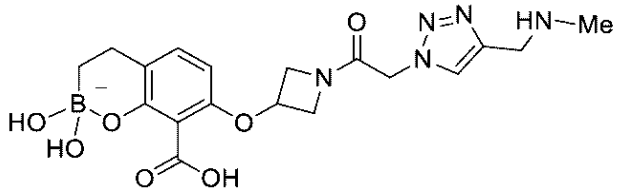
[Chemical Formula 280]



,

4,4-dihydroxy-8-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

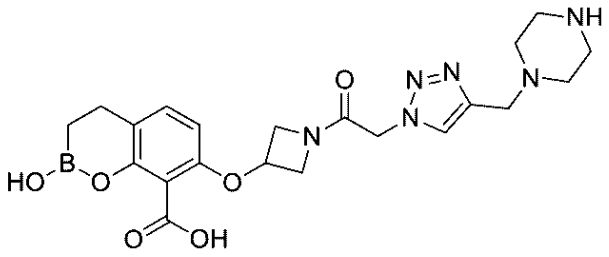
[Chemical Formula 281]



,

2-hydroxy-7-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

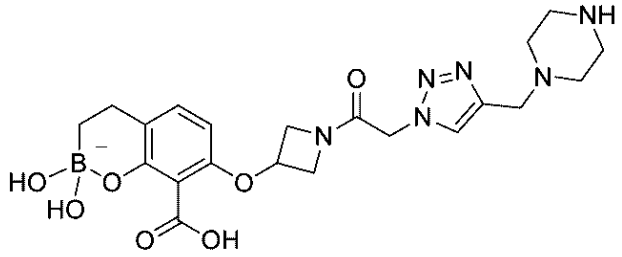
[Chemical Formula 282]



,

4,4-dihydroxy-8-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

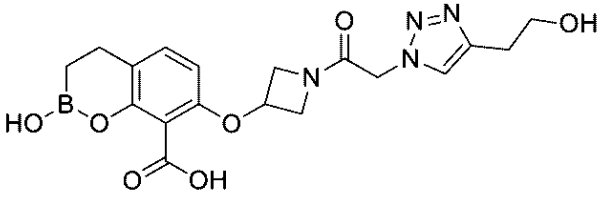
[Chemical Formula 283]



,

2-hydroxy-7-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

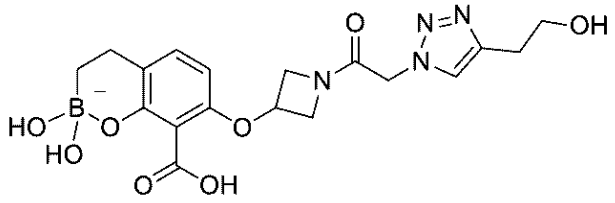
[Chemical Formula 284]



,

4,4-dihydroxy-8-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

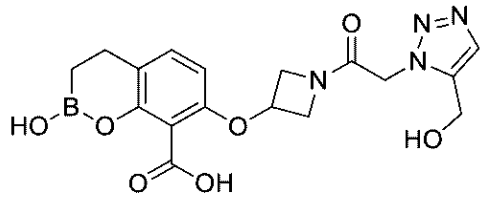
[Chemical Formula 285]



,

2-hydroxy-7-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

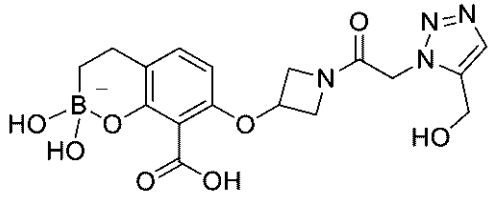
[Chemical Formula 286]



,

4,4-dihydroxy-8-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

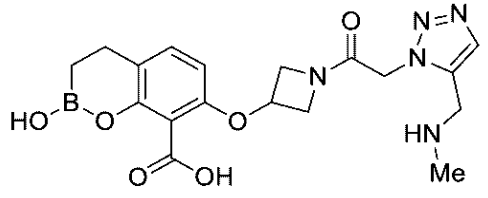
[Chemical Formula 287]



,

2-hydroxy-7-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 288]

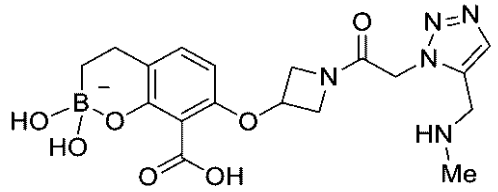


,

4,4-dihydroxy-8-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-

boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

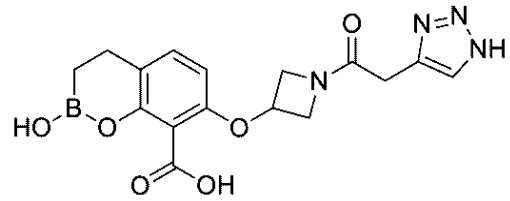
[Chemical Formula 289]



,

2-hydroxy-7-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

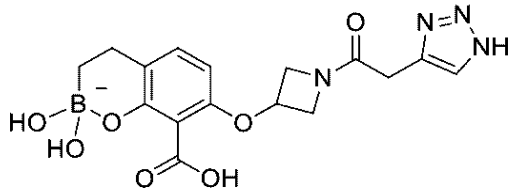
[Chemical Formula 290]



,

4,4-dihydroxy-8-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

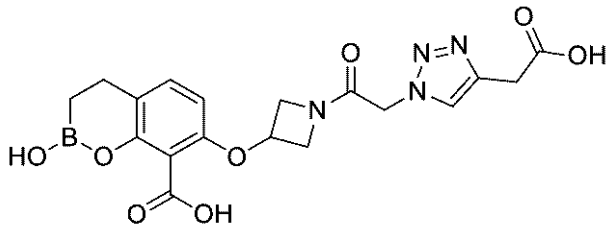
[Chemical Formula 291]



,

7-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

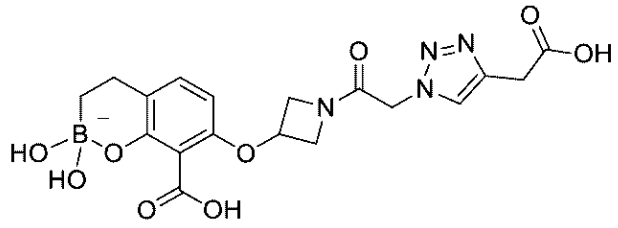
[Chemical Formula 292]



,

8-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

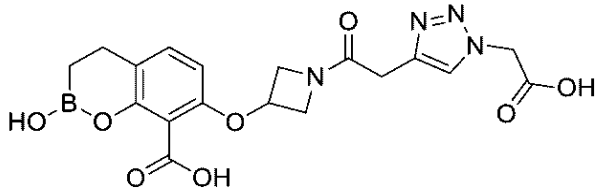
[Chemical Formula 293]



,

7-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

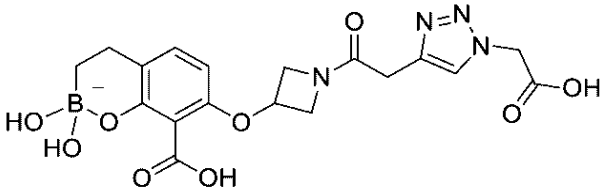
[Chemical Formula 294]



,

8-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

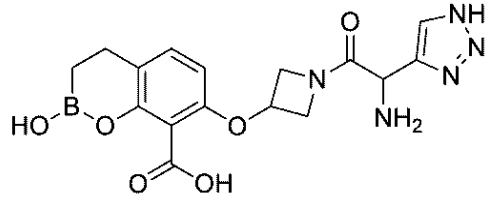
[Chemical Formula 295]



,

7-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

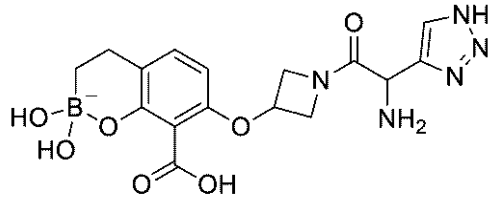
[Chemical Formula 296]



,

8-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

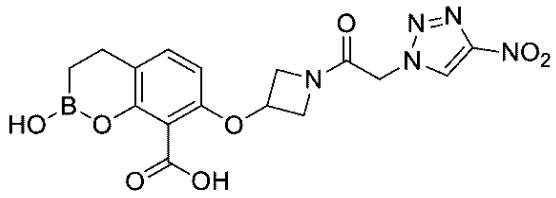
[Chemical Formula 297]



,

2-hydroxy-7-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 298]

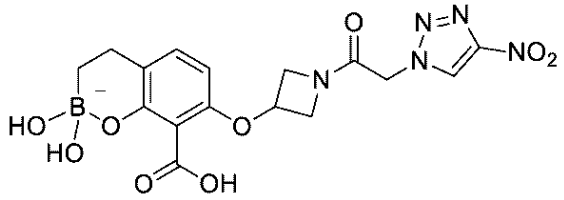


,

4,4-dihydroxy-8-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic

acid

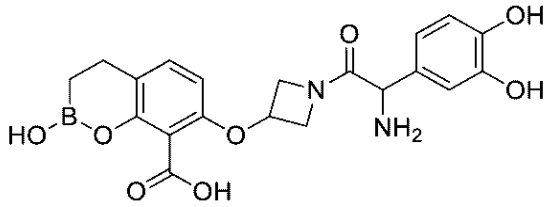
[Chemical Formula 299]



,

7-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

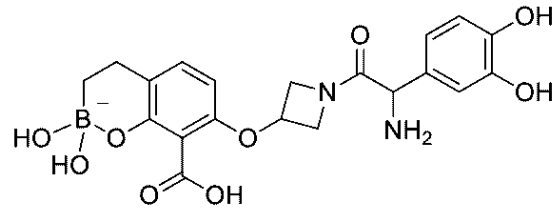
[Chemical Formula 300]



,

8-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

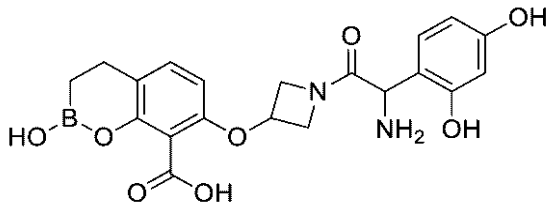
[Chemical Formula 301]



,

7-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 302]

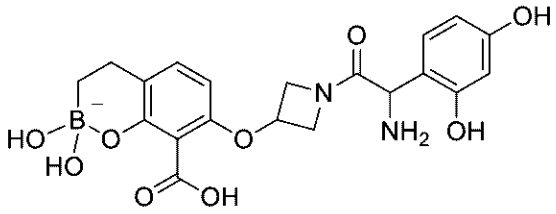


,

8-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-

triene-7-carboxylic acid

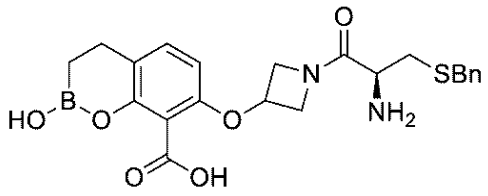
[Chemical Formula 303]



,

7-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

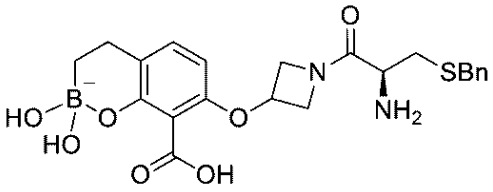
[Chemical Formula 304]



,

8-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

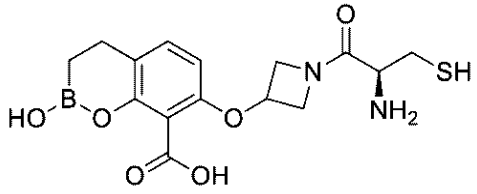
[Chemical Formula 305]



,

7-[(1-D-cysteinylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

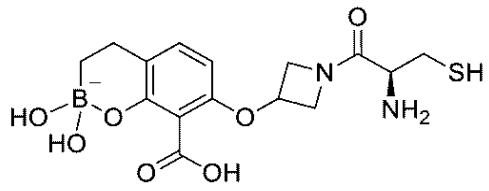
[Chemical Formula 306]



,

7-[(1-D-cysteinylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

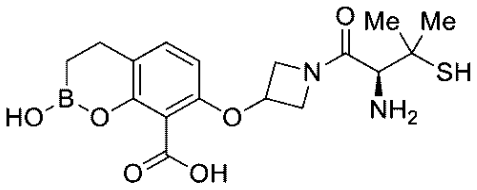
[Chemical Formula 307]



,

2-hydroxy-7-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

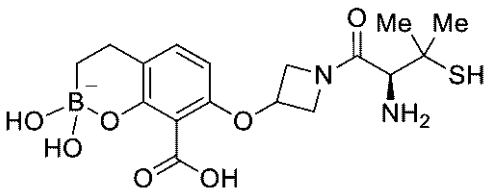
[Chemical Formula 308]



,

4,4-dihydroxy-8-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

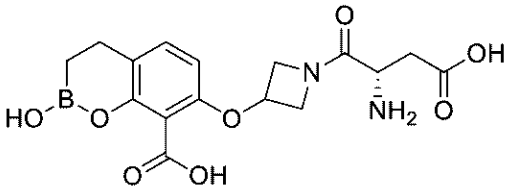
[Chemical Formula 309]



,

7-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

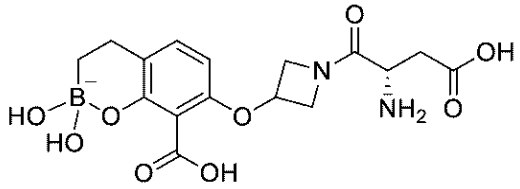
[Chemical Formula 310]



,

8-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

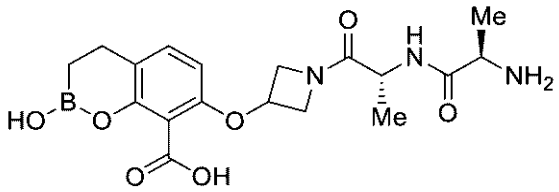
[Chemical Formula 311]



,

7-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

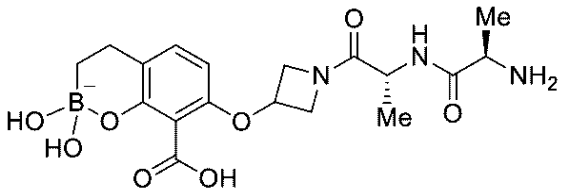
[Chemical Formula 312]



,

8-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

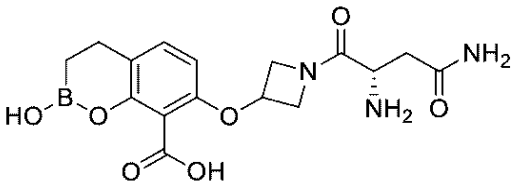
[Chemical Formula 313]



,

7-[(1-L-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

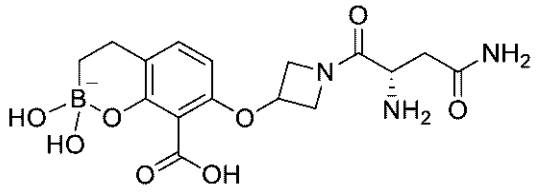
[Chemical Formula 314]



,

8-[(1-L-asparaginylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

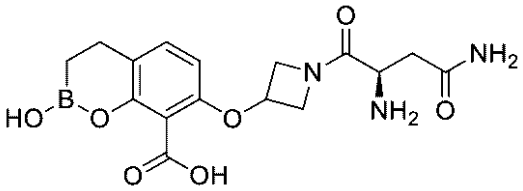
[Chemical Formula 315]



,

7-[(1-D-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

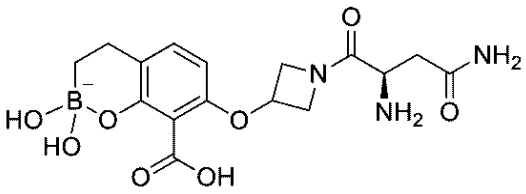
[Chemical Formula 316]



,

8-[(1-D-asparaginylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

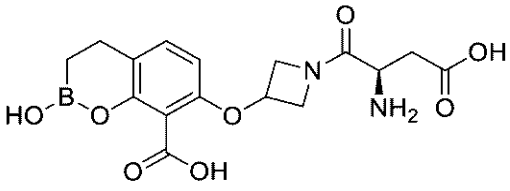
[Chemical Formula 317]



,

7-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

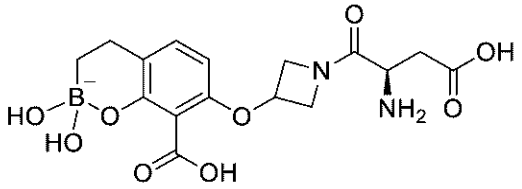
[Chemical Formula 318]



,

8-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

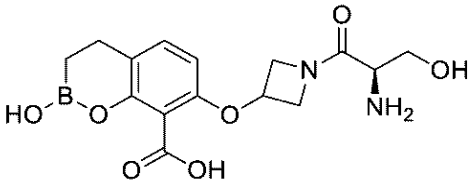
[Chemical Formula 319]



,

2-hydroxy-7-[(1-D-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

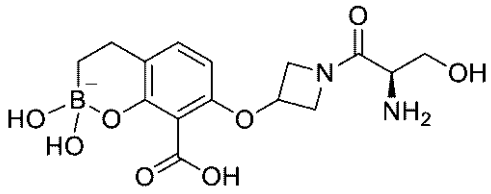
[Chemical Formula 320]



,

4,4-dihydroxy-8-[(1-D-serylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

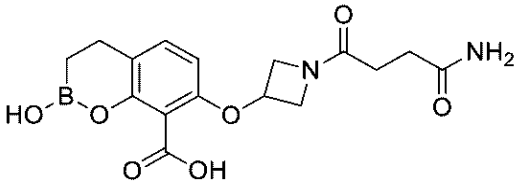
[Chemical Formula 321]



,

7-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

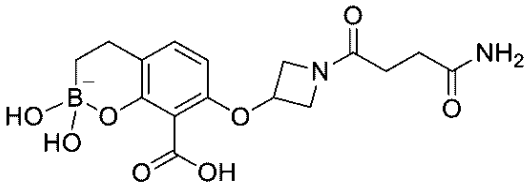
[Chemical Formula 322]



,

8-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

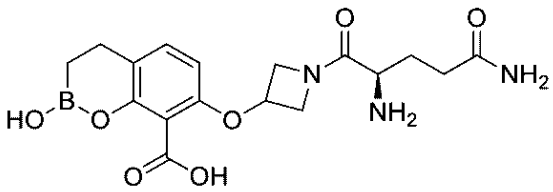
[Chemical Formula 323]



,

7-[(1-D-glutaminylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

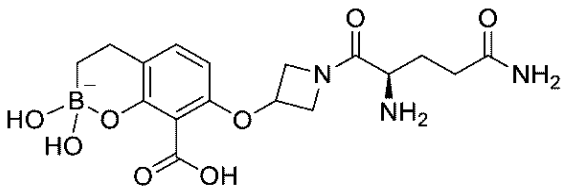
[Chemical Formula 324]



,

8-[(1-D-glutaminylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

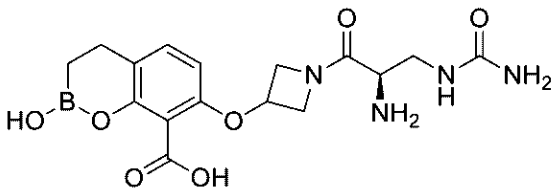
[Chemical Formula 325]



,

7-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

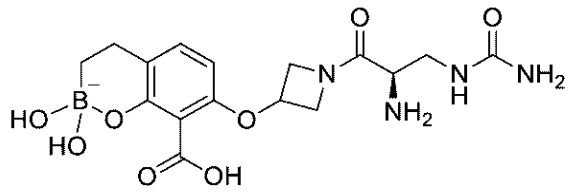
[Chemical Formula 326]



,

8-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

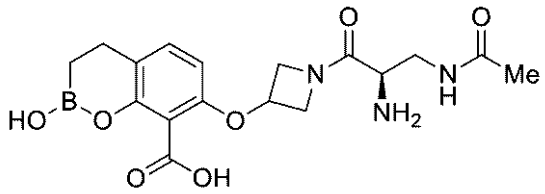
[Chemical Formula 327]



,

7-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

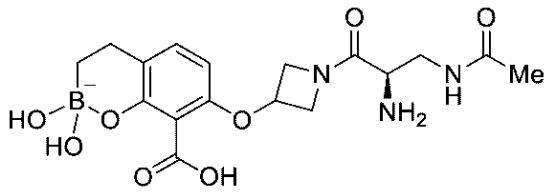
[Chemical Formula 328]



,

8-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

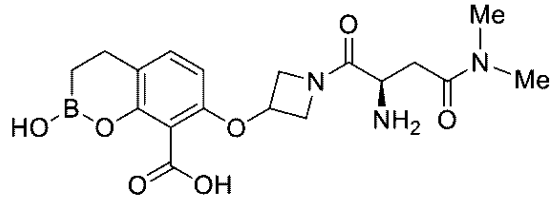
[Chemical Formula 329]



,

7-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

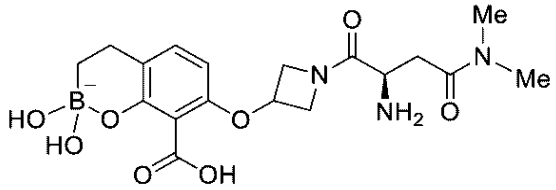
[Chemical Formula 330]



,

8-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

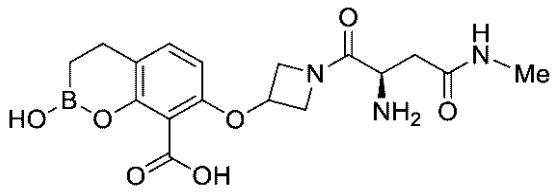
[Chemical Formula 331]



,

2-hydroxy-7-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

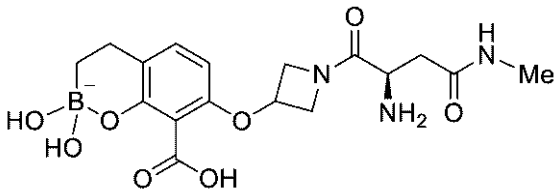
[Chemical Formula 332]



,

4,4-dihydroxy-8-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

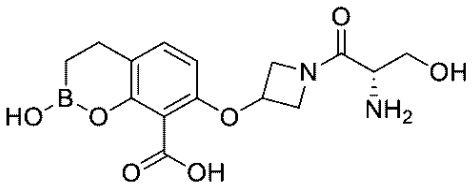
[Chemical Formula 333]



,

2-hydroxy-7-[(1-L-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

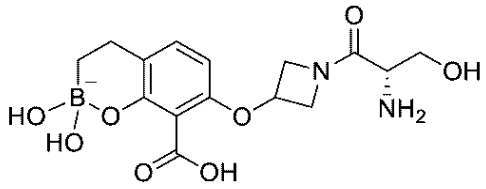
[Chemical Formula 334]



,

4,4-dihydroxy-8-[(1-L-serylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

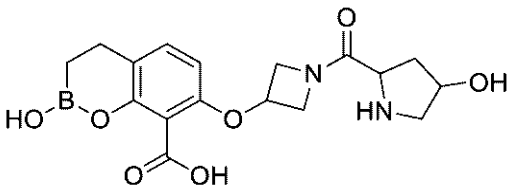
[Chemical Formula 335]



,

2-hydroxy-7-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

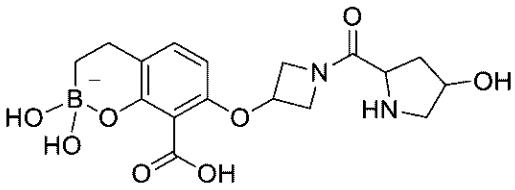
[Chemical Formula 336]



,

4,4-dihydroxy-8-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

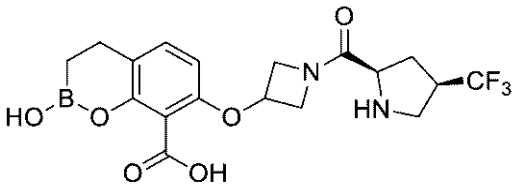
[Chemical Formula 337]



,

2-hydroxy-7-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

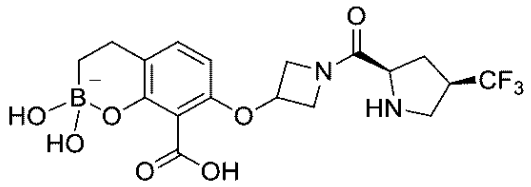
[Chemical Formula 338]



,

4,4-dihydroxy-8-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

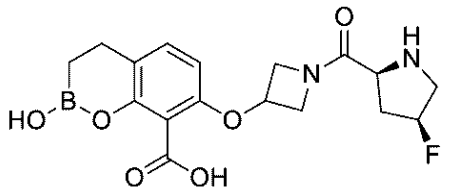
[Chemical Formula 339]



,

7-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

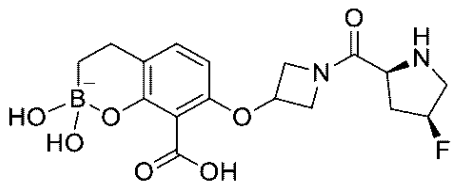
[Chemical Formula 340]



,

8-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

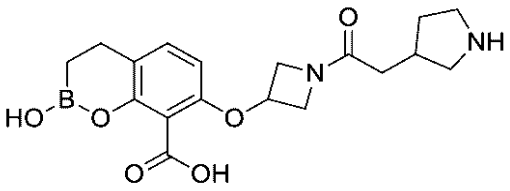
[Chemical Formula 341]



,

2-hydroxy-7-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

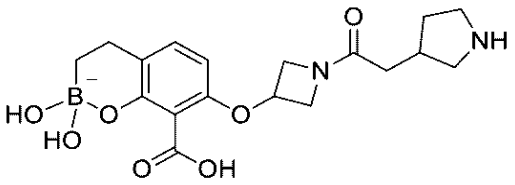
[Chemical Formula 342]



,

4,4-dihydroxy-8-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

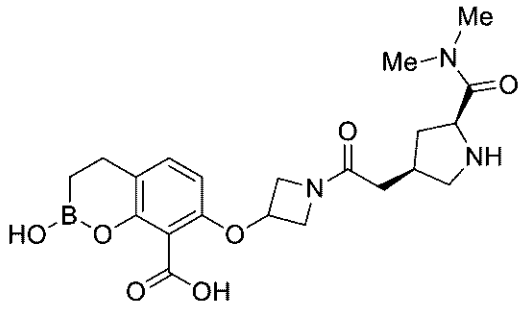
[Chemical Formula 343]



,

7-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

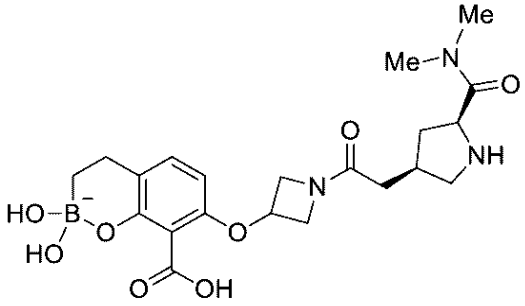
[Chemical Formula 344]



,

8-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

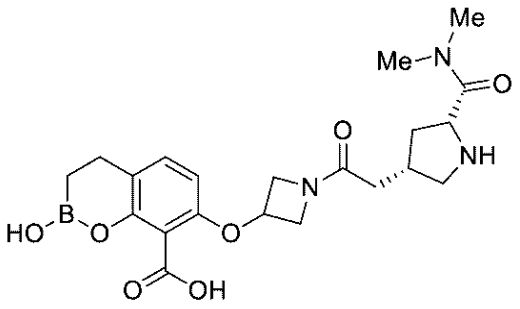
[Chemical Formula 345]



,

7-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

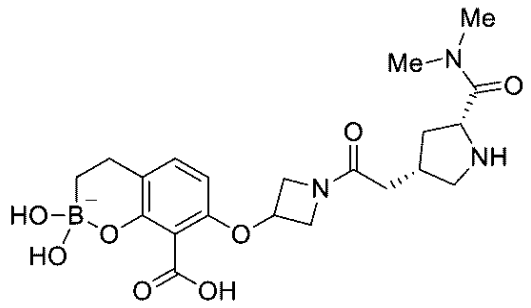
[Chemical Formula 346]



,

8-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

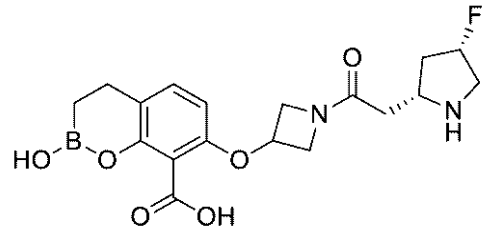
[Chemical Formula 347]



,

7-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

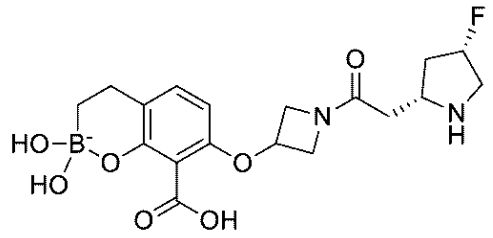
[Chemical Formula 348]



,

8-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

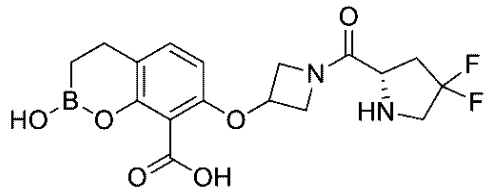
[Chemical Formula 349]



,

7-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

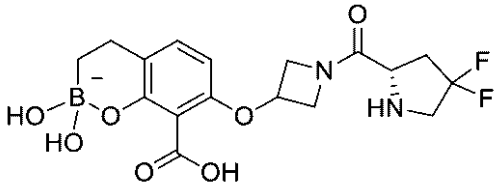
[Chemical Formula 350]



,

8-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

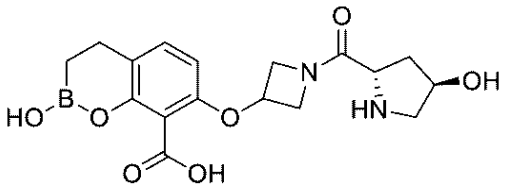
[Chemical Formula 351]



,

2-hydroxy-7-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

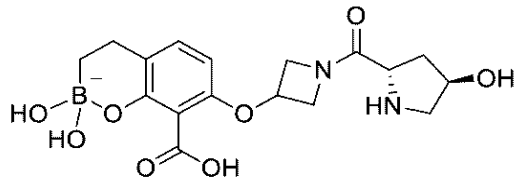
[Chemical Formula 352]



,

4,4-dihydroxy-8-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

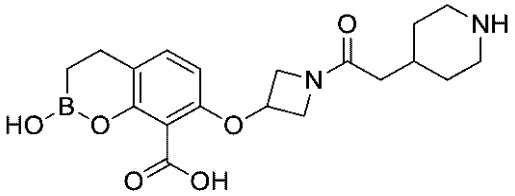
[Chemical Formula 353]



,

2-hydroxy-7-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

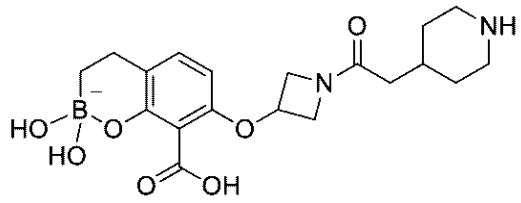
[Chemical Formula 354]



,

4,4-dihydroxy-8-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

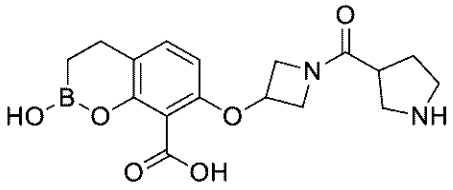
[Chemical Formula 355]



,

2-hydroxy-7-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

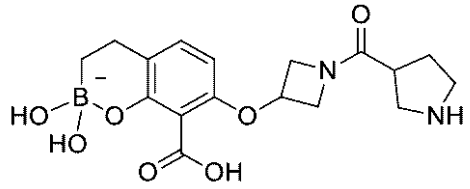
[Chemical Formula 356]



,

4,4-dihydroxy-8-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

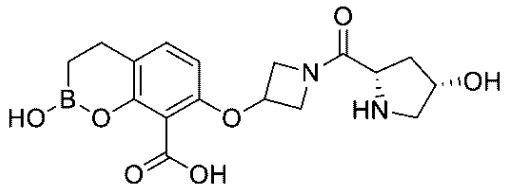
[Chemical Formula 357]



,

2-hydroxy-7-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

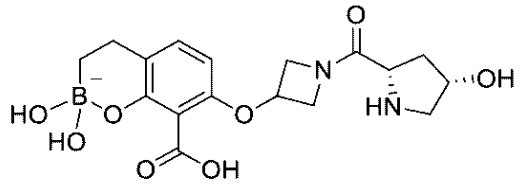
[Chemical Formula 358]



,

4,4-dihydroxy-8-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

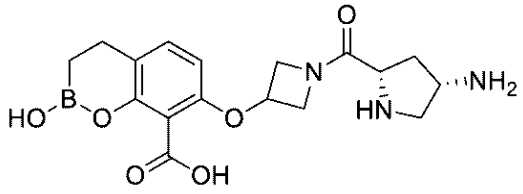
[Chemical Formula 359]



,

7-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

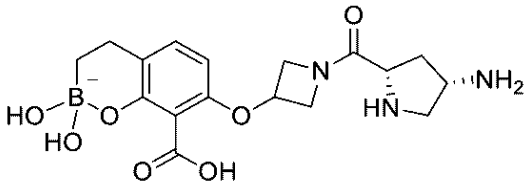
[Chemical Formula 360]



,

8-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

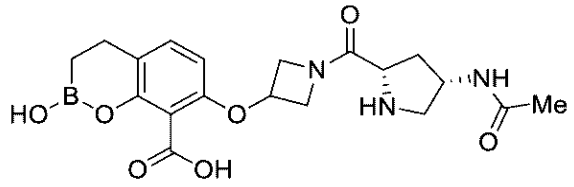
[Chemical Formula 361]



,

7-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

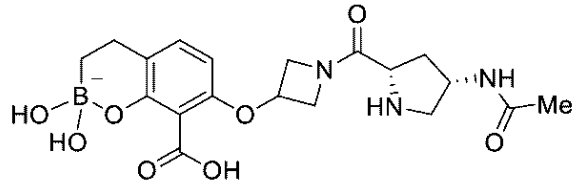
[Chemical Formula 362]



,

8-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

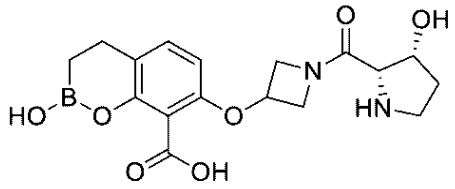
[Chemical Formula 363]



,

2-hydroxy-7-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

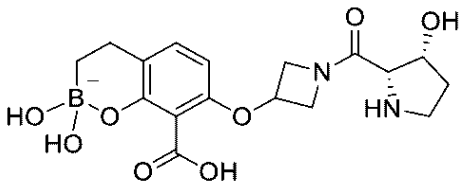
[Chemical Formula 364]



,

4,4-dihydroxy-8-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

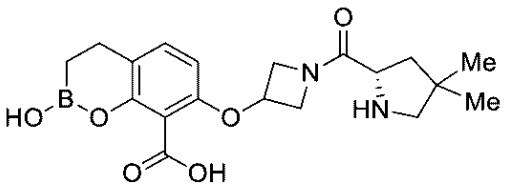
[Chemical Formula 365]



,

7-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

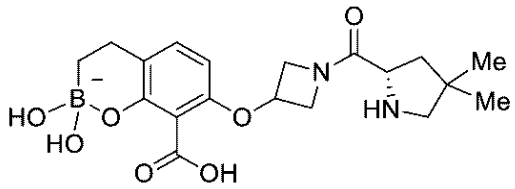
[Chemical Formula 366]



,

8-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

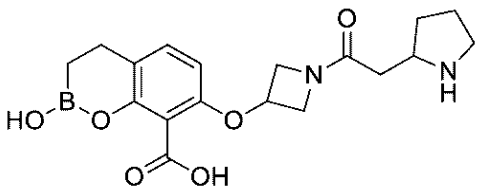
[Chemical Formula 367]



,

2-hydroxy-7-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

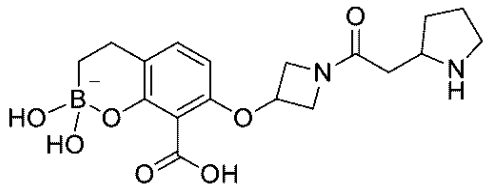
[Chemical Formula 368]



,

4,4-dihydroxy-8-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

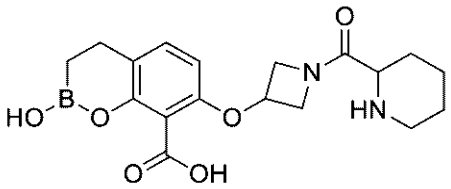
[Chemical Formula 369]



,

2-hydroxy-7-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

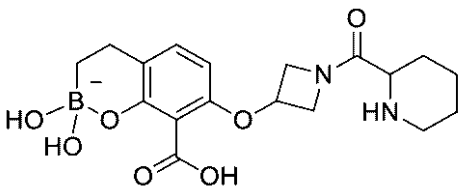
[Chemical Formula 370]



,

4,4-dihydroxy-8-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

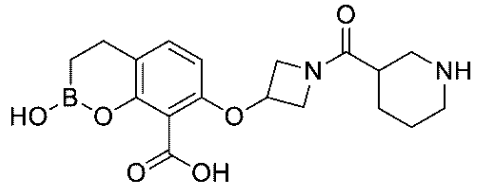
[Chemical Formula 371]



,

2-hydroxy-7-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

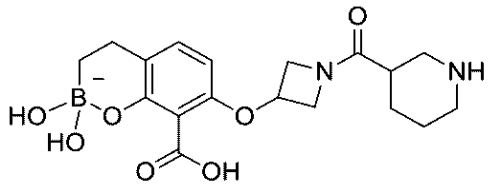
[Chemical Formula 372]



,

4,4-dihydroxy-8-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

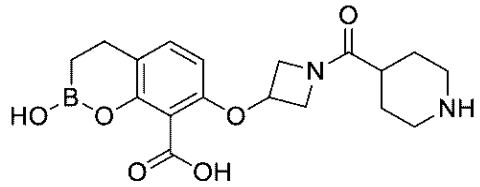
[Chemical Formula 373]



,

2-hydroxy-7-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

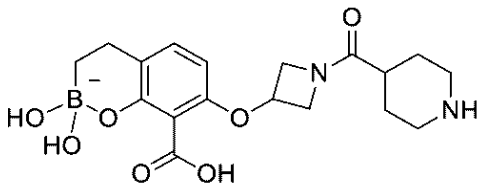
[Chemical Formula 374]



,

4,4-dihydroxy-8-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

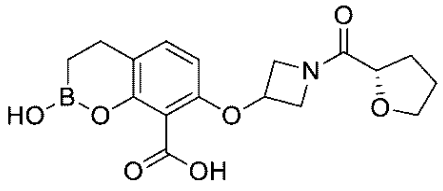
[Chemical Formula 375]



,

2-hydroxy-7-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

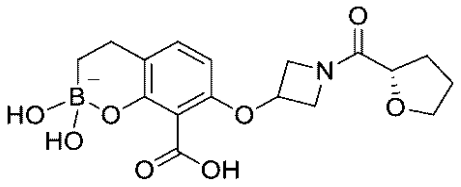
[Chemical Formula 376]



,

4,4-dihydroxy-8-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

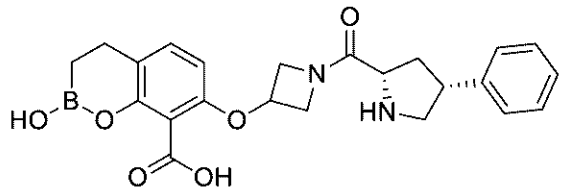
[Chemical Formula 377]



,

2-hydroxy-7-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

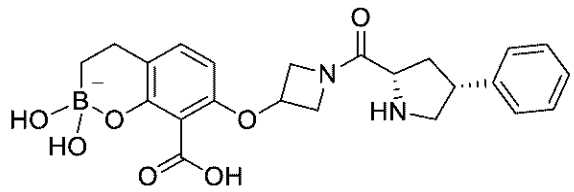
[Chemical Formula 378]



,

4,4-dihydroxy-8-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

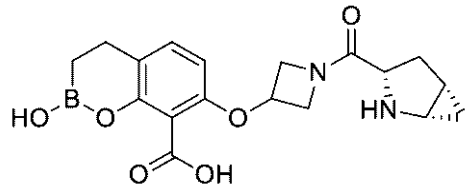
[Chemical Formula 379]



,

7-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

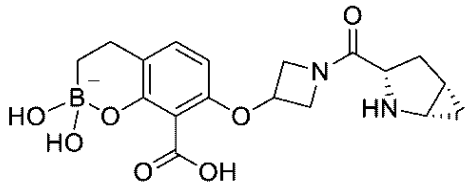
[Chemical Formula 380]



,

8-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

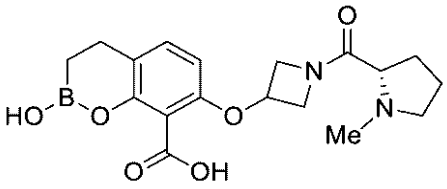
[Chemical Formula 381]



,

2-hydroxy-7-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

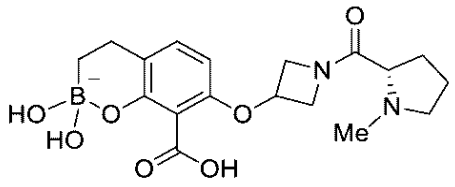
[Chemical Formula 382]



,

4,4-dihydroxy-8-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

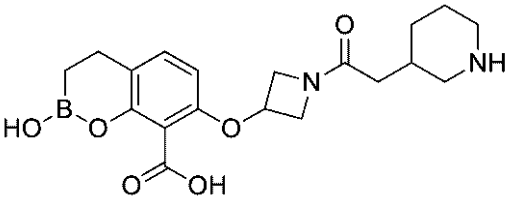
[Chemical Formula 383]



,

2-hydroxy-7-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

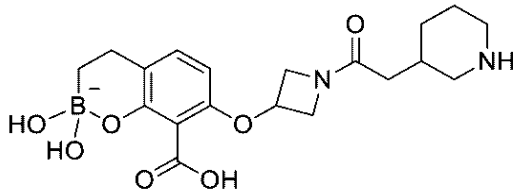
[Chemical Formula 384]



,

4,4-dihydroxy-8-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

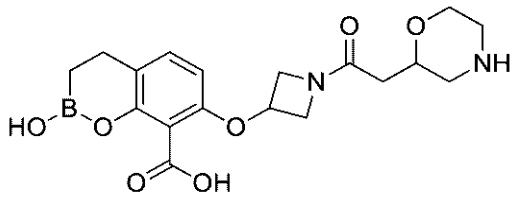
[Chemical Formula 385]



,

2-hydroxy-7-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

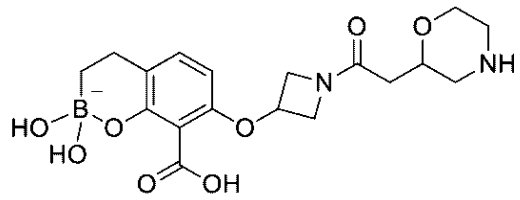
[Chemical Formula 386]



,

4,4-dihydroxy-8-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

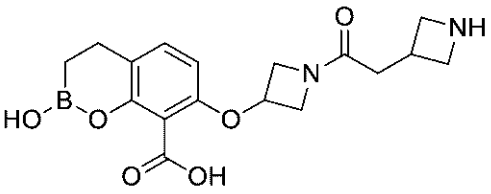
[Chemical Formula 387]



,

7-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

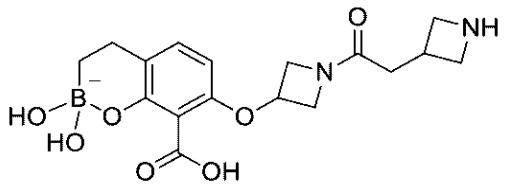
[Chemical Formula 388]



,

8-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

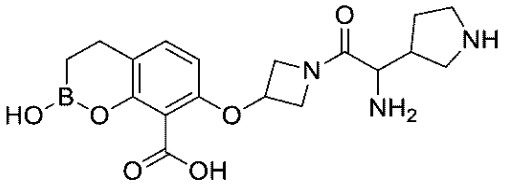
[Chemical Formula 389]



,

7-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

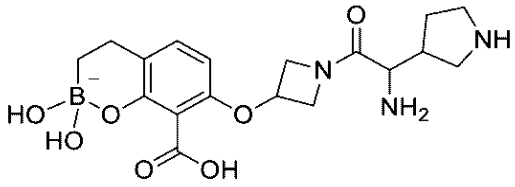
[Chemical Formula 390]



,

8-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

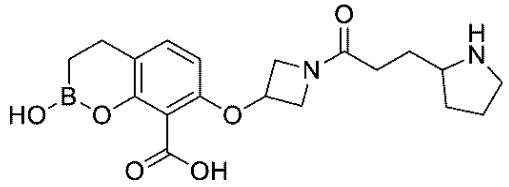
[Chemical Formula 391]



,

2-hydroxy-7-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

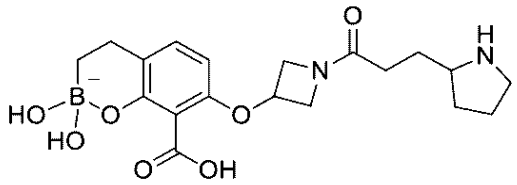
[Chemical Formula 392]



,

4,4-dihydroxy-8-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

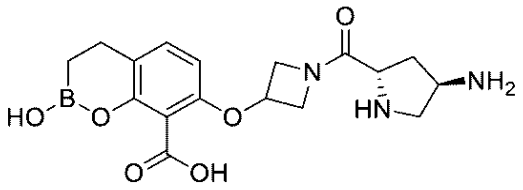
[Chemical Formula 393]



,

7-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

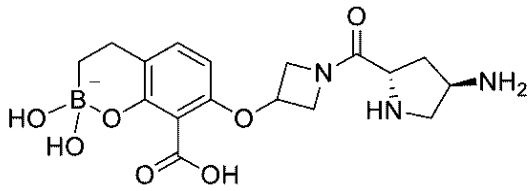
[Chemical Formula 394]



,

8-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

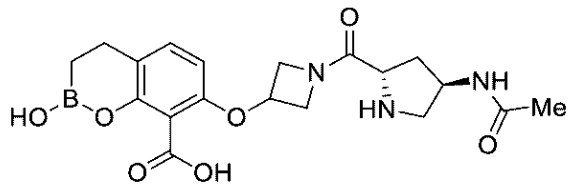
[Chemical Formula 395]



,

7-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

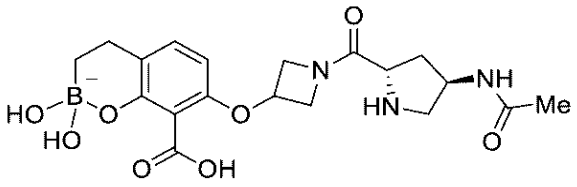
[Chemical Formula 396]



,

8-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

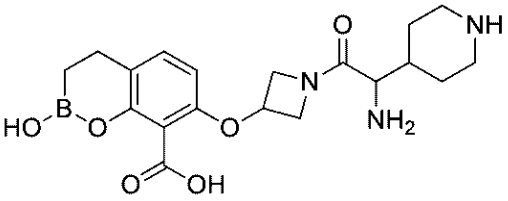
[Chemical Formula 397]



,

7-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

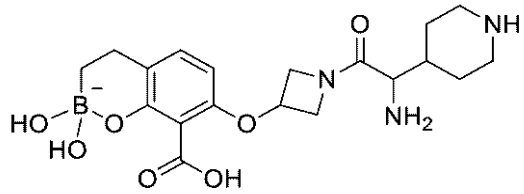
[Chemical Formula 398]



,

8-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

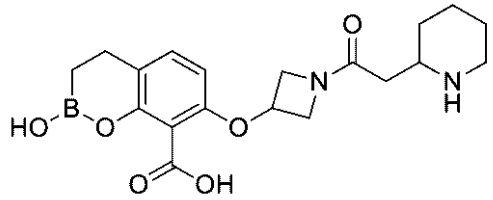
[Chemical Formula 399]



,

2-hydroxy-7-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

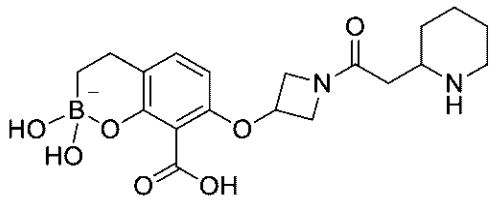
[Chemical Formula 400]



,

4,4-dihydroxy-8-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

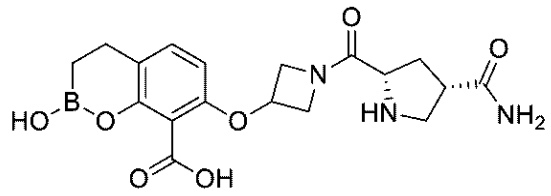
[Chemical Formula 401]



,

7-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

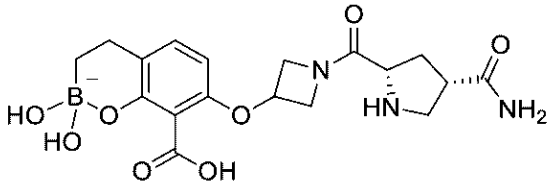
[Chemical Formula 402]



,

8-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

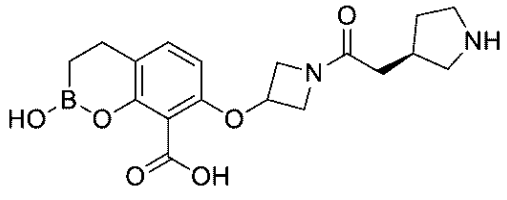
[Chemical Formula 403]



,

2-hydroxy-7-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

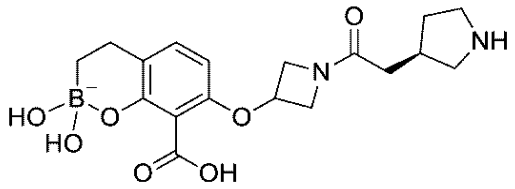
[Chemical Formula 404]



,

4,4-dihydroxy-8-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

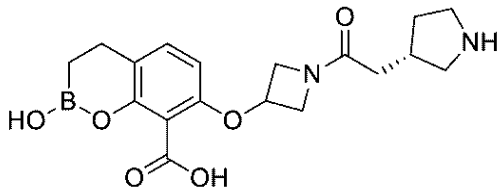
[Chemical Formula 405]



,

2-hydroxy-7-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

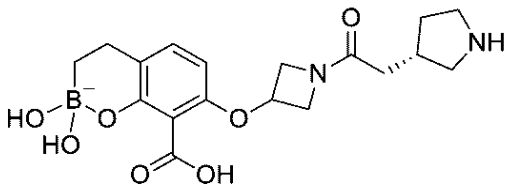
[Chemical Formula 406]



,

4,4-dihydroxy-8-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

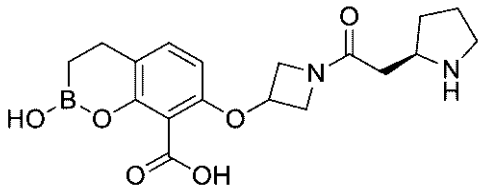
[Chemical Formula 407]



,

2-hydroxy-7-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

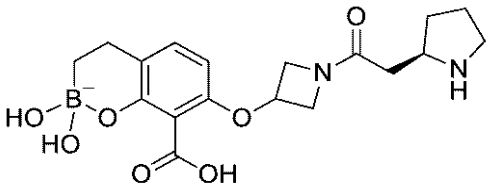
[Chemical Formula 408]



,

4,4-dihydroxy-8-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

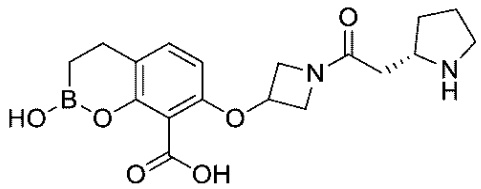
[Chemical Formula 409]



,

2-hydroxy-7-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

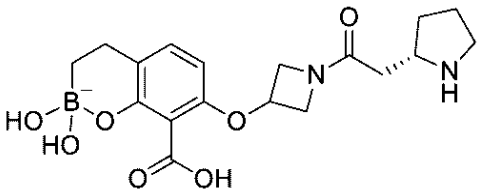
[Chemical Formula 410]



,

4,4-dihydroxy-8-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

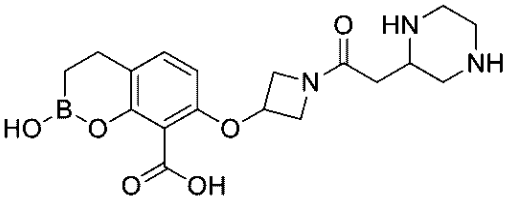
[Chemical Formula 411]



,

2-hydroxy-7-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

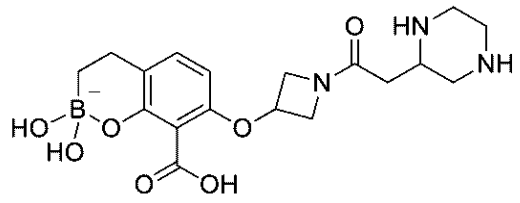
[Chemical Formula 412]



,

4,4-dihydroxy-8-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

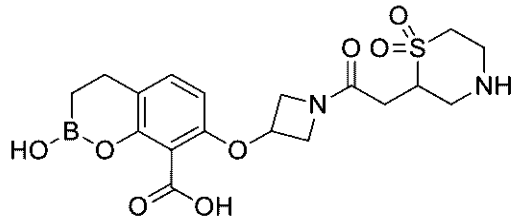
[Chemical Formula 413]



,

7-({1-[(1,1-dioxo-1λ⁶-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

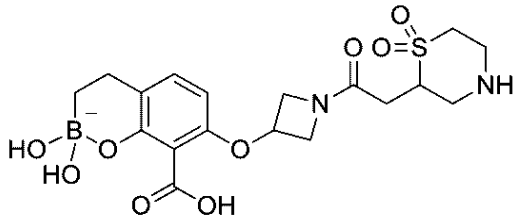
[Chemical Formula 414]



,

8-({1-[(1,1-dioxo-1λ⁶-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

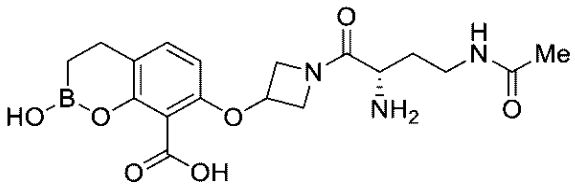
[Chemical Formula 415]



,

7-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 416]

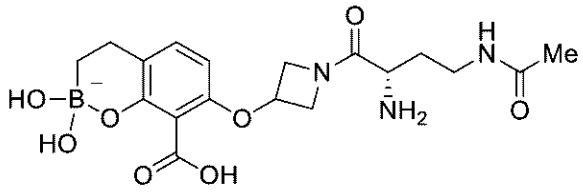


,

8-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-

4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

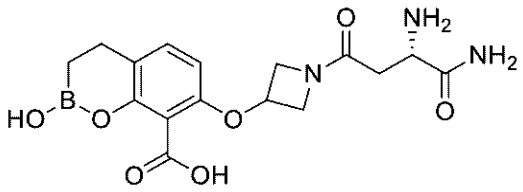
[Chemical Formula 417]



,

7-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

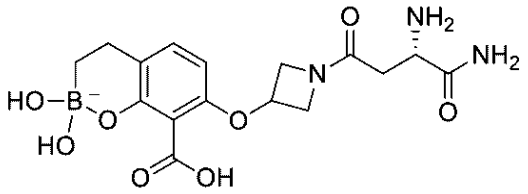
[Chemical Formula 418]



,

8-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

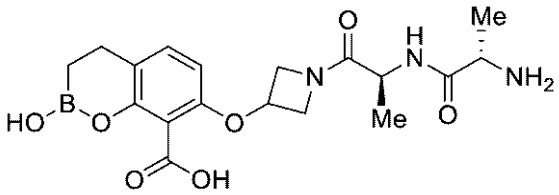
[Chemical Formula 419]



,

7-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

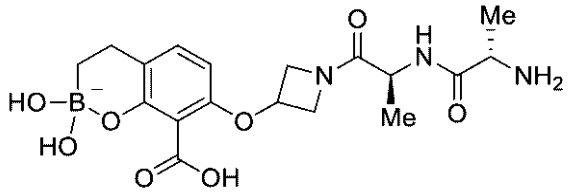
[Chemical Formula 420]



,

8-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

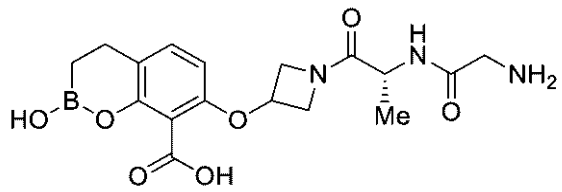
[Chemical Formula 421]



,

7-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

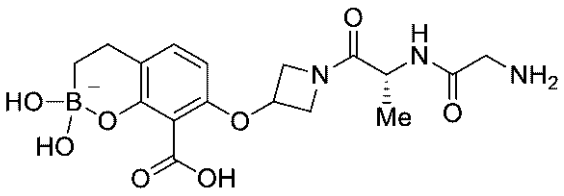
[Chemical Formula 422]



,

8-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

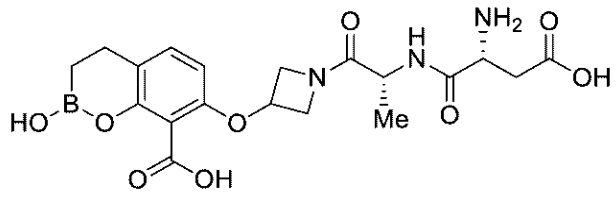
[Chemical Formula 423]



,

N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

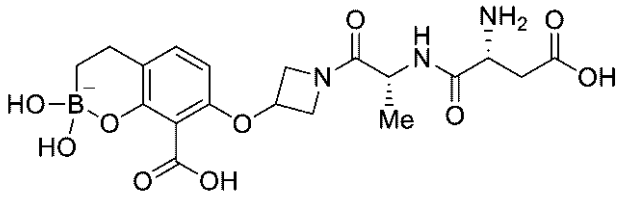
[Chemical Formula 424]



,

N-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

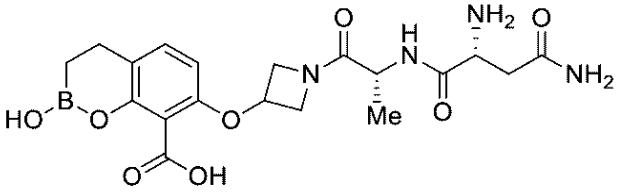
[Chemical Formula 425]



,

N^1-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

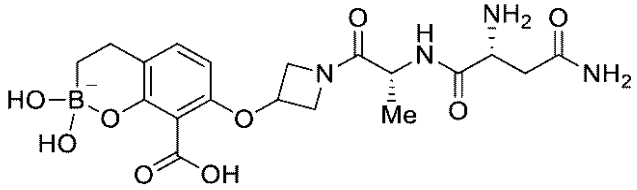
[Chemical Formula 426]



,

N^1-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

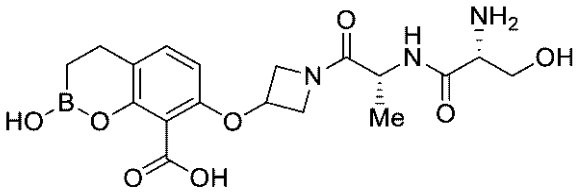
[Chemical Formula 427]



,

N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

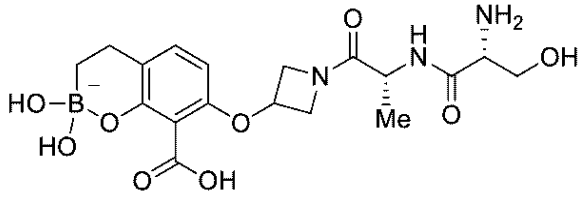
[Chemical Formula 428]



,

N-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

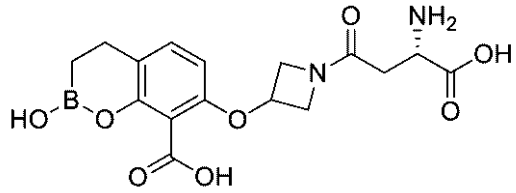
[Chemical Formula 429]



,

7-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

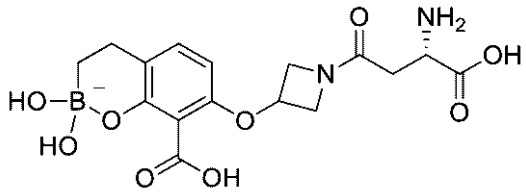
[Chemical Formula 430]



,

8-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

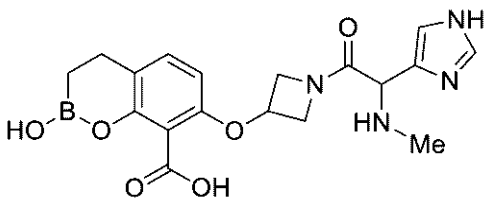
[Chemical Formula 431]



,

2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 432]

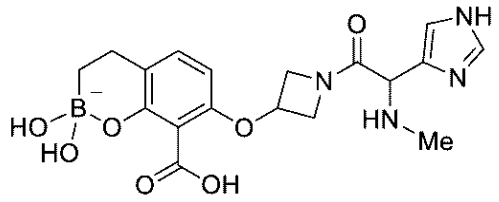


,

4,4-dihydroxy-8-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic

acid

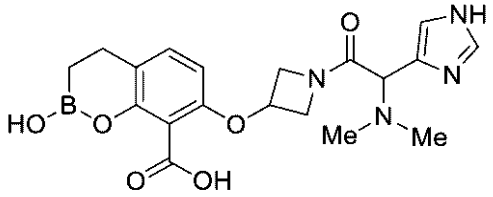
[Chemical Formula 433]



,

2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

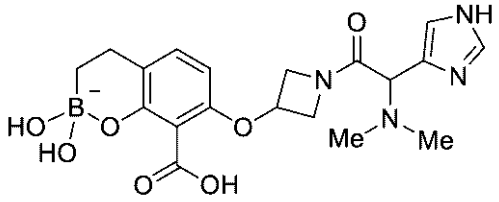
[Chemical Formula 434]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

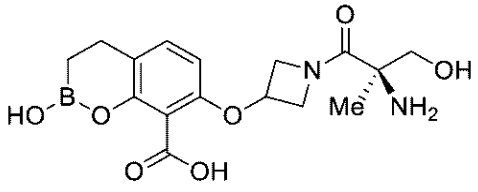
[Chemical Formula 435]



,

2-hydroxy-7-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 436]

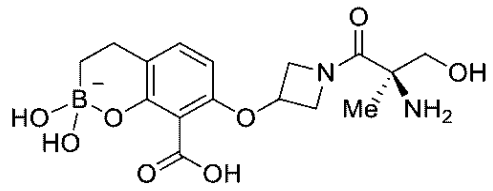


,

4,4-dihydroxy-8-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-

carboxylic acid

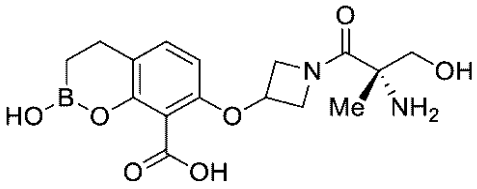
[Chemical Formula 437]



,

2-hydroxy-7-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

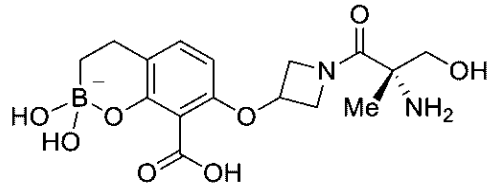
[Chemical Formula 438]



,

4,4-dihydroxy-8-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

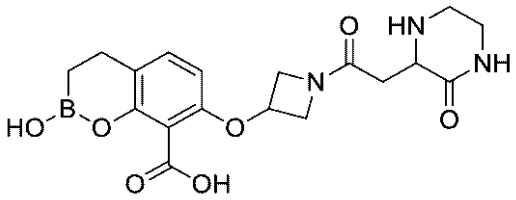
[Chemical Formula 439]



,

2-hydroxy-7-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

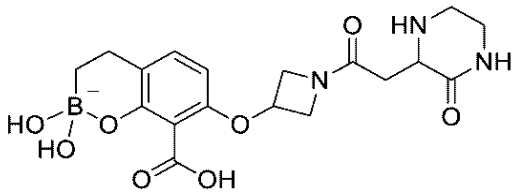
[Chemical Formula 440]



,

4,4-dihydroxy-8-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

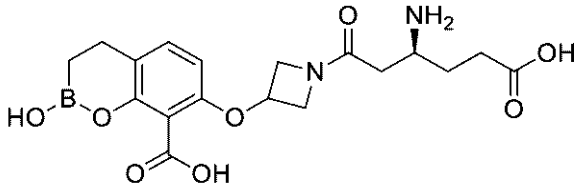
[Chemical Formula 441]



,

7-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

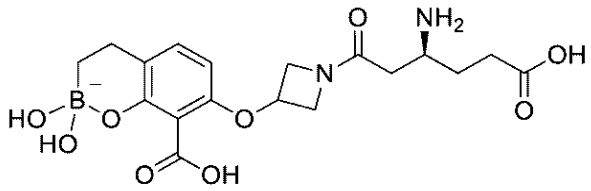
[Chemical Formula 442]



,

8-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

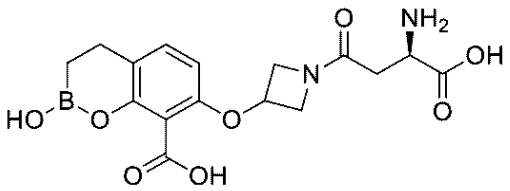
[Chemical Formula 443]



,

7-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

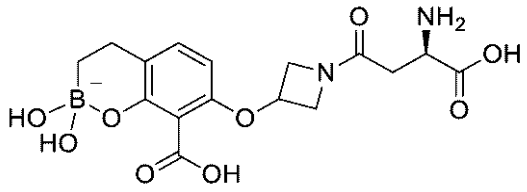
[Chemical Formula 444]



,

8-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

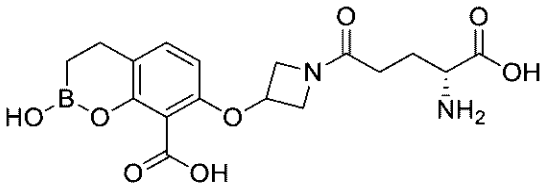
[Chemical Formula 445]



,

7-({1-[(4R)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

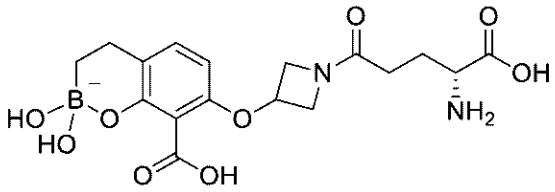
[Chemical Formula 446]



,

8-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

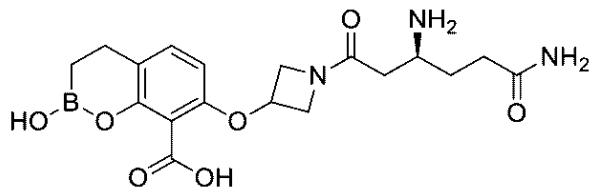
[Chemical Formula 447]



,

7-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

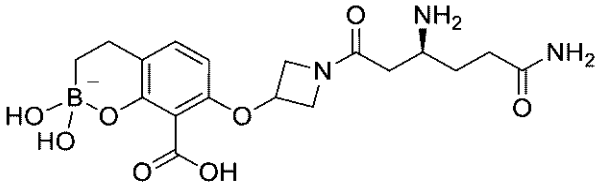
[Chemical Formula 448]



,

8-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

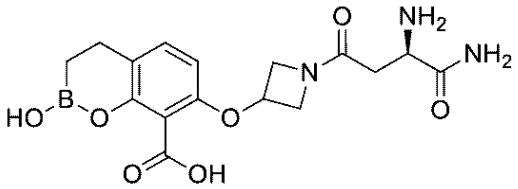
[Chemical Formula 449]



,

7-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

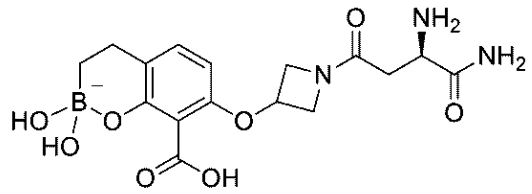
[Chemical Formula 450]



,

8-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

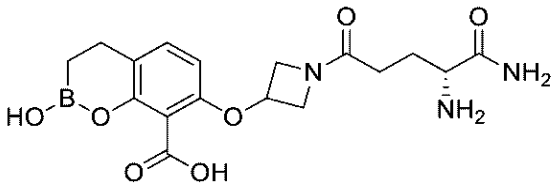
[Chemical Formula 451]



,

7-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

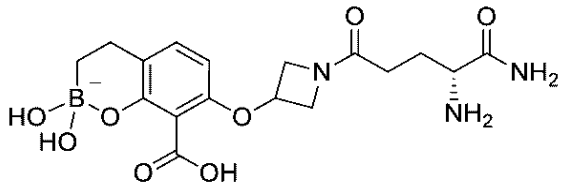
[Chemical Formula 452]



,

8-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

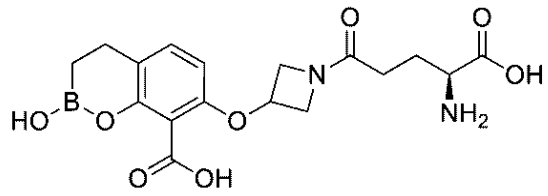
[Chemical Formula 453]



,

7-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

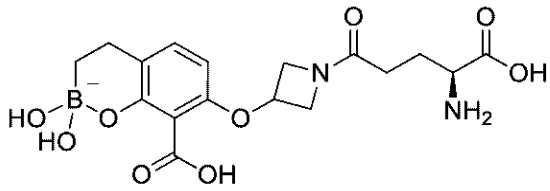
[Chemical Formula 454]



,

8-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

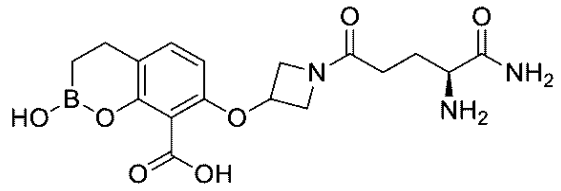
[Chemical Formula 455]



,

7-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

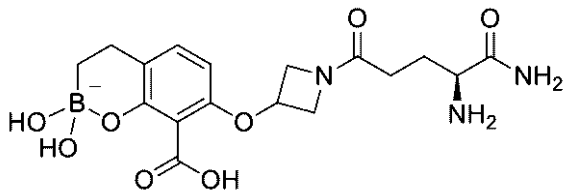
[Chemical Formula 456]



,

8-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

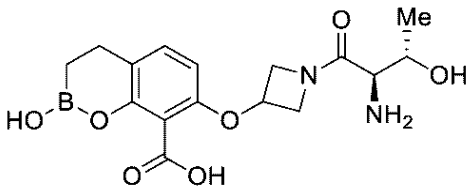
[Chemical Formula 457]



,

2-hydroxy-7-[(1-D-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

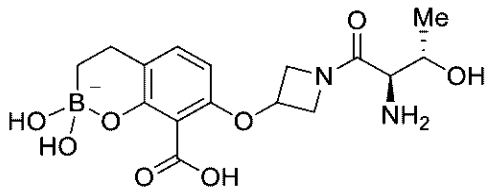
[Chemical Formula 458]



,

4,4-dihydroxy-8-[(1-D-threonylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

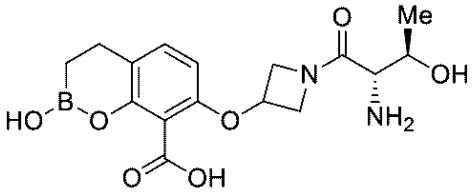
[Chemical Formula 459]



,

2-hydroxy-7-[(1-L-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

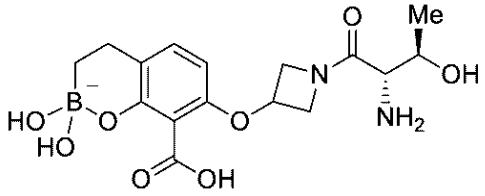
[Chemical Formula 460]



, or

4,4-dihydroxy-8-[(1-L-threonylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

[Chemical Formula 461]

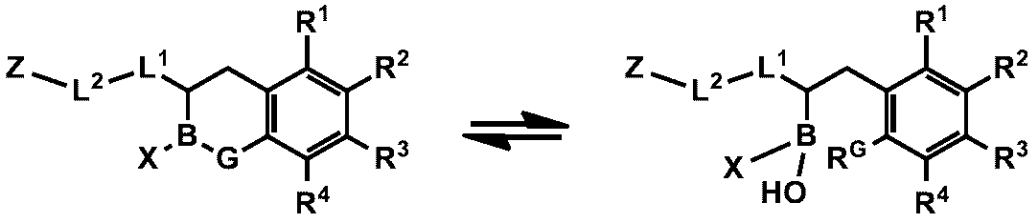


.

[Item 55]

A compound represented by formula (11):

[Chemical Formula 462]



(1a) (11)

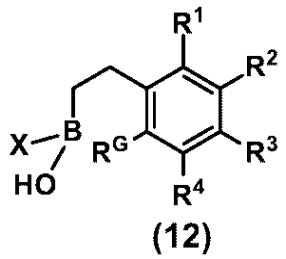
or a pharmaceutically acceptable salt thereof,

wherein R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, R^{a1}, Z, L^1, L^2, X, R^1, R^2, R^3, and R^4 are defined the same as the definition according to item 1, and formula (1a) is defined the same as item 1.

[Item 56]

The compound or the pharmaceutically acceptable salt thereof according to item 55, wherein the compound of formula (11) is represented by formula (12):

[Chemical Formula 463]



(12)

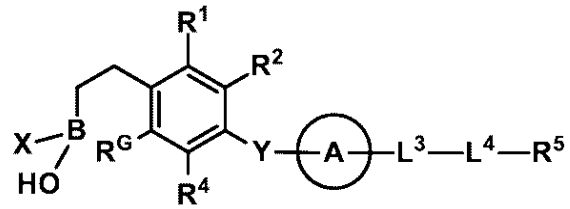
wherein X, R^1, R^2, R^3, and R^4 are defined the same as the definition according to any one of the preceding items.

[Item 57]

The compound or the pharmaceutically acceptable salt thereof according to item 55 or 56, wherein the compound of

formula (12) is represented by formula (13):

[Chemical Formula 464]



(13)

wherein X, Y, ring A, L^3, L^4, R^1, R^2, R^4, and R^5 are defined the same as the definition according to any one of the preceding items.

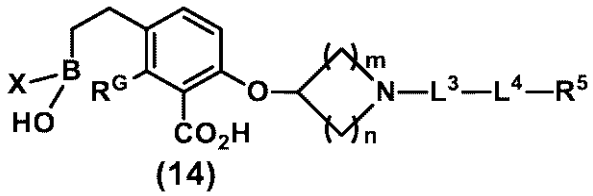
[Item 58]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 57, wherein X and R^G are hydroxyl groups, R^4 is a carboxyl group, and ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Item 59]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 58, wherein the compound of formula (13) is represented by formula (14):

[Chemical Formula 465]



(14)

wherein X, L^3, L^4, m, n, and R^5 are defined the same as the definition according to any one of the preceding items.

[Item 60]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 59, wherein R^G is a hydroxyl group or a thiol group.

[Item 61]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 60, wherein R^G

is a hydroxyl group.

[Item 62]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 61, wherein X is a hydroxyl group or a C_{1-6} alkoxy group.

[Item 63]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 62, wherein X is a hydroxyl group.

[Item 64]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 63, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Item 65]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 64, wherein m is 1, and n is 1.

[Item 66]

The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 65, wherein L^3 is defined the same as the definition according to any one of the preceding items.

[Item 67]

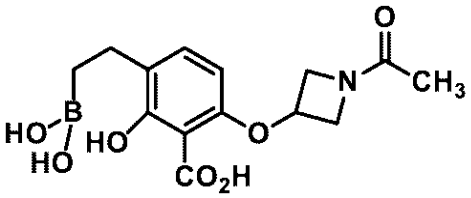
The compound or the pharmaceutically acceptable salt thereof according to any one of items 55 to 66, wherein L^4 and R^5 are defined the same as the definitions according to any one of the preceding items.

[Item 68]

The compound or the pharmaceutically acceptable salt thereof according to item 55, selected from the group consisting of the following compounds:

6-[(1-acetylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

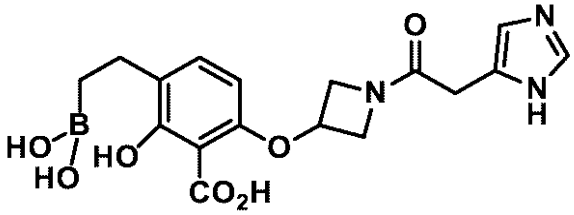
[Chemical Formula 466]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

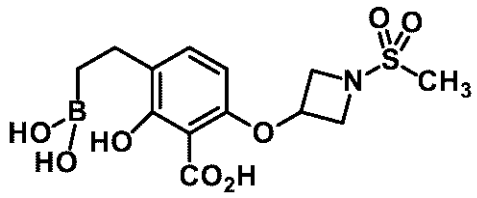
[Chemical Formula 467]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(methanesulfonyl)azetidin-3-yl]oxy}benzoic acid

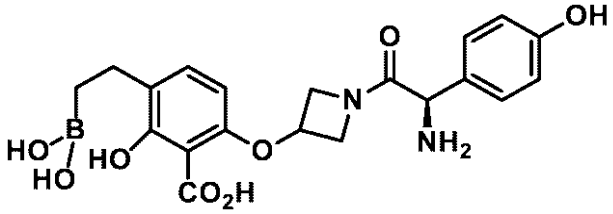
[Chemical Formula 468]



,

6-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

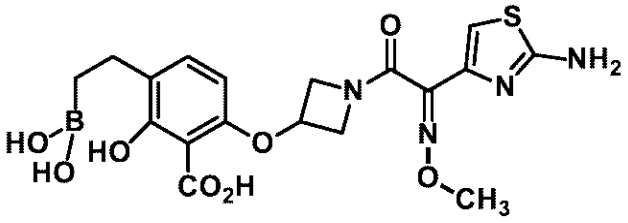
[Chemical Formula 469]



,

6-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

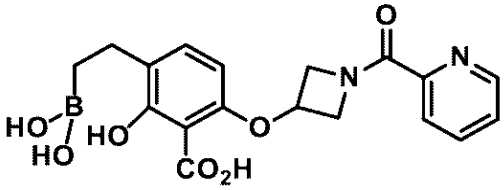
[Chemical Formula 470]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

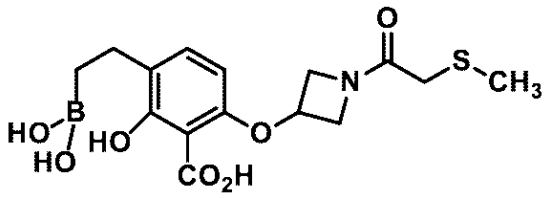
[Chemical Formula 471]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)benzoic acid

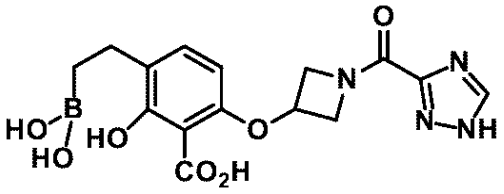
[Chemical Formula 472]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

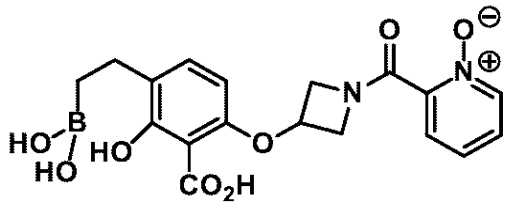
[Chemical Formula 473]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}benzoic acid

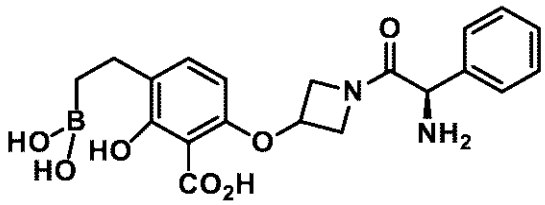
[Chemical Formula 474]



,

6-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

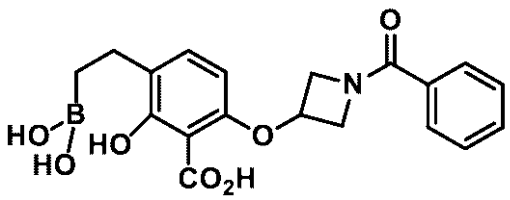
[Chemical Formula 475]



,

6-[(1-benzoylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

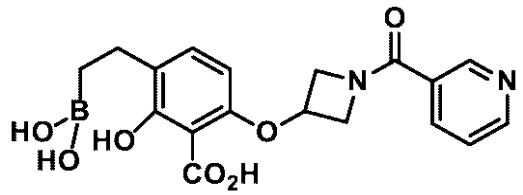
[Chemical Formula 476]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

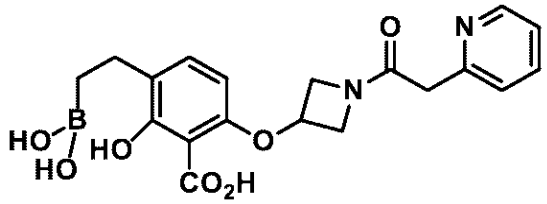
[Chemical Formula 477]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

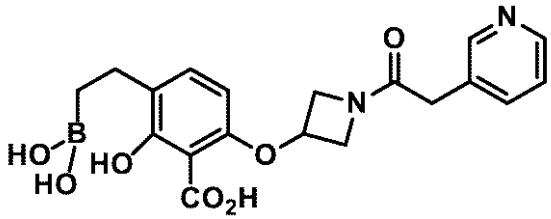
[Chemical Formula 478]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

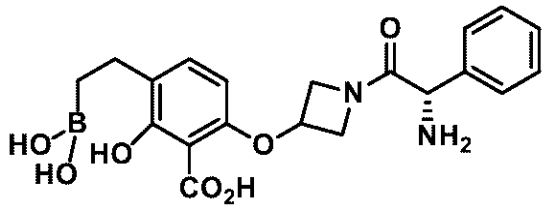
[Chemical Formula 479]



,

6-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

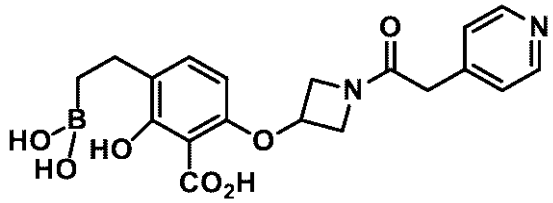
[Chemical Formula 480]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

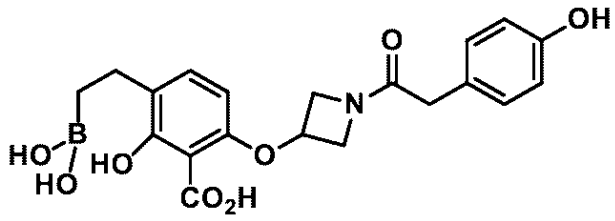
[Chemical Formula 481]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)benzoic acid

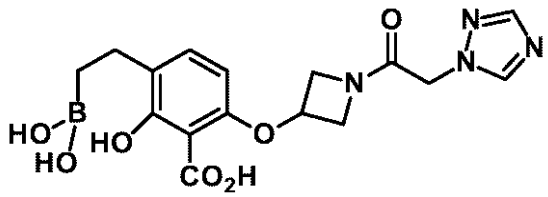
[Chemical Formula 482]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

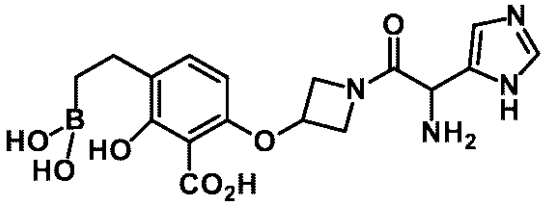
[Chemical Formula 483]



,

6-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

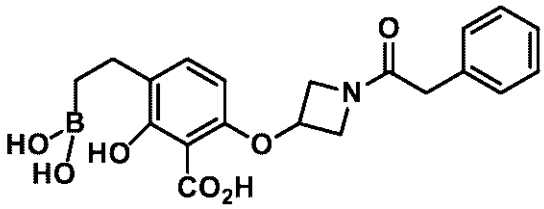
[Chemical Formula 484]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(phenylacetyl)azetidin-3-yl]oxy}benzoic acid

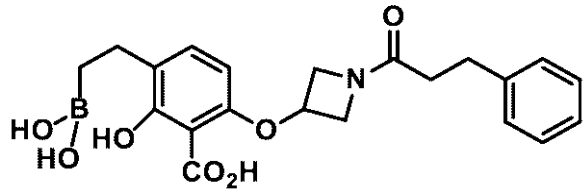
[Chemical Formula 485]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}benzoic acid

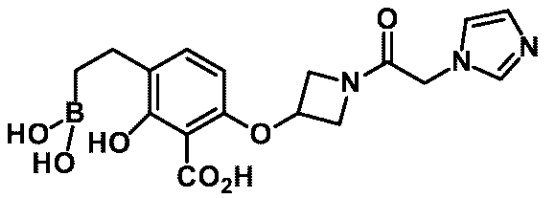
[Chemical Formula 486]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

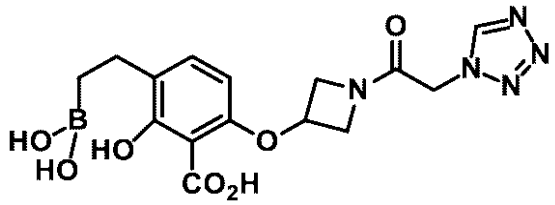
[Chemical Formula 487]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

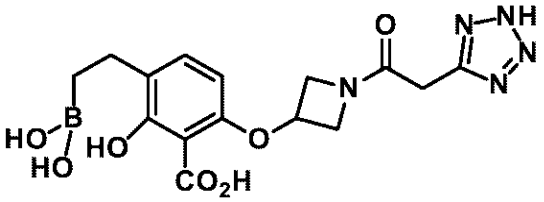
[Chemical Formula 488]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

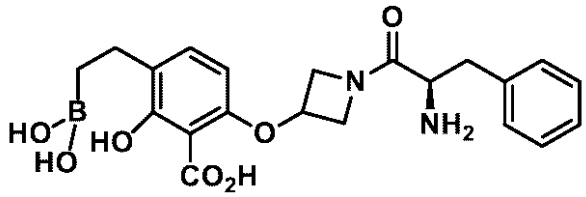
[Chemical Formula 489]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-phenylalanylazetidin-3-yl)oxy]benzoic acid

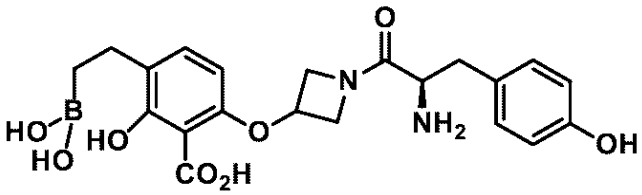
[Chemical Formula 490]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-tyrosylazetidin-3-yl)oxy]benzoic acid

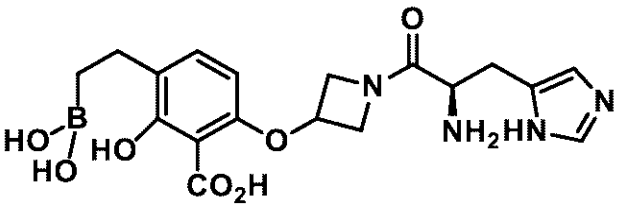
[Chemical Formula 491]



,

3-(2-boronoethyl)-6-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

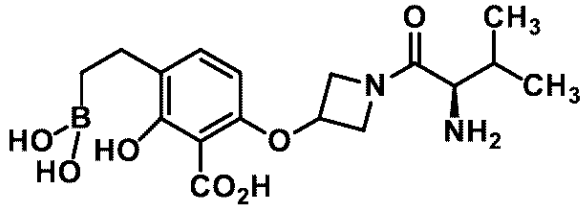
[Chemical Formula 492]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-valylazetidin-3-yl)oxy]benzoic acid

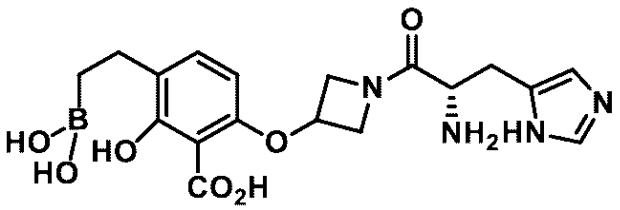
[Chemical Formula 493]



,

3-(2-boronoethyl)-6-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

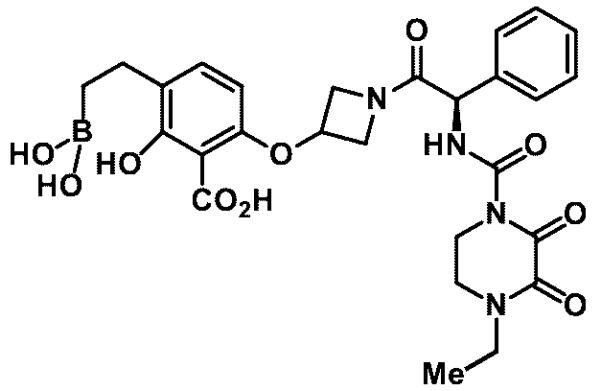
[Chemical Formula 494]



,

3-(2-boronoethyl)-6-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

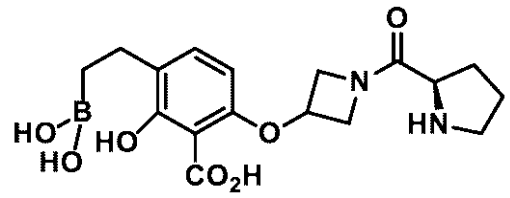
[Chemical Formula 495]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-prolylazetidin-3-yl)oxy]benzoic acid

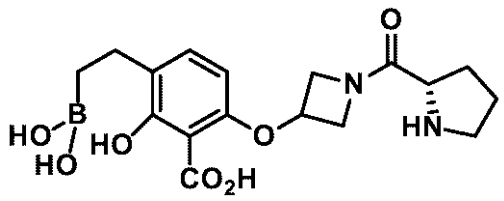
[Chemical Formula 496]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-prolylazetidin-3-yl)oxy]benzoic acid

[Chemical Formula 497]

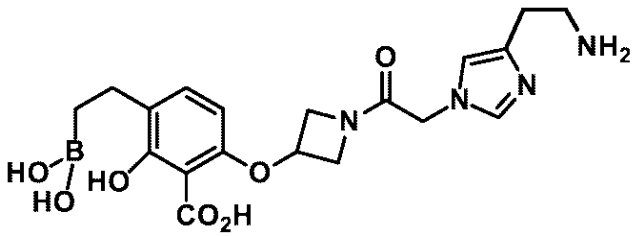


,

6-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-

3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

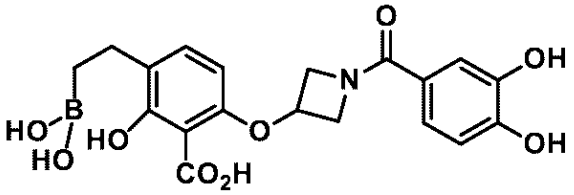
[Chemical Formula 498]



,

3-(2-boronoethyl)-6-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

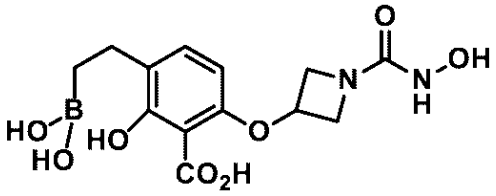
[Chemical Formula 499]



, and

3-(2-boronoethyl)-2-hydroxy-6-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}benzoic acid

[Chemical Formula 500]



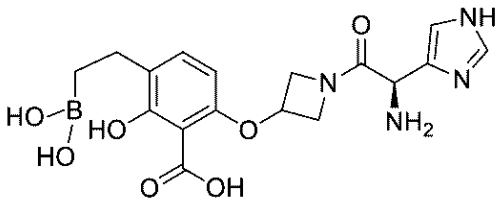
.

[Item 69]

The compound or the pharmaceutically acceptable salt thereof according to item 55, selected from the group consisting of the following compounds:

6-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

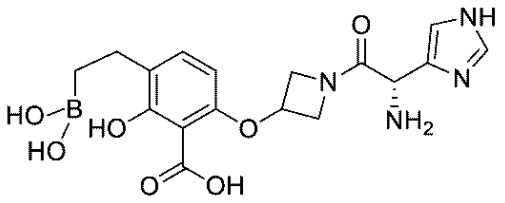
[Chemical Formula 501]



,

6-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

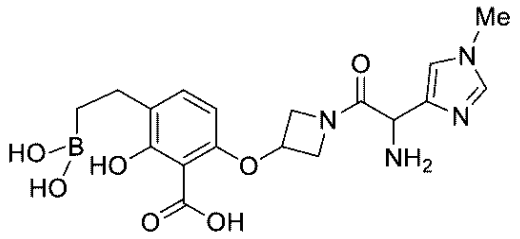
[Chemical Formula 502]



,

6-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

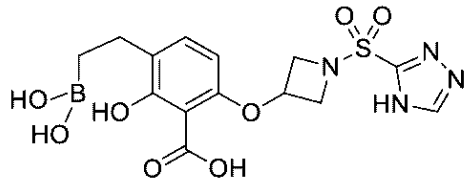
[Chemical Formula 503]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}benzoic acid

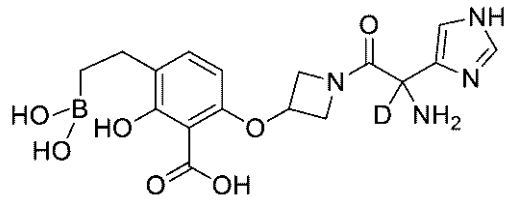
[Chemical Formula 504]



,

6-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

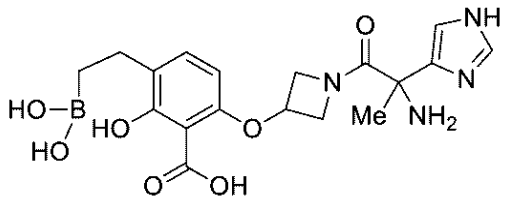
[Chemical Formula 505]



,

6-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

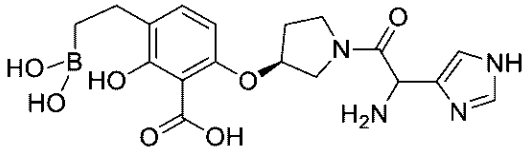
[Chemical Formula 506]



,

6-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

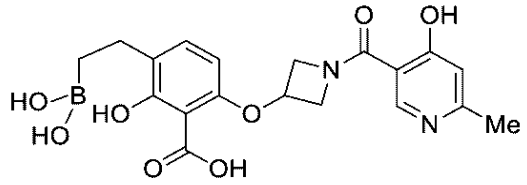
[Chemical Formula 507]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

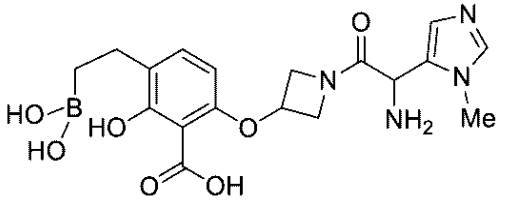
[Chemical Formula 508]



,

6-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

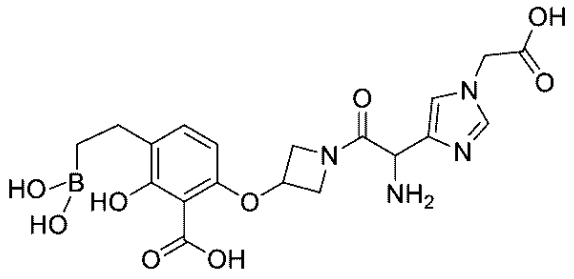
[Chemical Formula 509]



,

6-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

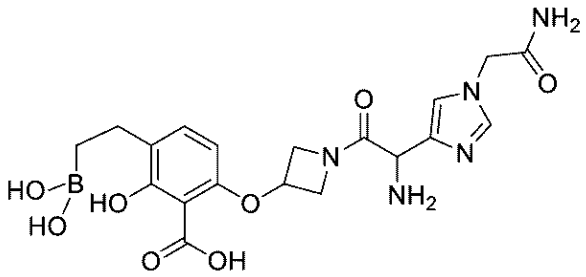
[Chemical Formula 510]



,

6-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

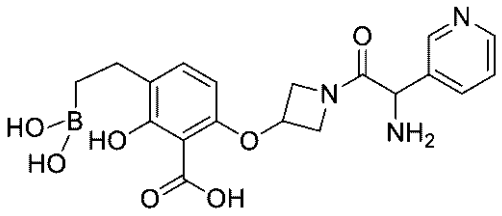
[Chemical Formula 511]



,

6-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

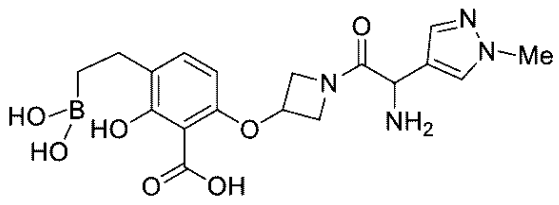
[Chemical Formula 512]



,

6-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

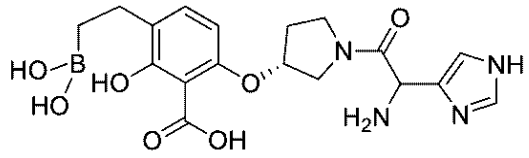
[Chemical Formula 513]



,

6-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

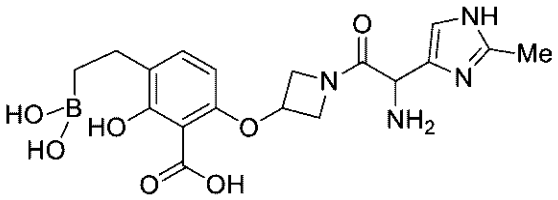
[Chemical Formula 514]



,

6-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

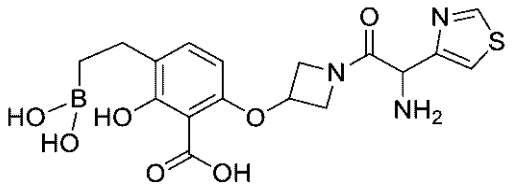
[Chemical Formula 515]



,

6-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

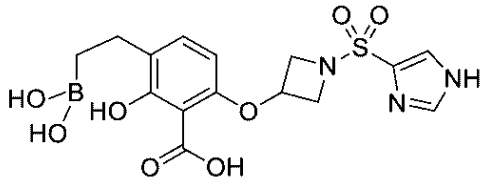
[Chemical Formula 516]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}benzoic acid

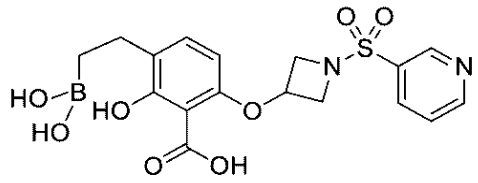
[Chemical Formula 517]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}benzoic acid

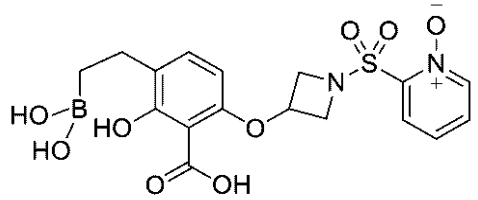
[Chemical Formula 518]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}benzoic acid

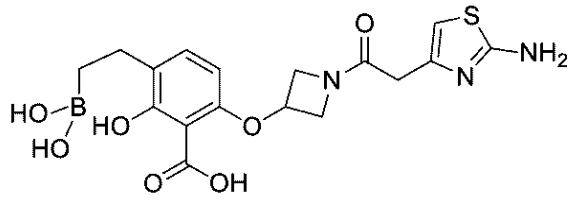
[Chemical Formula 519]



,

6-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

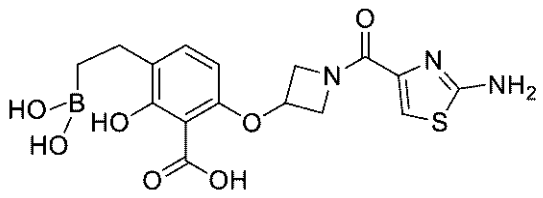
[Chemical Formula 520]



,

6-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

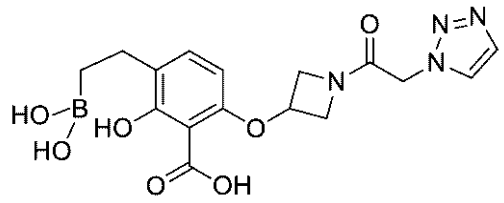
[Chemical Formula 521]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

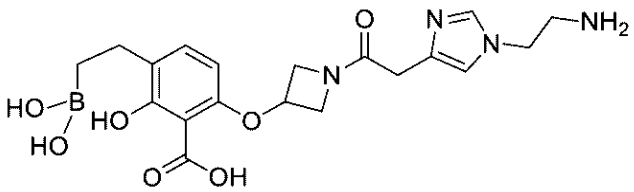
[Chemical Formula 522]



,

6-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

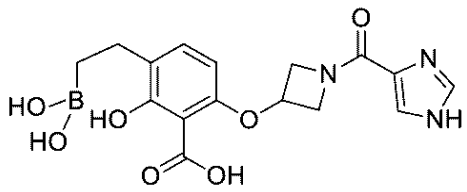
[Chemical Formula 523]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}benzoic acid

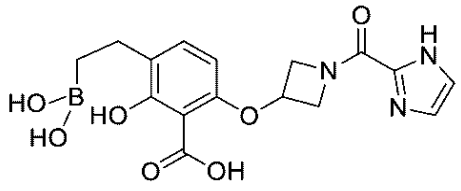
[Chemical Formula 524]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

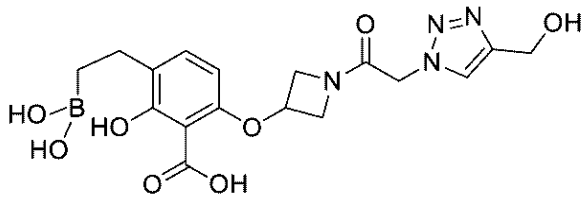
[Chemical Formula 525]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

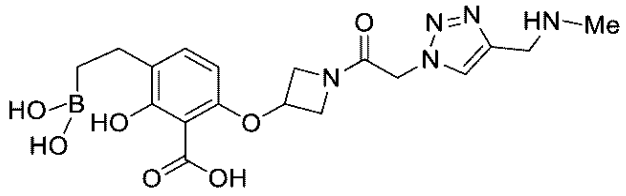
[Chemical Formula 526]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

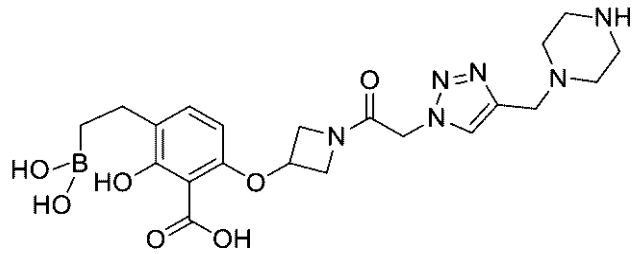
[Chemical Formula 527]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

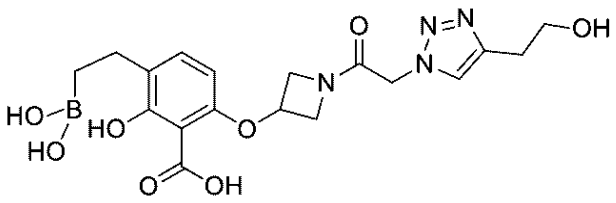
[Chemical Formula 528]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

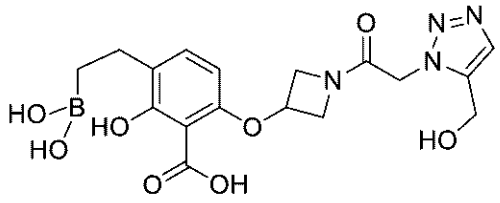
[Chemical Formula 529]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

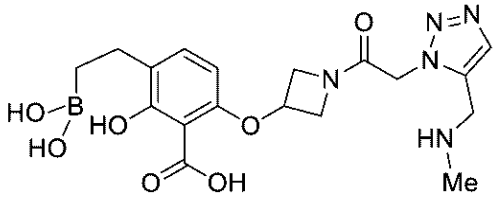
[Chemical Formula 530]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

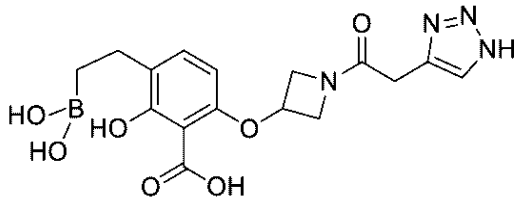
[Chemical Formula 531]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

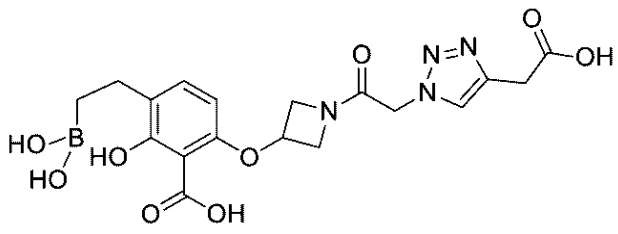
[Chemical Formula 532]



,

3-(2-boronoethyl)-6-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

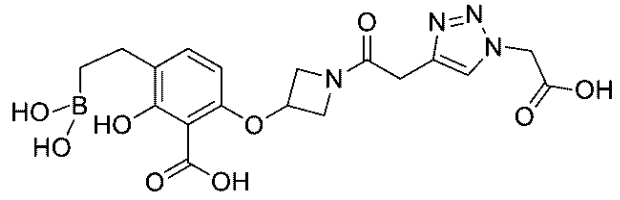
[Chemical Formula 533]



,

3-(2-boronoethyl)-6-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

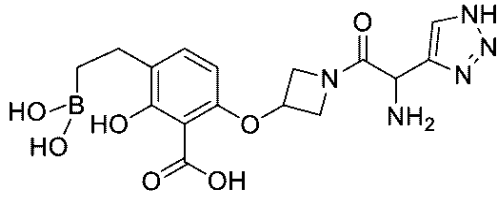
[Chemical Formula 534]



,

6-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

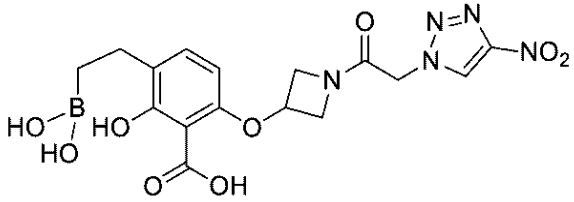
[Chemical Formula 535]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

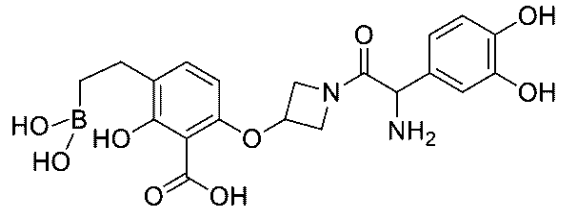
[Chemical Formula 536]



,

6-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

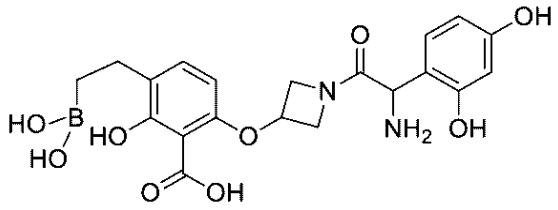
[Chemical Formula 537]



,

6-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

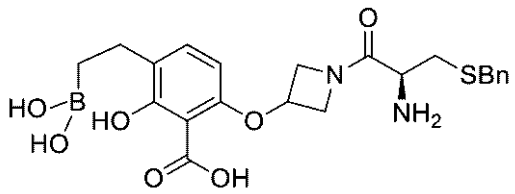
[Chemical Formula 538]



,

6-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

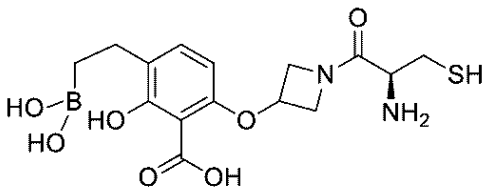
[Chemical Formula 539]



,

3-(2-boronoethyl)-6-[(1-D-cysteinylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

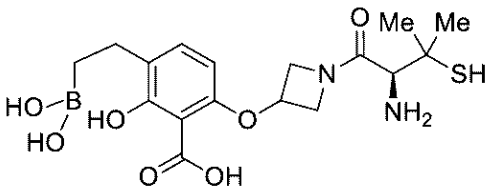
[Chemical Formula 540]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}benzoic acid

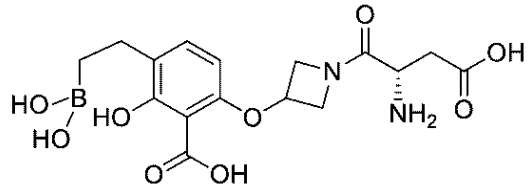
[Chemical Formula 541]



,

6-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

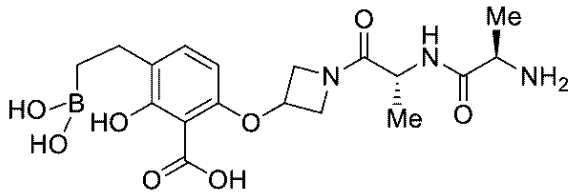
[Chemical Formula 542]



,

6-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

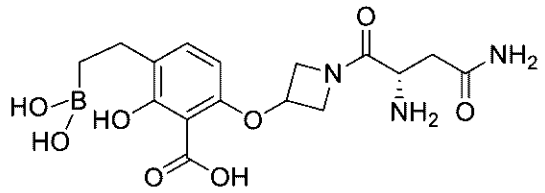
[Chemical Formula 543]



,

6-[(1-L-asparaginylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

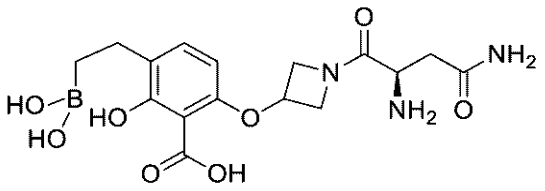
[Chemical Formula 544]



,

6-[(1-D-asparaginylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

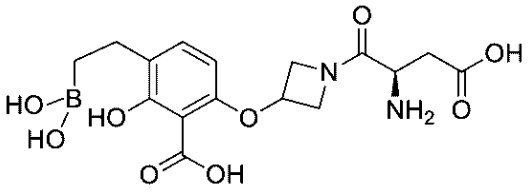
[Chemical Formula 545]



,

6-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

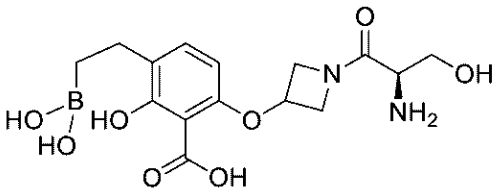
[Chemical Formula 546]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-serylazetidin-3-yl)oxy]benzoic acid

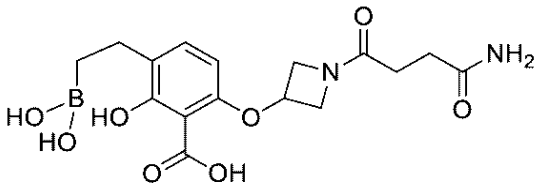
[Chemical Formula 547]



,

6-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

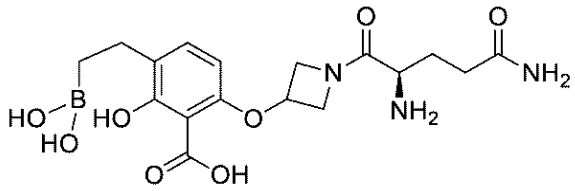
[Chemical Formula 548]



,

3-(2-boronoethyl)-6-[(1-D-glutaminylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

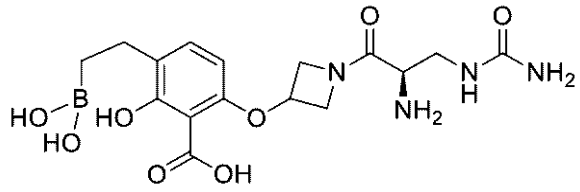
[Chemical Formula 549]



,

3-(2-boronoethyl)-6-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

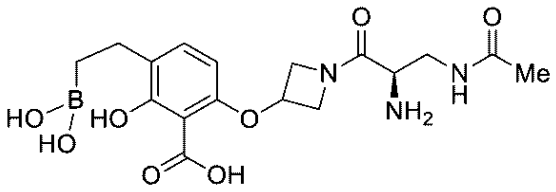
[Chemical Formula 550]



,

6-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

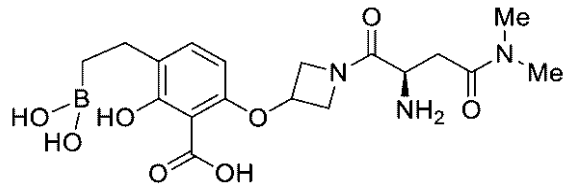
[Chemical Formula 551]



,

3-(2-boronoethyl)-6-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

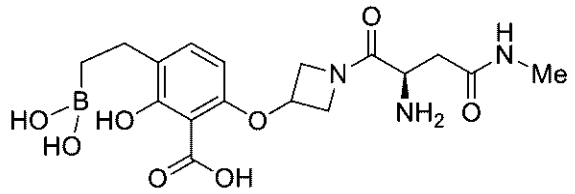
[Chemical Formula 552]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}benzoic acid

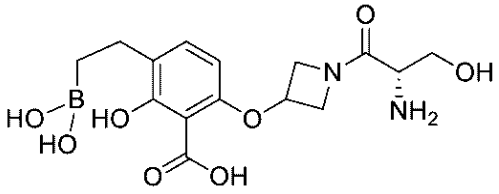
[Chemical Formula 553]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-serylazetidin-3-yl)oxy]benzoic acid

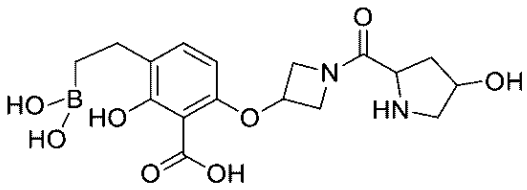
[Chemical Formula 554]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}benzoic acid

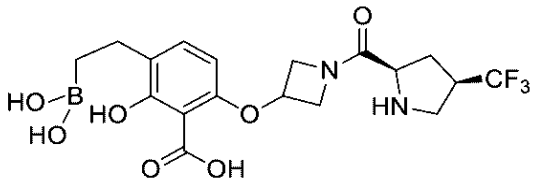
[Chemical Formula 555]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)benzoic acid

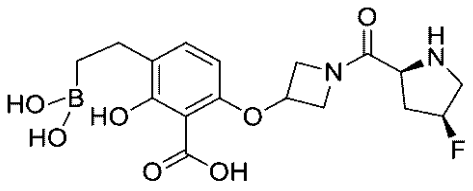
[Chemical Formula 556]



,

3-(2-boronoethyl)-6-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

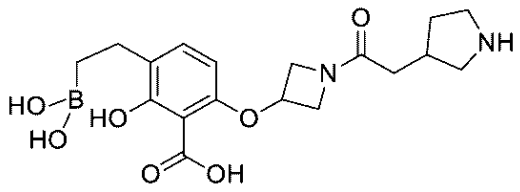
[Chemical Formula 557]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

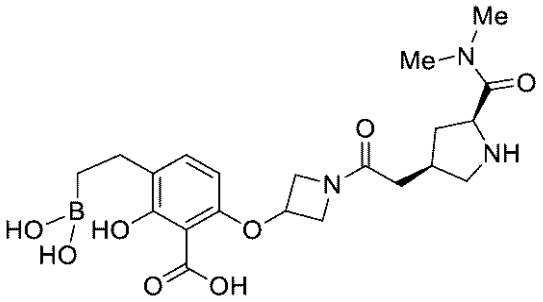
[Chemical Formula 558]



,

3-(2-boronoethyl)-6-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

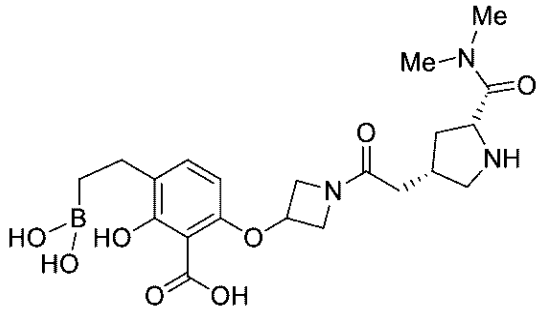
[Chemical Formula 559]



,

3-(2-boronoethyl)-6-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

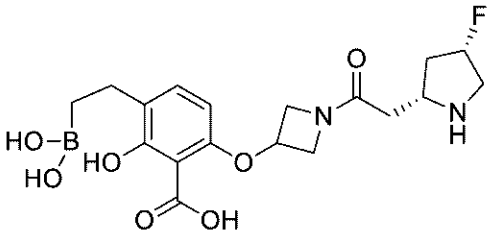
[Chemical Formula 560]



,

3-(2-boronoethyl)-6-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

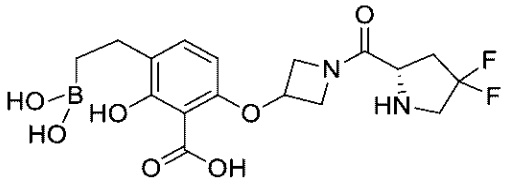
[Chemical Formula 561]



,

3-(2-boronoethyl)-6-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

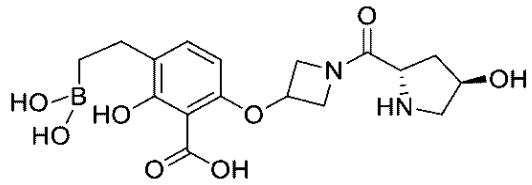
[Chemical Formula 562]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

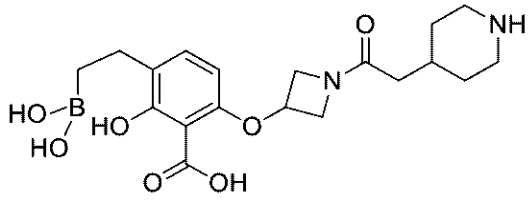
[Chemical Formula 563]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

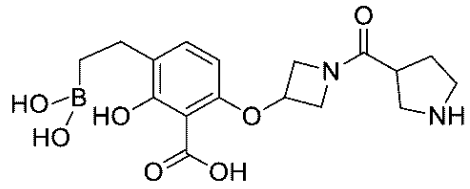
[Chemical Formula 564]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

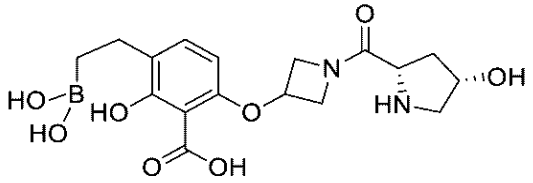
[Chemical Formula 565]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

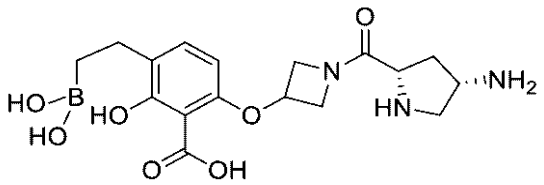
[Chemical Formula 566]



,

6-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

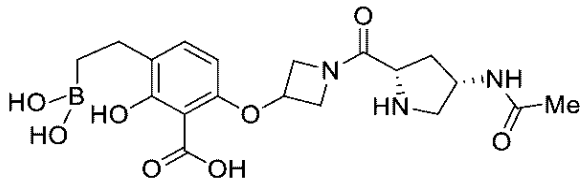
[Chemical Formula 567]



,

6-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

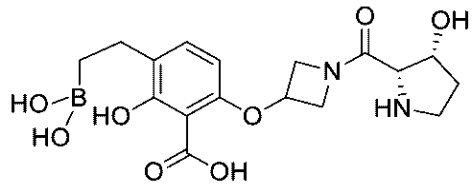
[Chemical Formula 568]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

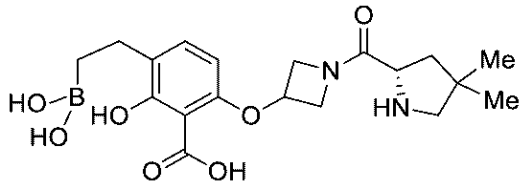
[Chemical Formula 569]



,

3-(2-boronoethyl)-6-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

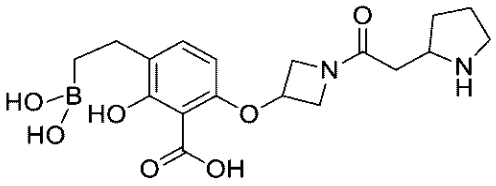
[Chemical Formula 570]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

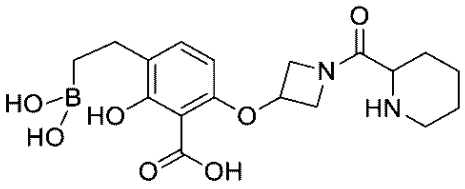
[Chemical Formula 571]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

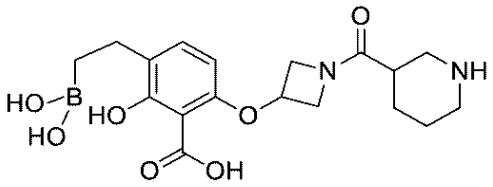
[Chemical Formula 572]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

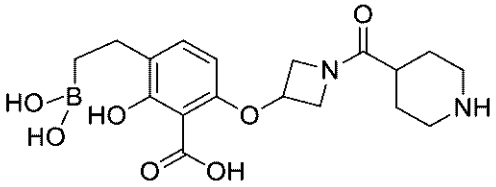
[Chemical Formula 573]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}benzoic acid

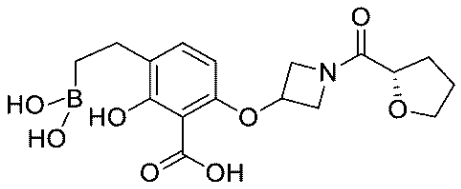
[Chemical Formula 574]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)benzoic acid

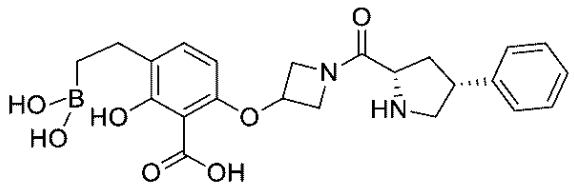
[Chemical Formula 575]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)benzoic acid

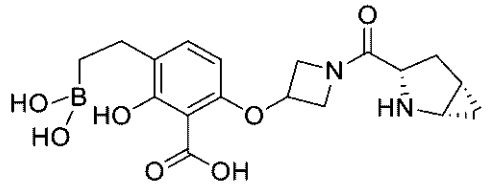
[Chemical Formula 576]



,

6-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

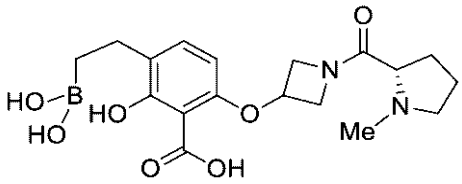
[Chemical Formula 577]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}benzoic acid

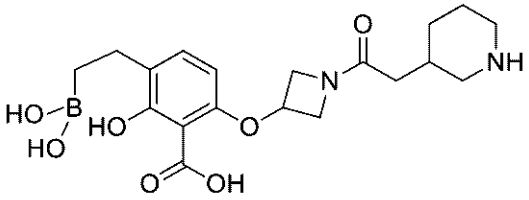
[Chemical Formula 578]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

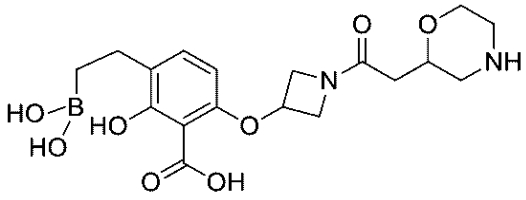
[Chemical Formula 579]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

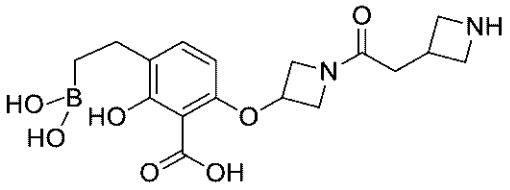
[Chemical Formula 580]



,

6-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

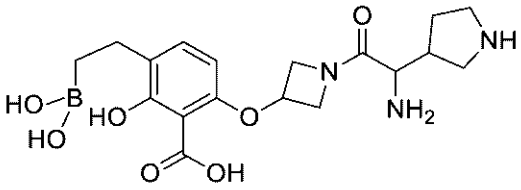
[Chemical Formula 581]



,

6-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

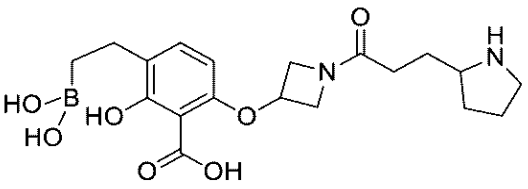
[Chemical Formula 582]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)benzoic acid

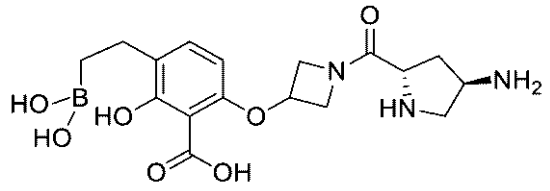
[Chemical Formula 583]



,

6-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

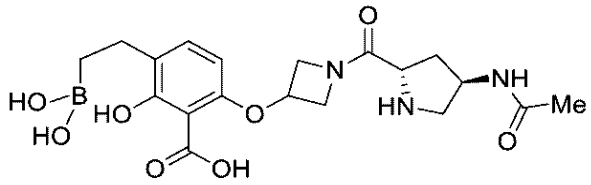
[Chemical Formula 584]



,

6-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

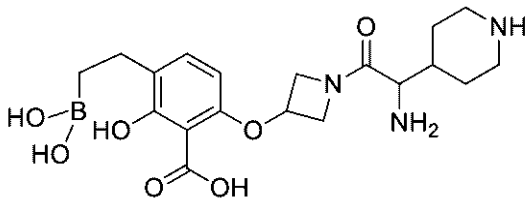
[Chemical Formula 585]



,

6-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

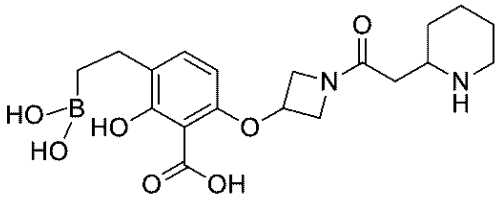
[Chemical Formula 586]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

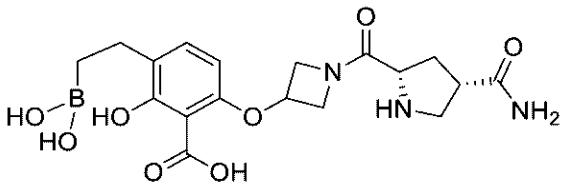
[Chemical Formula 587]



,

3-(2-boronoethyl)-6-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

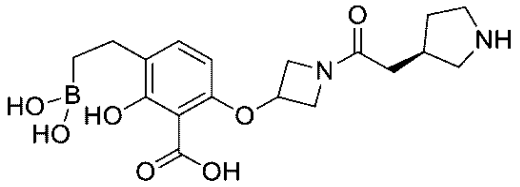
[Chemical Formula 588]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

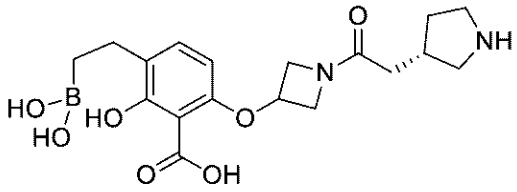
[Chemical Formula 589]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

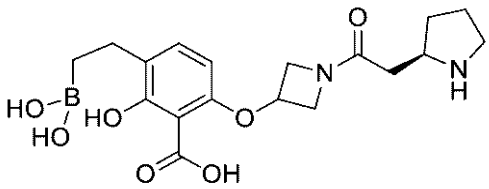
[Chemical Formula 590]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

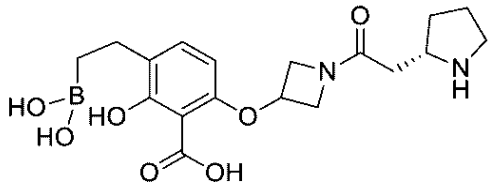
[Chemical Formula 591]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

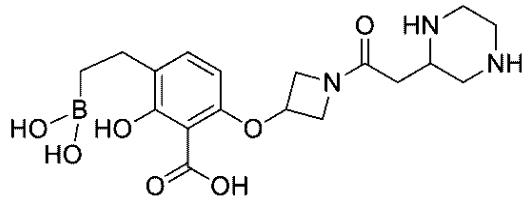
[Chemical Formula 592]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

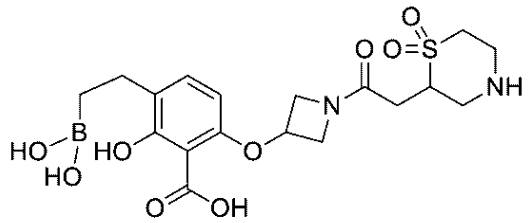
[Chemical Formula 593]



,

3-(2-boronoethyl)-6-({1-[(1,1-dioxo-1λ^6-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

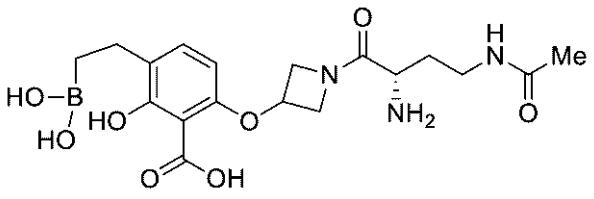
[Chemical Formula 594]



,

6-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

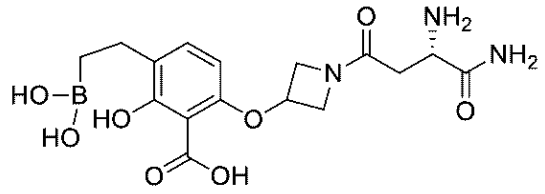
[Chemical Formula 595]



,

6-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

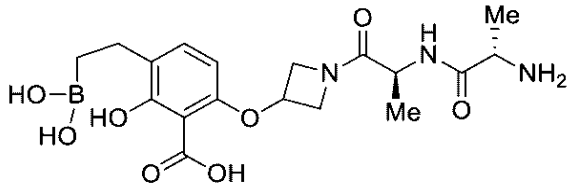
[Chemical Formula 596]



,

6-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

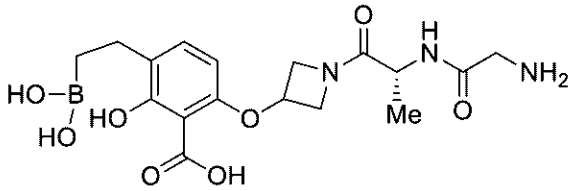
[Chemical Formula 597]



,

3-(2-boronoethyl)-6-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

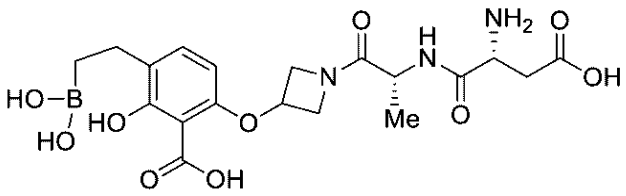
[Chemical Formula 598]



,

N-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

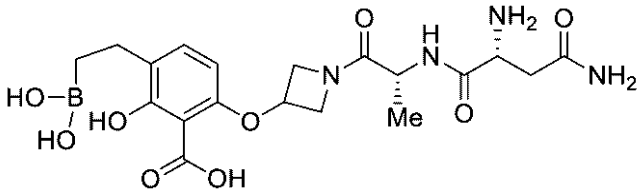
[Chemical Formula 599]



,

N^1-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

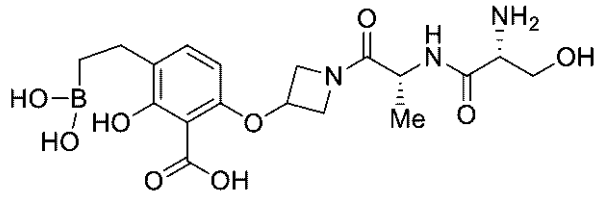
[Chemical Formula 600]



,

N-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

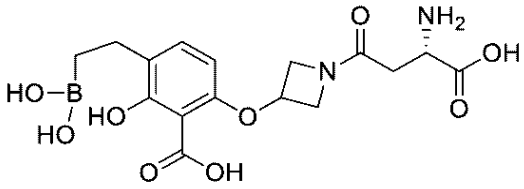
[Chemical Formula 601]



,

6-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

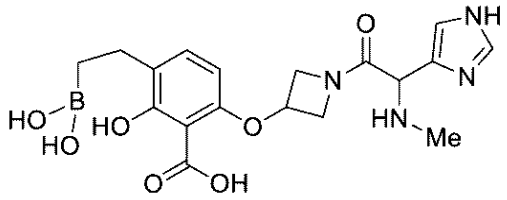
[Chemical Formula 602]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)benzoic acid

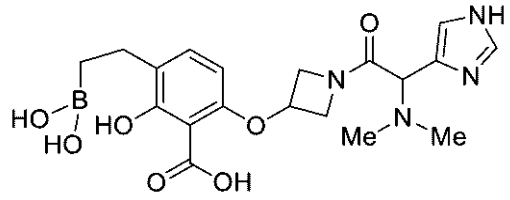
[Chemical Formula 603]



,

3-(2-boronoethyl)-6-({1-[(dimethylamino)(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

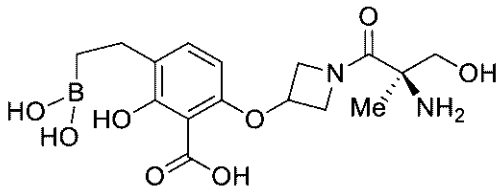
[Chemical Formula 604]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}benzoic acid

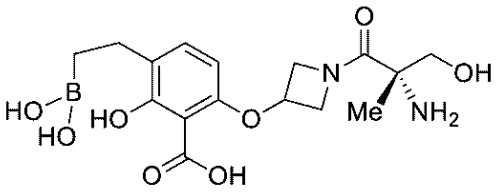
[Chemical Formula 605]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}benzoic acid

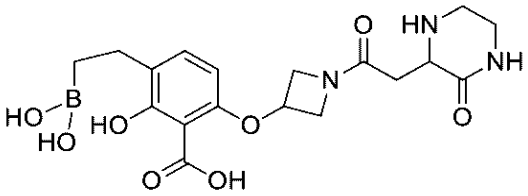
[Chemical Formula 606]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

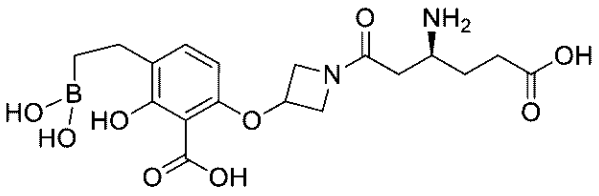
[Chemical Formula 607]



,

6-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

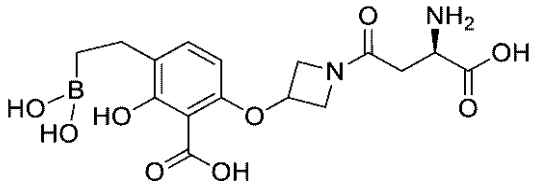
[Chemical Formula 608]



,

6-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

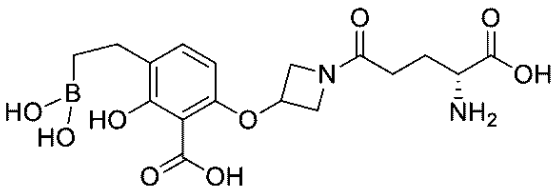
[Chemical Formula 609]



,

6-({1-[(4R)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

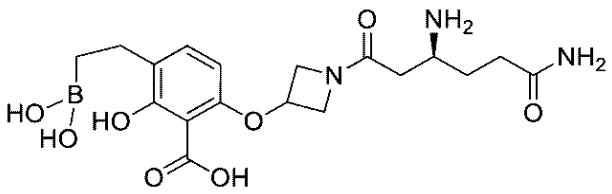
[Chemical Formula 610]



,

3-(2-boronoethyl)-6-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

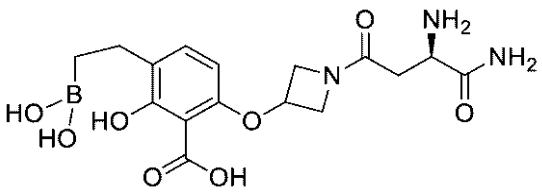
[Chemical Formula 611]



,

6-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

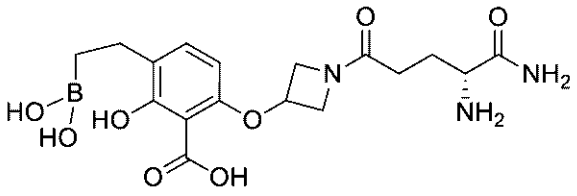
[Chemical Formula 612]



,

3-(2-boronoethyl)-6-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

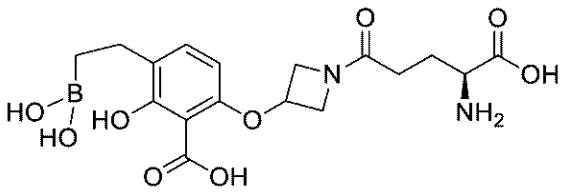
[Chemical Formula 613]



,

6-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

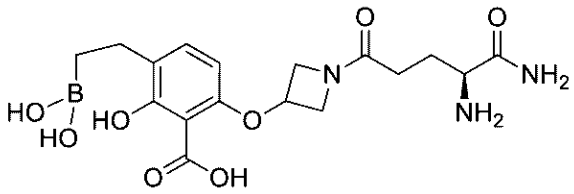
[Chemical Formula 614]



,

3-(2-boronoethyl)-6-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

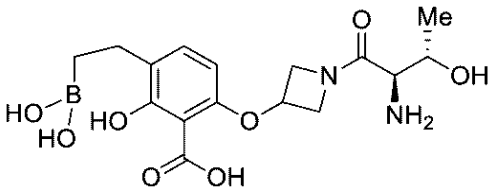
[Chemical Formula 615]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-threonylazetidin-3-yl)oxy]benzoic acid

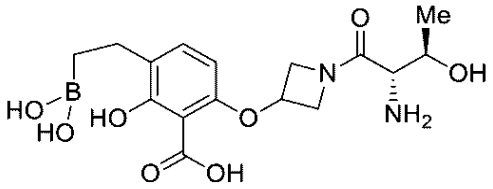
[Chemical Formula 616]



, and

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-threonylazetidin-3-yl)oxy]benzoic acid

[Chemical Formula 617]



.

[Item 70]

A medicament comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 69.

[Item 71]

The medicament according to item 70, which is a therapeutic drug or a prophylactic drug for a bacterial infection.

[Item 72]

A β-lactamase inhibiting agent comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 69 as an active ingredient.

[Item 73]

A pharmaceutical composition comprising the compound or the pharmaceutically acceptable salt thereof according to any one of items 1 to 69 and a pharmaceutically acceptable carrier.

[Item 74]

The pharmaceutical composition according to item 73, further comprising an additional agent.

[Item 75]

The pharmaceutical composition according to item 74, wherein the additional agent is selected from the group consisting of an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, and an anti-allergic agent.

[Item 76]

The pharmaceutical composition according to item 74 or 75, wherein the additional agent is a β-lactam agent.

[Item 77]

The pharmaceutical composition according to item 75 or 76, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide, ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Item 78]

The pharmaceutical composition according to item 76 or 77, wherein the β-lactam agent is selected from ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, or panipenem.

[Item 79]

The pharmaceutical composition according to item 76 or 77, wherein the β-lactam agent is selected from aztreonam, tigemonam, BAL30072, SYN2416, or carumonam.

[Item 80]

The pharmaceutical composition according to item 73, characterized in that an additional agent is concomitantly administered.

[Item 81]

The pharmaceutical composition according to item 80, wherein the additional agent is selected from an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, or an anti-allergic agent.

[Item 82]

The pharmaceutical composition according to item 80 or 81, wherein the additional agent is a β-lactam agent.

[Item 83]

The pharmaceutical composition according to item 81 or 82, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide,

ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Item 84]

The pharmaceutical composition according to item 82 or 83, wherein the β-lactam agent is selected from the group consisting of ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, and panipenem.

[Item 85]

The pharmaceutical composition according to item 82 or 83, wherein the β-lactam agent is selected from the group consisting of aztreonam, tigemonam, BAL30072, SYN2416, and carumonam.

[Item 86]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items for treating a bacterial infection.

[Item 87]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein the bacterial infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Item 88]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema,

secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Item 89]

A medicament comprised of a combination of the compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items and at least one agent selected from the group consisting of therapeutic agents for sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, and an odontogenic infection.

[Item 90]

A pharmaceutical composition comprising a β-lactam agent, wherein the pharmaceutical composition is administered with the compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items.

[Item 91]

A method for treating a bacterial infection, characterized in that a therapeutically effective amount of the compound or the pharmaceutically acceptable salt thereof according to any one of the preceding items is administered to a patient in need thereof.

[Item 92]

The method according to any one of the preceding items, wherein the bacterial infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Item 93]

The method according to any one of the preceding items, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Item 94]

The method of any one of the preceding items, characterized in that an additional agent is concomitantly administered.

[0011]

The present invention is intended so that one or more of the features described above can be provided not only as the explicitly disclosed combinations, but also as other combinations thereof. Additional embodiments and advantages of the invention are recognized by those skilled in the art by reading and understanding the following detailed description as needed.

[Advantageous Effects of Invention]

[0012]

The compound of the invention has excellent inhibitory action against serine-β-lactamase with a serine residue at the center of enzymatic activity. A better embodiment of the compound of the invention is expected to have a broad β-lactamase inhibitory action or metallo-β-lactamase inhibitory action with zinc (Zn^{2+}) at the center of

enzymatic activity against multiple types of β-lactamases. Therefore, the compound of the invention is useful alone or in concomitant use with a β-lactam agent as a therapeutic agent and/or prophylactic agent for a bacterial infection in which a bacteria that can have a β-lactamase is involved, i.e., sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Description of Embodiments]

[0013]

The present invention is described hereinafter in more detail.

Throughout the entire specification, a singular expression should be understood as encompassing the concept thereof in the plural form, unless specifically noted otherwise. Thus, singular articles (e.g., "a", "an", "the", and the like in the case of English) should also be understood as encompassing the concept thereof in the plural form, unless specifically noted otherwise. The terms used herein should also be understood as being used in the meaning that is commonly used in the art, unless specifically noted otherwise. Thus, unless defined otherwise, all terminologies and scientific technical terms that are used herein have the same meaning as the general understanding of those skilled in the art to which the present invention pertains. In case of a contradiction, the present specification (including the definitions) takes precedence.

The terms and the general technologies that are used

herein are first described.

[0014]

Unless specifically noted otherwise, the term "group" refers to a monovalent group. Examples of groups that are not a monovalent group include alkylene groups (divalent). The term "group" may also be omitted in the following descriptions of substituents or the like.

[0015]

Unless specifically limited, the number of substituents when defined as "optionally substituted" or "substituted" is not particularly limited herein, as long as a substitution is possible. The number of substituents is one or multiple substituents. Moreover, unless indicated otherwise, the description for each substituent is also applicable when the substituent is a part of or a substituent of another group.

[0016]

A substituent in "optionally substituted" is selected from substituent group α that consists of the following. The substitution is optionally substituted with 1 to 5 of the same or different substituents. While not particularly limited by the type of substituent, if an atom to which the substituent attaches is an oxygen atom, a nitrogen atom, or a sulfur atom, the substituent is limited to the following substituents that attaches to a carbon atom.

Substituent group α includes

1) a halogen atom
2) a hydroxyl group
3) a carboxyl group
4) a cyano group
5) a sulfanyl group,
6) a nitro group,
7) a C_{1-6} alkyl group
8) a C_{2-6} alkenyl group
9) a C_{2-6} alkynyl group
10) a C_{1-6} alkoxy group

11) a C_{1-6} alkylthio group
12) a C_{1-6} alkylcarbonyl group
13) a C_{1-6} alkylsulfonyl group
(wherein each substituent from 7) to 13) is optionally substituent with 1 to 5 of the same or different sub substituents selected from substituent group β)
14) a C_{3-10} alicyclic group
15) a C_{3-10} alicyclic oxy group
16) a C_{6-10} aryloxy group
17) a 5- or 6-membered heteroaryloxy group
18) a 4- to 10-membered non-aryl heterocyclyl oxy group
19) a C_{3-10} alicyclic thio group
20) a C_{6-10} arylthio group
21) a 5- or 6-membered heteroarylthio group
22) a 4- to 10-membered non-aryl heterocyclyl thio group
23) C_{6-10} aryl
24) 5- or 6-membered heteroaryl
25) a 4- to 10-membered non-aryl heterocycle
26) a C_{3-10} alicyclic carbonyl group
27) a C_{6-10} arylcarbonyl group
28) a 5- or 6-membered heteroarylcarbonyl group
29) a 4- to 10-membered non-aryl heterocyclyl carbonyl group
30) a 4- to 10-membered non-aryl heterocyclyl carbonylamino group
31) a C_{3-10} alicyclic sulfonyl group
32) a C_{6-10} arylsulfonyl group
33) a 5- or 6-membered heteroarylsulfonyl group
34) a 4- to 10-membered non-aryl heterocyclyl sulfonyl group
(wherein each substituent from 14) to 34) is optionally substituted with 1 to 5 of substituent group β or 1) a C_{1-6} alkyl group)
35) $-NR^{10a}R^{11a}$
36) $-SO_2-R^{10b}$
37) $-SO_2-NR^{10b}R^{11b}$

38) $-NR^{10c}-C(=O)R^{11c}$

39) $-NR^{10d}-C(=O)OR^{11d}$

40) $-NR^{12a}-C(=O)NR^{10e}R^{11e}$

41) $-NR^{10f}-C(=S)R^{11f}$

42) $-NR^{10g}-C(=S)OR^{11g}$,

43) $-NR^{12b}-C(=S)NR^{10h}R^{11h}$

44) $-NR^{10i}-SO_2-R^{11i}$

45) $-NR^{12c}-SO_2-NR^{10j}R^{11j}$

46) $-C(=O)OR^{10k}$

47) $-C(=O)NR^{10l}R^{11k}$

48) $-C(=O)NR^{10m}OR^{11l}$

49) $-C(=O)NR^{12d}-NR^{10n}R^{11m}$

50) $-C(=S)OR^{10o}$

51) $-C(=S)NR^{10p}R^{11n}$

52) $-C(=S)NR^{10q}OR^{11o}$

53) $-C(=S)NR^{12e}-NR^{10r}R^{11p}$

54) $-C(=NR^{13a})R^{10s}$

55) $-C(=NR^{13b})CHO$

56) $-C(=NR^{13c})NR^{10t}R^{11q}$

57) $-C(=NR^{13d})NR^{12f}-NR^{10u}R^{11r}$

58) $-NR^{17c}-C(=NR^{13k})R^{17d}$

59) $-NR^{12g}-C(=NR^{13e})-NR^{10v}R^{11s}$

60) $-NR^{14}-C(=NR^{13f})-NR^{12h}-NR^{10w}R^{11t}$

61) $-OC(=O)R^{10x}$

62) $-OC(=O)OR^{10y}$

63) $-OC(=O)NR^{10z1}R^{11u}$

64) $-NR^{12i}-NR^{10z2}R^{11v}$

65) $-NR^{10z3}OR^{11w}$

66) $-C(=N-OR^{13a})R^{10s}$

67) $-C(=N-OR^{13b})CHO$

68) $-C(=N-OR^{13c})NR^{10t}R^{11q}$

69) $-C(=N-OR^{13d})NR^{12f}-NR^{10u}R^{11r}$

70) $-C(=O)NR^{12j}-S(=O)_2-R^{10a1}$ and

71) $-C(=O)NR^{12k}-S(=O)_2-NR^{10a2}R^{11x}$,

substituent group β is a group consisting of

1) a halogen atom,

2) a hydroxyl group,
3) a carboxyl group,
4) a cyano group,
5) a C_{3-10} alicyclic group,
6) a C_{1-6} alkoxy group,
7) a C_{3-10} alicyclic oxy group,
8) a C_{1-6} alkylthio group,
9) a 5- or 6-membered heteroarylthio group,
10) C_{6-10} aryl,
11) 5- or 6-membered heteroaryl,
12) a 4- to 10-membered non-aryl heterocycle,
13) a C_{1-6} alkylcarbonyl group,
14) a C_{3-10} alicyclic carbonyl group,
15) a C_{6-10} arylcarbonyl group,
16) a 5- or 6-membered heteroarylcarbonyl group,
17) a 4- to 10-membered non-aryl heterocyclyl carbonyl group,
18) $-NR^{15a}R^{16a}$,
19) $-SO_2-NR^{15b}R^{16b}$,
20) $-NR^{15c}-C(=O)R^{16c}$
21) $-NR^{17a}-C(=O)NR^{15d}R^{16d}$,
22) $-C(=O)NR^{15e}R^{16e}$,
23) $-C(=NR^{13g})R^{15f}$,
24) $-C(=NR^{13h})NR^{15g}R^{16f}$
25) $-NR^{16g}-C(=NR^{13i})R^{15h}$
26) $-NR^{17b}-C(=NR^{13j})-NR^{15i}R^{16h}$
27) $-C(=N-OR^{13g})R^{15f}$, and
28) $-C(=N-OR^{13h})NR^{15g}R^{16f}$

(wherein each substituent from 5) to 17) in substituent group β is optionally substituted with 1 to 5 substituents selected from the group consisting of a halogen atom, a hydroxyl group, a cyano group, a carboxyl group, and $-NR^{18a}R^{18b}$),

R^{13a}, R^{13b}, R^{13c}, R^{13d}, R^{13e}, R^{13f}, R^{13g}, R^{13h}, R^{13i}, R^{13j}, and R^{13k} are the same or different, each independently a hydrogen atom, a hydroxyl group, a C_{1-6} alkyl group, or a

C_{1-6} alkoxy group,

R^{10a}, R^{10b}, R^{10c}, R^{10d}, R^{10e}, R^{10f}, R^{10g}, R^{10h}, R^{10i}, R^{10j}, R^{10k}, R^{10l}, R^{10m}, R^{10n}, R^{10o}, R^{10p}, R^{10q}, R^{10r}, R^{10s}, R^{10t}, R^{10u}, R^{10v}, R^{10w}, R^{10x}, R^{10y}, R^{10a1}, R^{10a2}, R^{10z1}, R^{10z2}, R^{10z3}, R^{11a}, R^{11b}, R^{11c}, R^{11d}, R^{11e}, R^{11f}, R^{11g}, R^{11h}, R^{11i}, R^{11j}, R^{11k}, R^{11l}, R^{11m}, R^{11n}, R^{11o}, R^{11p}, R^{11q}, R^{11r}, ^{11s}, R^{11t}, R^{11u}, R^{11v}, R^{11w}, R^{11x}, R^{12a}, R^{12b}, R^{12c}, R^{12d}, R^{12e}, R^{12f}, R^{12g}, R^{12h}, R^{12i}, R^{12j}, R^{12k}, R^{14}, R^{15a}, R^{15b}, R^{15c}, R^{15d}, R^{15e}, R^{15f}, R^{15g}, R^{15h}, R^{15i}, R^{16a}, R^{16b}, R^{16c}, R^{16d}, R^{16e}, R^{16f}, R^{16g}, R^{16h}, R^{17a}, R^{17b}, R^{17c}, and R^{17d} are the same or different, each independently a hydrogen atom, a 5- or 6-membered non-aryl heterocycle, or a C_{1-6} alkyl group (wherein the 5- or 6-membered non-aryl heterocycle and the C_{1-6} alkyl group are optionally substituted with 1 to 3 of the same or different substituents, each independently selected from the group consisting of a hydroxyl group, a cyano group, a C_{1-6} alkoxy group, $-NR^{18a}R^{18b}$, a carboxyl group, and $-C(=O)NR^{18c}R^{18d}$), and

R^{18a}, R^{18b}, R^{18c}, and R^{18d} are the same or different, each independently a hydrogen atom or a C_{1-6} alkyl group.

[0017]

Preferred examples of substituents in "optionally substituted" include the following substituents.

Preferred substituent group α includes

1) a halogen atom
2) a hydroxyl group
3) a carboxyl group
4) a cyano group
5) a C_{1-6} alkyl group
6) a C_{1-6} alkoxy group
7) a C_{1-6} alkylthio group
8) a C_{1-6} alkylcarbonyl group

(wherein each substituent from 5) to 8) is optionally substituted with 1 to 5 of the same or different substituents selected from substituent group β)

9) a C_{3-10} alicyclic group
10) a C_{3-10} alicyclic oxy group
11) a C_{6-10} aryloxy group

12) a 5- or 6-membered heteroaryloxy group
13) a 4- to 10-membered non-aryl heterocyclyl oxy group
14) a C_{3-10} alicyclic thio group
15) a C_{6-10} arylthio group
16) a 5- or 6-membered heteroarylthio group
17) a 4- to 10-membered non-aryl heterocyclyl thio group
18) C_{6-10} aryl
19) 5- or 6-membered heteroaryl
20) a 4- to 10-membered non-aryl heterocycle
21) a C_{3-10} alicyclic carbonyl group
22) a C_{6-10} arylcarbonyl group
23) a 5- or 6-membered heteroarylcarbonyl group
24) a 4- to 10-membered non-aryl heterocyclyl carbonyl group
(wherein each substituent from 9) to 24) is optionally substituted with 1 to 5 of substituent group β or 1) a C_{1-6} alkyl group)
25) $-NR^{10a}R^{11a}$
26) $-SO_2-NR^{10b}R^{11b}$
27) $-NR^{10c}-C(=O)R^{11c}$
28) $-NR^{12a}-C(=O)NR^{10d}R^{11d}$
29) $-NR^{10e}-SO_2-R^{11e}$
30) $-NR^{12b}-SO_2-NR^{10f}R^{11f}$
31) $-C(=O)NR^{10g}R^{11g}$
32) $-C(=NR^{13a})R^{10h}$
33) $-C(=NR^{13b})NR^{10i}R^{11h}$
34) $-NR^{11f}-C(=NR^{13c})R^{10g}$
35) $-NR^{12c}-C(=NR^{13d})-NR^{10j}R^{11i}$
36) $-C(=N-OR^{13a})R^{10h}$, and
37) $-C(=N-OR^{13b})NR^{10i}R^{11h}$,

substituent group β is preferably selected from the group consisting of
1) a halogen atom
2) a hydroxyl group
3) a cyano group
4) a C_{3-10} alicyclic group

5) a C_{1-6} alkoxy group
6) a C_{1-6} alkylthio group
7) a 5- or 6-membered heteroarylthio group
8) 5- or 6-membered heteroaryl
9) a 4- to 10-membered non-aryl heterocycle
10) a C_{1-6} alkylcarbonyl group
11) a C_{3-10} alicyclic carbonyl group
12) a C_{6-10} arylcarbonyl group
13) a 5- or 6-membered heteroarylcarbonyl group
14) a 4- to 10-membered non-aryl heterocyclyl carbonyl group
15) $-NR^{15a}R^{16a}$
16) $-NR^{15b}-C(=O)R^{16b}$
17) $-NR^{17a}-C(=O)NR^{15c}R^{16c}$
18) $-C(=O)NR^{15d}R^{16d}$
19) $-C(=NR^{13e})R^{15e}$
20) $-C(=NR^{13f})NR^{15f}R^{16e}$
21) $-NR^{16f}-C(=NR^{13g})R^{15g}$
22) $-NR^{17b}-C(=NR^{13h})-NR^{15h}R^{16g}$
23) $-C(=N-OR^{13e})R^{15e}$ and
24) $-C(=N-OR^{13f})NR^{15f}R^{16e}$

(wherein each substituent from 4) to 14) in substituent group β is optionally substituted with 1 to 5 substituents selected from the group consisting of a halogen atom, a hydroxyl group, a cyano group, a carboxyl group, and $-NR^{18a}R^{18b}$),

R^{13a}, R^{13b}, R^{13c}, R^{13d}, R^{13e}, R^{13f}, R^{13g}, and R^{13h} are the same or different, each independently a hydrogen atom, a hydroxyl group, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group,

R^{10a}, R^{10b}, R^{10c}, R^{10d}, R^{10e}, R^{10f}, R^{10g}, R^{10h}, R^{10i}, R^{10j}, R^{11a}, R^{11b}, R^{11c}, R^{11d}, R^{11e}, R^{11f}, R^{11g}, R^{11h}, R^{11i}, R^{12a}, R^{12b}, R^{12c}, R^{15a}, R^{15b}, R^{15c}, R^{15d}, R^{15e}, R^{15f}, R^{15g}, R^{15h}, R^{16a}, R^{16b}, R^{16c}, R^{16d}, R^{16e}, R^{16f}, R^{16g}, R^{17a}, and R^{17b} are the same or different, each independently a hydrogen atom or a C_{1-6} alkyl group (wherein the group is optionally substituted with 1 to 3 of the same or different substituents selected from a hydroxyl group, a

cyano group, C_{1-6} alkoxy group, and $-NR^{18a}R^{18b}$), and

R^{18a} and R^{18b} are the same or different, each independently a hydrogen atom or a C_{1-6} alkyl group.

[0018]

More preferred examples of substituents in "optionally substituted" include the following substituents.

More preferred substituent group α includes

1) a halogen atom
2) a hydroxyl group
3) a cyano group
4) a C_{1-6} alkyl group
5) a C_{1-6} alkoxy group
6) a C_{1-6} alkylthio group
7) a C_{1-6} alkylcarbonyl group

(wherein each substituent from 4) to 7) is optionally substituted with 1 to 5 of the same or different substituents selected from substituent group β)

8) a 5- or 6-membered heteroaryloxy group
9) a 4- to 10-membered non-aryl heterocyclyl oxy group
10) a 5- or 6-membered heteroarylthio group
11) a 4- to 10-membered non-aryl heterocyclyl thio group
12) C_{6-10} aryl
13) 5- or 6-membered heteroaryl
14) a 4- to 10-membered non-aryl heterocycle

(wherein each substituent from 4) to 14) is optionally substituted with 1 to 5 of substituent group β or 1) a C_{1-6} alkyl group)

15) $-NR^{10a}R^{11a}$
16) $-NR^{11b}-C(=O)R^{10b}$
17) $-NR^{12a}-C(=O)NR^{10c}R^{11c}$
18) $-C(=O)NR^{10d}R^{11d}$
19) $-C(=NR^{13a})R^{10e}$
20) $-C(=NR^{13b})NR^{10f}R^{11e}$
21) $-NR^{11f}-C(=NR^{13c})R^{10g}$
22) $-NR^{12b}-C(=NR^{13d})-NR^{10h}R^{11g}$
23) $-C(=N-OR^{13a})R^{10e}$ and

24) $-C(=N-OR^{13b})NR^{10f}R^{11e}$,

substituent group β is more preferably

1) a halogen atom,

2) a hydroxyl group,

3) a cyano group,

4) $-NR^{15a}R^{16a}$,

5) $-NR^{15b}-C(=O)R^{16b}$,

6) $-NR^{17a}-C(=O)NR^{15c}R^{16c}$,

7) $-C(=O)NR^{15d}R^{16d}$,

8) $-C(=NR^{13e})R^{15e}$,

9) $-C(=NR^{13f})NR^{15f}R^{16e}$,

10) $-NR^{16f}-C(=NR^{13g})R^{15g}$,

11) $-NR^{17b}-C(=NR^{13h})-NR^{15h}R^{16g}$

12) $-C(=N-OR^{13e})R^{15e}$, or

13) $-C(=N-OR^{13f})NR^{15f}R^{16e}$,

R^{13a}, R^{13b}, R^{13c}, R^{13d}, R^{13e}, R^{13f}, R^{13g}, and R^{13h} are the same or different, each independently a hydrogen atom, a hydroxyl group, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group,

R^{10a}, R^{10b}, R^{10c}, R^{10d}, R^{10e}, R^{10f}, R^{10g}, R^{10h}, R^{11a}, R^{11b}, R^{11c}, R^{11d}, R^{11e}, R^{11f}, R^{11g}, R^{12a}, R^{12b}, R^{15a}, R^{15b}, R^{15c}, R^{15d}, R^{15e}, R^{15f}, R^{15g}, R^{15h}, R^{16a}, R^{16b}, R^{16c}, R^{16d}, R^{16e}, R^{16f}, R^{16g}, R^{17a}, and R^{17b} are the same or different, each independently a hydrogen atom or a C_{1-6} alkyl group (wherein the group is optionally substituted with 1 to 3 of the same or different substituents selected from a hydroxyl group, a cyano group, a C_{1-6} alkoxy group, and $-NR^{18a}R^{18b}$), and

R^{18a} and R^{18b} are the same or different, each independently a hydrogen atom or a C_{1-6} alkyl group.

[0019]

"C_{1-6}" means that the number of carbon atoms is 1 to 6. The same applies to other numbers. For example, "C_{1-4}" means that the number of carbon atoms is 1 to 4.

[0020]

A "heteroatom" refers to an oxygen atom, a nitrogen atom, a sulfur atom, or the like.

[0021]

A "halogen atom" refers to a fluorine atom, chlorine atom, bromine atom, or iodine atom, preferably a fluorine atom or chlorine atom, and still more preferably a fluorine atom. A "halogen atom" is also referred to as "halogen".

[0022]

"C_{1-6} alkyl group" refers to a linear or branched saturated hydrocarbon group with 1 to 6 carbon atoms. "C_{1-6} alkyl group" is preferably a "C_{1-4} alkyl group", more preferably a "C_{1-3} alkyl group", and still more preferably a "C_{1-2} alkyl group". Specific examples of "C_{1-6} alkyl group" include, but are not limited to, methyl, ethyl, propyl, butyl, isopropyl, isobutyl, tert-butyl, sec-butyl, isopentyl, neopentyl, tert-pentyl, 1,2-dimethylpropyl, and the like.

[0023]

"C_{2-6} alkenyl group" refers to a linear or branched unsaturated hydrocarbon group with 2 to 6 carbon atoms, comprising one or more carbon-carbon double bonds. "C_{2-6} alkenyl group" is preferably a "C_{2-4} alkenyl group". Specific examples of "C_{2-6} alkenyl group" include, but are not limited to, a vinyl group, 1-propylenyl group, 2-propylenyl group, 1-butenyl group, 2-butenyl group, 3-butenyl group, 2-methyl-1-propylenyl group, 2-methyl-2-propylenyl group, and the like.

[0024]

"C_{2-6} alkynyl group" refers to a linear or branched unsaturated aliphatic hydrocarbon group comprising one or more carbon-carbon triple bonds. "C_{2-6} alkynyl group" is preferably a "C_{2-4} alkynyl group". Specific examples thereof include, but are not limited to, an ethynyl group, 1-propynyl group, 2-propynyl group, 1-butynyl group, 1-methyl-2-propynyl group, 3-butynyl group, 1-pentynyl group, 1-hexynyl group, and the like.

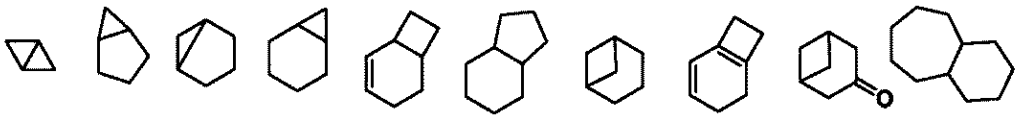
[0025]

"C_{3-20} alicyclic group" refers to a monocyclic or bicyclic non-aromatic hydrocarbon ring with 3 to 20 carbon

atoms, including those with a partially unsaturated bond, those with a partially crosslinked structure, those that have a partially spiro form, and those having 1 or 2 carbonyl structures. "Alicyclic group" encompasses cycloalkyl groups, cycloalkenyl groups, and cycloalkynyl groups. "C_{3-20} alicyclic group" is preferably a "C_{3-10} alicyclic group", and more preferably a "C_{3-6} alicyclic group". Specific examples of "C_{3-20} alicyclic group" include, but are not limited to, a cyclopropyl group, cyclobutyl group, cyclopentyl group, cyclohexyl group, cycloheptyl group, cyclooctyl group, cyclohexadinyl group, cycloheptadinyl group, cyclooctadinyl group, adamantyl, norbornyl, and the like.

Specific examples of "C_{3-20} alicyclic group" with a partially crosslinked structure include, but are not limited to, those with a structure shown below and the like.

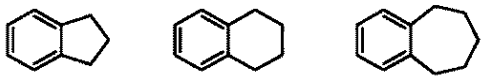
[Chemical Formula 618]



[0026]

"C_{3-20} alicyclic group" also encompasses compounds fused to an aromatic ring. Specific examples thereof include the groups represented by the following and the like.

[Chemical Formula 619]



[0027]

"C_{3-10} alicyclic group" refers to the "C_{3-20} alicyclic group" described above wherein the "C_{3-10} alicyclic group" is a monovalent group.

[0028]

"C_{6-10} aryl" refers to a monocyclic or bicyclic aromatic hydrocarbon ring with 6 to 10 carbon atoms. Specific examples thereof include a phenyl group, 1-naphthyl group, 2-naphthyl group, and the like. Preferred C_{6-10} aryl

includes C_6 aryl and C_{10} aryl.

[0029]

"5- or 6-membered heteroaryl" refers to a monocyclic aromatic heterocycle consisting of 5 to 6 atoms, comprising 1 to 4 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom.

[0030]

"5- to 10-membered heteroaryl" refers to a monocyclic or bicyclic aromatic heterocycle consisting of 5 to 10 atoms, comprising 1 to 4 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom.

[0031]

"9- or 10-membered heteroaryl" refers to a bicyclic aromatic heterocycle consisting of 9 to 10 atoms, comprising 1 to 4 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom.

[0032]

"5- or 6-membered nitrogen-containing heteroaryl" refers to a monocyclic aromatic heterocycle consisting of 5 to 6 atoms, comprising 0 to 3 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom, in addition to 1 nitrogen atom.

[0033]

Specific examples of "6-membered heteroaryl" include, but are not limited to, pyridine, pyridazine, pyrimidine, pyrazine, and the like.

[0034]

Specific examples of "5-membered heteroaryl" include, but are not limited to, thiophene, pyrrole, thiazole, isothiazole, pyrazole, imidazole, furan, oxazole, isoxazole, oxadiazole, thiadiazole, triazole, tetrazole, and the like. 5-membered heteroaryl is preferably triazole, tetrazole, or

thiadiazole, and more preferably thiadiazole.

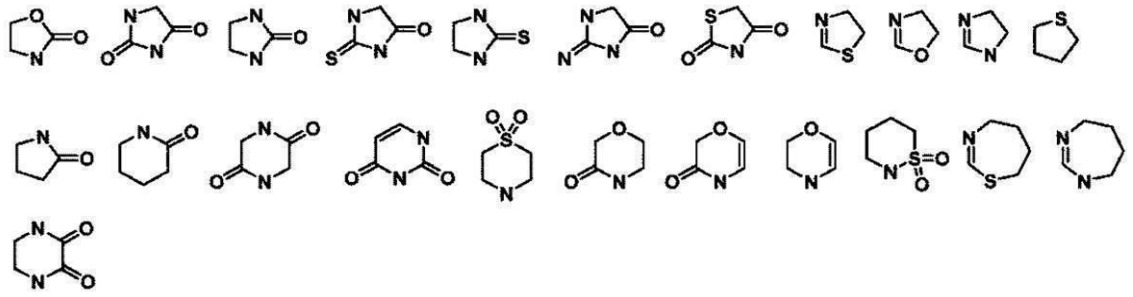
[0035]

Specific examples of "5- or 6-membered heteroaryl" include the specific examples for "5-membered heteroaryl" and "6-membered heteroaryl" described above.

[0036]

"4- to 20-membered non-aryl heterocycle" refers to a monocyclic or bicyclic non-aromatic heterocycle comprised of 4 to 20 atoms, comprising 1 to 2 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom, including those with a partially unsaturated bond, those with a partially crosslinked structure, and those that have a partially spiro form. A non-aryl heterocycle may form a fused ring with aryl or heteroaryl. When fused to, for example, C_{6-10} aryl or 5- or 6-membered heteroaryl, such a heterocycle is still encompassed by a heterocycle. Such a heterocycle may comprise 1 or 2 carbonyl, thiocarbonyl, sulfinyl, or sulfonyl to make up the non-aryl heterocycle. For example, lactam, thiolactam, lactone, thiolactone, cyclic imide, cyclic carbamate, cyclic thiocarbamate, and other cyclic groups are also encompassed by said non-aryl heterocycle. In this regard, oxygen atoms of carbonyl, sulfinyl, and sulfonyl and sulfur atoms of thiocarbonyl are not included in the number of 4 to 20 members (size of ring) or the number of heteroatoms constituting the ring. Specific examples of "4- to 20-membered non-aryl heterocycle" include, but are not limited to, azetidine, pyrrolidine, piperidine, piperazine, morpholine, homopiperidine, oxetane, tetrahydrofuran, tetrahydropyran, and the like, those with a structure shown below, and the like.

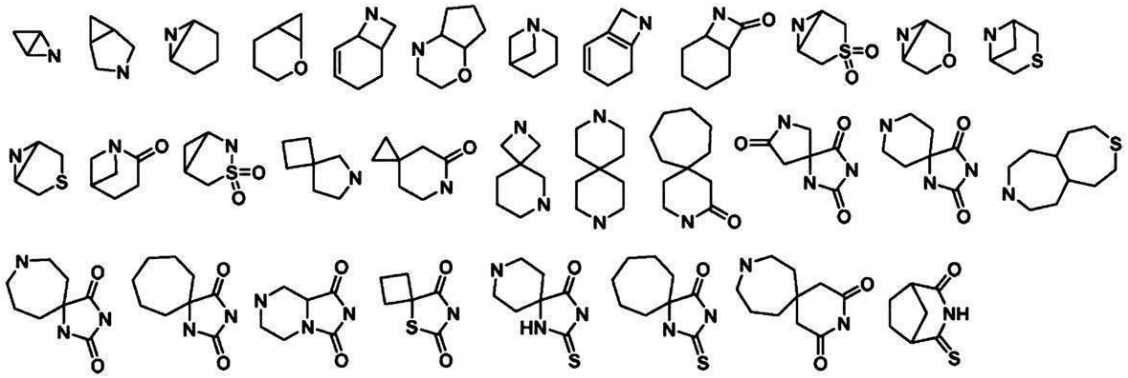
[Chemical Formula 620]



[0037]

Specific examples of "4- to 20-membered non-aryl heterocycle" with partial crosslinking or spiro structure include, but are not limited to, those with a structure shown below and the like.

[Chemical Formula 621]



[0038]

"4- to 20-membered nitrogen-containing non-aryl heterocycle" refers to a monocyclic or bicyclic non-aromatic heterocycle comprised of 4 to 20 atoms, comprising 0 or 1 of the same or different heteroatoms selected from the group consisting of an oxygen atom, a nitrogen atom, and a sulfur atom, in addition to 1 nitrogen atom, including those with a partially unsaturated bond, those with a partially crosslinked structure, and those that have a partially spiro form.

[0039]

"4- to 10-membered non-aryl heterocycle" refers to the "4- to 20-membered non-aryl heterocycle" described above wherein "4- to 10-membered non-aryl heterocycle" is a

monovalent group.

[0040]

"4- to 10-membered nitrogen-containing non-aryl heterocycle" refers to the "4- to 20-membered nitrogen-containing non-aryl heterocycle" wherein the "4- to 10-membered nitrogen-containing non-aryl heterocycle" is a monovalent group.

[0041]

"5- to 7-membered non-aryl heterocycle" refers to the "4- to 20-membered non-aryl heterocycle" described above wherein "5- to 7-membered non-aryl heterocycle" is a monovalent group.

[0042]

"4- to 7-membered non-aryl heterocycle" refers to the "4- to 20-membered non-aryl heterocycle" described above wherein "4- to 7-membered non-aryl heterocycle" is a monovalent group.

[0043]

Specific examples of "4-membered non-aryl heterocycle" include, but are not limited to, azetidine, oxetane, thietane, and the like.

[0044]

Specific examples of "4-membered non-aryl heterocycle" with a partially unsaturated bond include, but are not limited to, those with a structure shown below and the like.

[Chemical Formula 622]



[0045]

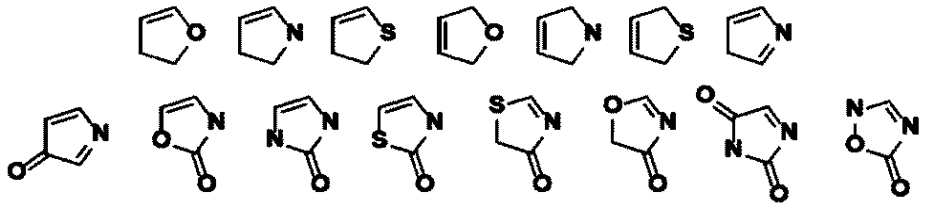
Specific examples of "5-membered non-aryl heterocycle" include, but are not limited to, pyrrolidine, pyrrolidone, oxazolidinone, tetrahydrofuran, tetrahydrothiophene, and the like.

[0046]

Specific examples of "5-membered non-aryl heterocycle" with a partially unsaturated bond include, but are not

limited to, those with a structure shown below and the like.

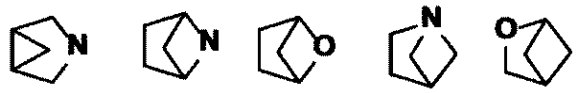
[Chemical Formula 623]



[0047]

Specific examples of "5-membered non-aryl heterocycle" with a partially crosslinked structure include, but are not limited to, those with a structure shown below and the like.

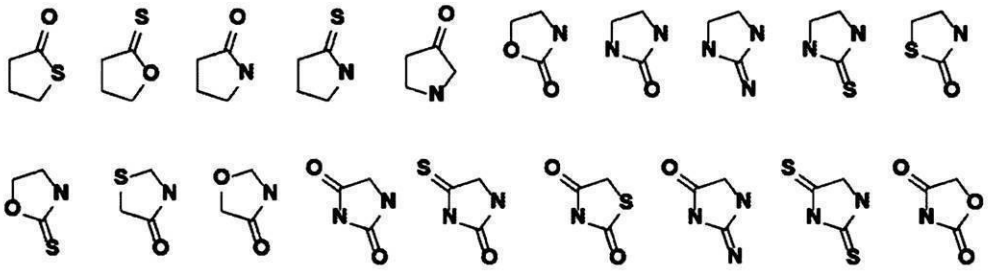
[Chemical Formula 624]



[0048]

Specific examples of "5-membered non-aryl heterocycle" comprising carbonyl, thiocarbonyl, or the like include, but are not limited to, those with a structure shown below and the like.

[Chemical Formula 625]



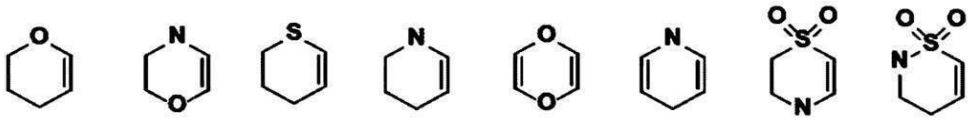
[0049]

Specific examples of "6-membered non-aryl heterocycle" include, but are not limited to, piperidine, piperazine, morpholine, tetrahydropyran, tetrahydrothiopyran, and the like.

[0050]

Specific examples of "6-membered non-aryl heterocycle" with a partially unsaturated bond include, but are not limited to, those with a structure shown below and the like.

[Chemical Formula 626]



[0051]

Specific examples of "6-membered non-aryl heterocycle" with a partially crosslinked structure include, but are not limited to, those with a structure shown below and the like.

[Chemical Formula 627]



[0052]

"C_{1-6} alkoxy group" refers to a "C_{1-6} alkyloxy group", and the C_{1-6} alkyl moiety is defined the same as the C_{1-6} alkyl group described above. "C_{1-6} alkoxy group" is preferably a "C_{1-4} alkoxy group", more preferably a "C_{1-3} alkoxy group", and still more preferably a "C_{1-2} alkoxy group". Specific examples of "C_{1-6} alkoxy group" include, but are not limited to, a methoxy group, ethoxy group, propoxy group, butoxy group, isopropoxy group, isobutoxy group, tert-butoxy group, sec-butoxy group, isopentyloxy group, neopentyloxy group, tert-pentyloxy group, 1,2-dimethylpropoxy group, and the like.

[0053]

"C_{3-10} alicyclic oxy group" refers to a (C_{3-10} alicyclic group)-O-group, and the C_{3-10} alicyclic moiety is defined the same as a C_{3-10} alicyclic group. "C_{3-6} alicyclic oxy group" refers to a (C_{3-6} alicyclic group)-O-group, and the C_{3-6} alicyclic moiety is defined the same as a C_{3-6} alicyclic group. "C_{3-6} alicyclic oxy group" is preferably a "C_{3-5} alicyclic oxy group". Specific examples of "C_{3-6} alicyclic oxy group" include, but are not limited to, a cyclopropyloxy group, cyclobutyloxy group, cyclopentyloxy group, cyclohexyloxy group, and the like.

[0054]

The C_{6-10} aryl moiety of a "C_{6-10} aryloxy group" is defined the same as the C_{6-10} aryl described above. "C_{6-10} aryloxy group" is preferably a "C_6 or C_{10} aryloxy group". Specific examples of "C_{6-10} aryloxy group" include, but are not limited to, a phenoxy group, 1-naphthyloxy group, 2-naphthyloxy group, and the like.

[0055]

The 5- or 6-membered heteroaryl moiety of "5- or 6-membered heteroaryloxy group" is defined the same as the "5-membered heteroaryl" or "6-membered heteroaryl" described above. Specific examples of "5- or 6-membered heteroaryloxy group" include, but are not limited to, a pyrazoyloxy group, triazoyloxy group, thiazoyloxy group, thiadiazoyloxy group, pyridyloxy group, pyridazoyloxy group, and the like.

[0056]

The 4- to 10-membered non-aryl heterocycle moiety of "4- to 10-membered non-aryl heterocyclyl oxy group" is defined the same as the "4- to 10-membered non-aryl heterocycle" described above. "4- to 10-membered non-aryl heterocyclyl oxy group" is preferably a "4- to 6-membered non-aryl heterocyclyl oxy group". Specific examples of "4- to 10-membered non-aryl heterocyclyl oxy group" include, but are not limited to, a tetrahydrofuranyloxy group, tetrahydropyranyloxy group, azetidinyloxy group, pyrrolidinyloxy group, piperidinyloxy group, and the like.

[0057]

The C_{1-6} alkyl moiety of "C_{1-6} alkylthio group" is defined the same as the C_{1-6} alkyl described above. "C_{1-6} alkylthio group" is preferably a "C_{1-4} alkylthio group", and more preferably a "C_{1-3} alkylthio group". Specific examples of "C_{1-6} alkylthio group" include, but are not limited to, a methylthio group, ethylthio group, propylthio group, butylthio group, isopropylthio group, isobutylthio group, tert-butylthio group, sec-butylthio group, isopentylthio group, neopentylthio group, tert-pentylthio group, 1,2-

dimethylpropylthio group, and the like.

[0058]

"C_{3-10} alicyclic thio group" refers to a (C_{3-10} alicyclic group)-S-group, and the C_{3-10} alicyclic moiety is defined the same as the C_{3-10} alicyclic group described above. "C_{3-10} alicyclic thio group" is preferably a "C_{3-6} alicyclic thio group". Specific examples of "C_{3-6} alicyclic thio group" include, but are not limited to, a cyclopropylthio group, cyclobutylthio group, cyclopentylthio group, cyclohexylthio group, and the like.

[0059]

The C_{6-10} aryl moiety of "C_{6-10} arylthio group" is defined the same as the C_{6-10} aryl described above. "C_{6-10} arylthio group" is preferably a "C_6 or C_{10} arylthio group". Specific examples of "C_{6-10} aryloxy group" include, but are not limited to, a phenylthio group, 1-naphthylthio group, 2-naphthylthio group, and the like.

[0060]

The 5- or 6-membered heteroaryl moiety of "5- or 6-membered heteroarylthio group" is defined the same as the "5-membered heteroaryl" or "6-membered heteroaryl" described above. Specific examples of "5- or 6-membered heteroarylthio group" include, but are not limited to, a pyrazoylthio group, triazoylthio group, thiazoylthio group, thiadiazoylthio group, pyridylthio group, pyridazoylthio group, and the like.

[0061]

The 4- to 10-membered non-aryl heterocycle moiety of "4- to 10-membered non-aryl heterocyclyl thio group" is defined the same as the "4- to 10-membered non-aryl heterocycle" described above. "4- to 10-membered non-aryl heterocyclyl thio group" is preferably a "4- to 6-membered non-aryl heterocyclyl thio group". Specific examples of "4- to 10-membered non-aryl heterocyclyl thio group" include, but are not limited to, a tetrahydropyranylthio group, piperidinylthio group, and the like.

[0062]

"C_{1-6} alkylcarbonyl group" refers to a carbonyl group substituted with the "C_{1-6} alkyl group" described above. "C_{1-6} alkylcarbonyl group" is preferably a "C_{1-4} alkylcarbonyl group". Specific examples of "C_{1-6} alkylcarbonyl group" include, but are not limited to, an acetyl group, propionyl group, butyryl group, and the like.

[0063]

"C_{3-10} alicyclic carbonyl group" refers to a carbonyl group substituted with the "C_{3-10} alicyclic group" described above. "C_{3-10} alicyclic carbonyl group" is preferably a "C_{3-6} alicyclic carbonyl group". Specific examples of "C_{3-10} alicyclic carbonyl group" include, but are not limited to, a cyclopropylcarbonyl group, cyclopentylcarbonyl group, and the like.

[0064]

"C_{6-10} arylcarbonyl group" refers to a carbonyl group substituted with the "C_{6-10} aryl" described above. "C_{6-10} arylcarbonyl group" is preferably a "C_6 or C_{10} arylcarbonyl group". Specific examples of "C_{6-10} arylcarbonyl group" include, but are not limited to, a benzoyl group, 1-naphthylcarbonyl group, 2-naphthylcarbonyl group, and the like.

[0065]

"5- or 6-membered heteroarylcarbonyl group" refers to a carbonyl group substituted with the "5- or 6-membered heteroaryl" described above. Specific examples of "5- or 6-membered heteroarylcarbonyl group" include, but are not limited to, a pyrazoylcarbonyl group, triazoylcarbonyl group, thiazoylcarbonyl group, thiadiazoylcarbonyl group, pyridylcarbonyl group, pyridazoylcarbonyl group, and the like.

[0066]

"4- to 10-membered non-aryl heterocyclyl carbonyl group" refers to a carbonyl group substituted with the "4- to 10-membered non-aryl heterocycle" described above. "4-

to 10-membered non-aryl heterocyclyl carbonyl group" is preferably a "4- to 6-membered non-aryl heterocyclyl carbonyl group". Specific examples of "4- to 10-membered non-aryl heterocyclyl carbonyl group" include, but are not limited to, an azetidinylcarbonyl group, pyrrolidinylcarbonyl group, piperidinylcarbonyl group, morpholinylcarbonyl group, and the like.

[0067]

"C_{1-6} alkylsulfonyl group" refers to a sulfonyl group substituted with the "C_{1-6} alkyl group" described above. "C_{1-6} alkylsulfonyl group" is preferably a "C_{1-4} alkylsulfonyl group". Specific examples of "C_{1-6} alkylsulfonyl group" include, but are not limited to, a methylsulfonyl group, propionylsulfonyl group, butyrylsulfonyl group, and the like.

[0068]

"C_{3-10} alicyclic sulfonyl group" refers to a sulfonyl group substituted with the "C_{3-10} alicyclic group" described above. "C_{3-10} alicyclic sulfonyl group" is preferably a "C_{3-6} alicyclic sulfonyl group". Specific examples of "C_{3-10} alicyclic sulfonyl group" include, but are not limited to, a cyclopropylsulfonyl group, cyclobutylsulfonyl group, cyclopentylsulfonyl group, cyclohexylsulfonyl group, and the like.

[0069]

"C_{6-10} arylsulfonyl group" refers to a sulfonyl group substituted with the "C_{6-10} aryl" described above. "C_{6-10} arylsulfonyl group" is preferably a "C_6 or C_{10} arylsulfonyl group". Specific examples of "C_{6-10} arylsulfonyl group" include, but are not limited to, a phenylsulfonyl group, 1-naphthylsulfonyl group, 2-naphthylsulfonyl group, and the like.

[0070]

"5- or 6-membered heteroarylsulfonyl group" refers to a sulfonyl group substituted with the "5- or 6-membered heteroaryl" described above. Specific examples of "5- or 6-

membered heteroarylsulfonyl group" include a pyrazoylsulfonyl group, triazoylsulfonyl group, thiazoylsulfonyl group, thiadiazoylsulfonyl group, pyridylsulfonyl group, pyridazoylsulfonyl group, and the like.

[0071]

"C_{1-6} alkylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from saturated hydrocarbon with 1 to 6 carbon atoms. "C_{1-3} alkylene group" and "C_{2-4} alkylene group" refer to substituents that are divalent groups due to removing two hydrogen atoms from saturated hydrocarbon with 1 to 3 carbon atoms and 2 to 4 carbon atoms, respectively.

[0072]

"C_{3-10} cycloalkylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from saturated cyclic hydrocarbon with 3 to 10 carbon atoms. "C_{3-6} cycloalkylene group" and "C_{4-6} cycloalkylene group" refer to substituents that are divalent groups due to removing two hydrogen atoms from saturated cyclic hydrocarbon with 3 to 6 carbon atoms and 4 to 6 carbon atoms, respectively.

[0073]

"C_{6-10} arylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from aromatic hydrocarbon with 6 to 10 carbon atoms. "C_6 arylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from aromatic hydrocarbon with 6 carbon atoms.

[0074]

"5- or 6-membered heteroarylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from a 5- or 6-membered heteroaryl ring. "5-membered heteroarylene group" and "6-membered heteroarylene group" refer to substituents that are divalent groups due to removing two hydrogen atoms from 5-membered and 6-

membered heteroaryl rings, respectively.

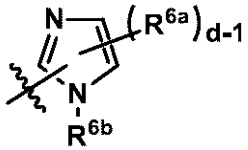
[0075]

"4- to 10-membered non-aryl heterocyclylene group" refers to a substituent that is a divalent group due to removing two hydrogen atoms from a 4- to 10-membered non-aryl heterocycle. "4- to 5-membered non-aryl heterocyclylene group" and "4- to 6-membered non-aryl heterocyclylene group" refer to substituents that are divalent groups due to removing two hydrogen atoms from 4- to 5-membered and 4- to 6-membered non-aryl heterocycles, respectively.

[0076]

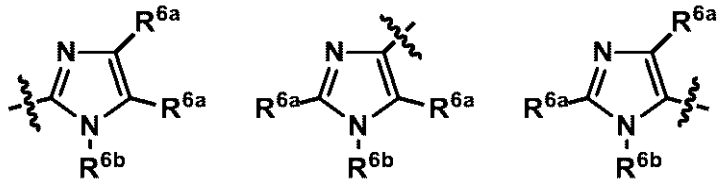
A bond intersecting a wavy line in the description of a specific structure of R^5 indicates a bond with L^4. A bond intersecting a bond between ring atoms means that there are variables (e.g., R^{6a}, R^{7a}, and the like) at each of the substitutable positions on a monocycle or fused polycycle including the ring atoms. For example, for a monocyclic 5-membered ring (heteroaryl),

[Chemical Formula 628]



(wherein d is 3) is one of

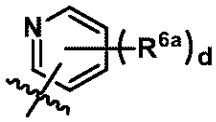
[Chemical Formula 629]



, and

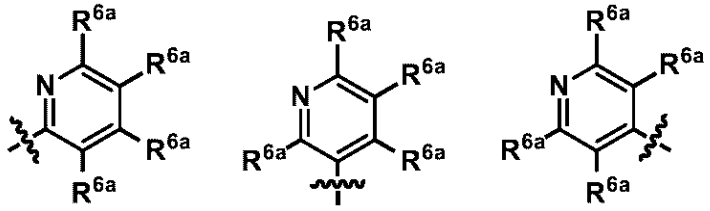
L^4 attaches to a ring carbon atom of the 5-membered ring. For example, for a monocyclic 6-membered ring (heteroaryl),

[Chemical Formula 630]



(wherein d is 4) is one of

[Chemical Formula 631]

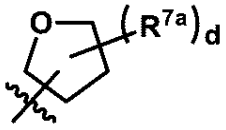


, and

L^4 attaches to a ring carbon atom of the 6-membered ring.

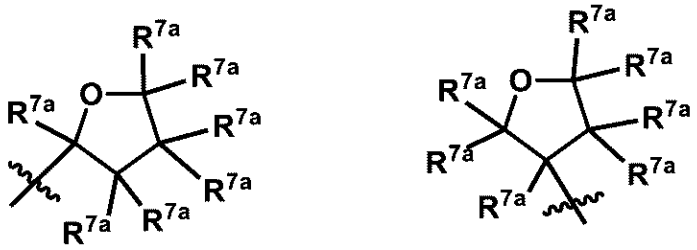
Alternatively, for example, for a monocyclic 5-membered ring (non-aryl heterocycle),

[Chemical Formula 632]



(wherein d is 7) is one of

[Chemical Formula 633]

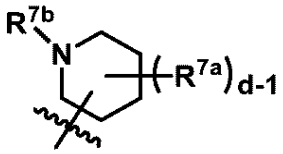


, and

L^4 attaches to a ring carbon atom of the 5-membered ring.

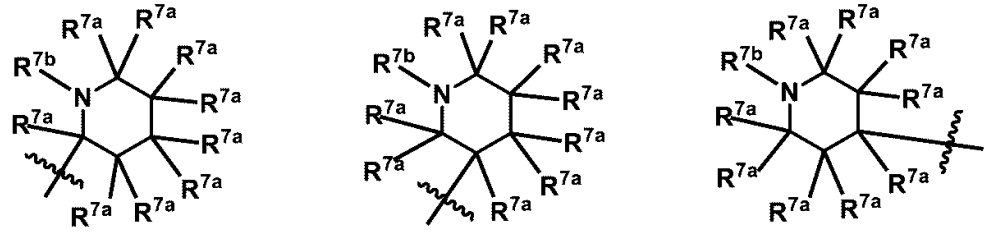
For example, for a monocyclic 6-membered ring (non-aryl heterocycle),

[Chemical Formula 634]



(wherein d is 10) is one of

[Chemical Formula 635]



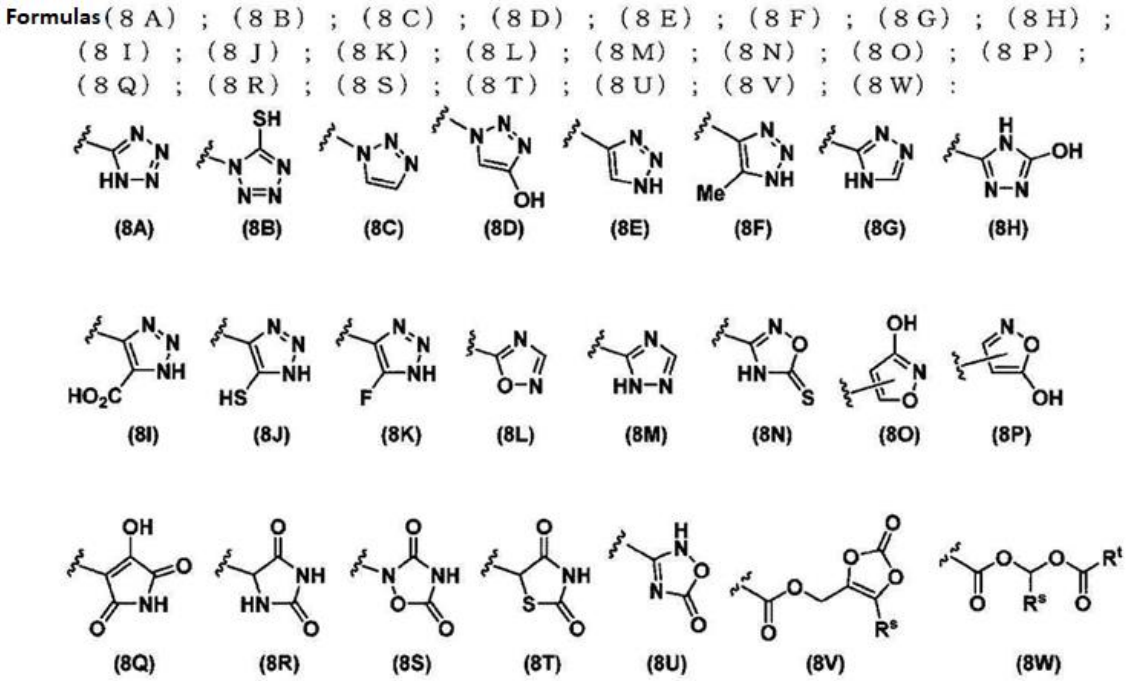
, and L^4 attaches to a ring carbon atom of the 6-membered ring.

Subscript d is the number of substitutable positions on a ring of R^5, but is a number of substitutable positions excluding the attachment position to L^4.

[0077]

"Bioisostere" refers to another partial structure (functional group) serving the same biological role as a group (e.g., carboxyl group) in a drug molecule (prodrug structures are also encompassed as a concept of a bioisostere in the present invention). "Carboxylic acid isostere" refers to a bioisostere of carboxylic acid. Examples of the carboxylic acid isostere include, but are not limited to, $-SO_3H$, $-SO_2NHR^{19a}$, $-B(OR^{m1})_2$, $-PO(OR^{m1})(OR^{m2})$, $-CONHR^{19a}$, $-CONHSO_2R^{19a}$, $-CONR^{19a}CN$, $-CONHNHSO_2R^{19a}$, and substituents represented by the formulas (8A), (8B), (8C), (8D), (8E), (8F), (8G), (8H), (8I), (8J), (8K), (8L), (8M), (8N), (8O), (8P), (8Q), (8R), (8S), (8T), (8U), (8V), and (8W) described below (each of the substituents is further optionally substituted with 1 to 3 of the same or different R^{19b} at a chemical substitutable position),

[Chemical Formula 636]



wherein [in (8V) and (8W),

R^s is a hydrogen atom, a C_{1-6} alkyl group, or a C_{3-10} alicyclic group (wherein the C_{1-6} alkyl group or C_{3-10} alicyclic group is optionally substituted with 1 to 5 halogen atoms),

R^t is a hydrogen atom, a C_{1-6} alkyl group, a C_{1-6} alkoxy group, (wherein the C_{1-6} alkyl group or C_{1-6} alkoxy group is optionally substituted with 1 to 5 halogen atoms), a C_{3-10} alicyclic group, a C_{3-10} alicyclic oxy group, a phenyl group, a phenoxy group, a pyridyl group, or a pyridyloxy group, (wherein the C_{3-10} alicyclic group, C_{3-10} alicyclic oxy group, phenyl group, phenoxy group, pyridyl group, or pyridyloxy group is optionally substituted with 1 to 5 substituents selected from the group consisting of a halogen atom, a C_{1-6} alkyl group, and a C_{1-6} alkoxy group)],

R^{19a} and R^{19b} are the same or different, each independently representing a hydrogen atom, a hydroxyl group, a C_{1-6} alkyl group, C_{6-10} aryl, 5- or 6-membered heteroaryl, or a 4- to 10-membered non-aryl heterocycle,

R^{m1} represents

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl, or
6) a 4- to 10-membered non-aryl heterocycle,
(wherein each substituent from 2) to 6) is optionally substituted),

wherein if R^{m1} is attached to a boron atom via an oxygen atom, two R^{m1}, as C_{2-4} alkylene, together with the boron atom and two oxygen atoms, may form a 5- to 7-membered non-aryl heterocycle (wherein an alkylene moiety is optionally substituted in the non-aryl heterocycle), and

R^{m2} represents a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group,

wherein, preferably,

R^s is a hydrogen atom or a C_{1-6} alkyl group, and

R^t is a hydrogen atom, a C_{1-6} alkyl group, a C_{1-6} alkoxy group, a C_{3-10} alicyclic group, or a C_{3-10} alicyclic oxy group,

or alternatively preferably,

R^{19a} and R^{19b} are the same or different, each independently a hydrogen atom, a hydroxyl group, or a C_{1-6} alkyl group,

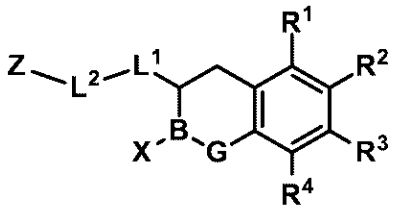
or also preferably

R^{m1} and R^{m2} are the same or different, each independently a hydrogen atom, a C_{1-6} alkyl group, or a C_{3-10} alicyclic group.

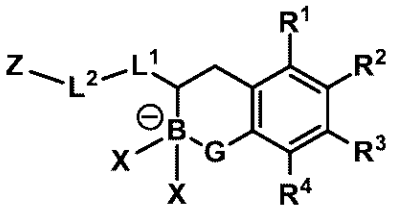
[0078]

An exemplary embodiment of the compounds of the invention is a compound represented by formula (1a) or (1b):

[Chemical Formula 637]



(1a)



(1b)

or a pharmaceutically acceptable salt thereof,

wherein

G is an oxygen atom, a sulfur atom, or $-NR^{a1}-$,

X is a hydroxyl group, an optionally substituted C_{1-6} alkoxy group, or $-NR^{a2}R^{b1}$,

R^{a1}, R^{a2}, and R^{b1} are the same or different, each independently

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl

5) 5- or 6-membered heteroaryl,

6) a 4- to 10-membered non-aryl heterocycle,

7) a C_{1-6} alkylcarbonyl group,

8) a C_{3-10} alicyclic carbonyl group,

9) a C_{6-10} arylcarbonyl group,

10) a 5- or 6-membered heteroarylcarbonyl group,

11) a C_{1-6} alkylsulfonyl group,

12) a C_{3-10} alicyclic sulfonyl group,

13) a C_{6-10} arylsulfonyl group,

14) a 5- or 6-membered heteroarylsulfonyl group, or

15)- OR^{c1},

(wherein each substituent from 2) to 14) is optionally substituted),

wherein R^{a2} and R^{b1} together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{c1} is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl, or
6) a 4- to 10-membered non-aryl heterocycle,
(wherein each substituent from 2) to 6) is optionally substituted),

L^1 is a single bond, an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-NR^d-$, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

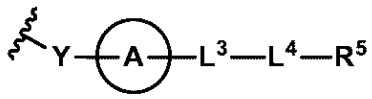
L^2 is a single bond or an optionally substituted C_{1-6} alkylene group,

Z is
1) a hydrogen atom,
2) a hydroxyl group,
3) a cyano group,
4) a carboxyl group,
5) a C_{3-10} alicyclic group,
6) C_{6-10} aryl,
7) 5- or 6-membered heteroaryl,
8) a 4- to 10-membered non-aryl heterocycle,
9) a C_{1-6} alkoxy group,
10) a C_{3-10} alicyclic oxy group,
11) a C_{6-10} aryloxy group,
12) a 5- or 6-membered heteroaryloxy group,
13) a 4- to 10-membered non-aryl heterocyclyl oxy group,
14) a C_{1-6} alkylthio group,
15) a C_{3-10} alicyclic thio group,
16) a C_{6-10} arylthio group,
17) a 5- or 6-membered heteroarylthio group,
18) a 4- to 10-membered non-aryl heterocyclyl thio group,
(wherein each substituent from 5) to 18) is optionally substituted),
19) $-SO_2-NR^{e1}R^{f1}$,
20) $-NR^{e1}-C(=O)OR^{f1}$,
21) $-NR^{g1}-C(=O)NR^{e1}R^{f1}$,
22) $-NR^{e1}-C(=S)R^{f1}$,

23) $-NR^{e1}-C(=S)OR^{f1}$,
24) $-NR^{g1}-C(=S)NR^{e1}R^{f1}$,
25) $-NR^{g1}-CR^{e1}(=NR^{f1})$,
26) $-NR^{g1}-CR^{e1}(=N-OR^{f1})$,
27) $-NR^{h1}-C(=NR^{g1})NR^{e1}R^{f1}$,
28) $-NR^{h1}-C(=N-OR^{g1})NR^{e1}R^{f1}$,
29) $-NR^{i1}-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
30) $-NR^{i1}-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
31) $-NR^{e1}-SO_2-R^{f1}$,
32) $-NR^{g1}-SO_2-NR^{e1}R^{f1}$,
33) $-C(=O)OR^{e1}$,
34) $-C(=S)OR^{e1}$,
35) $-C(=S)NR^{e1}R^{f1}$,
36) $-C(=S)NR^{e1}OR^{f1}$,
37) $-C(=S)NR^{g1}-NR^{e1}R^{f1}$,
38) $-C(=NR^{e1})R^{f1}$,
39) $-C(=N-OR^{e1})R^{f1}$,
40) $-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
41) $-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
42) $-NR^{e1}R^{f1}$,
43) $-NR^{g1}-NR^{e1}R^{f1}$,
44) $-NR^{e1}OR^{f1}$,
45) $-NR^{e1}-C(=O)R^{f1}$,
46) $-C(=O)NR^{e1}R^{f1}$,
47) $-C(=O)NR^{e1}OR^{f1}$,
48) $-C(=O)NR^{g1}-NR^{e1}R^{f1}$,
49) $-C(=O)R^{e1}$,
50) $-C(=NR^{g1})NR^{e1}R^{f1}$, or
51) $-C(=N-OR^{h1})NR^{e1}R^{f1}$,

one of R^1, R^2, and R^3 is formula (2):

[Chemical Formula 638]



(2)

wherein,

Y is an oxygen atom, a sulfur atom, or $-NR^j-$,

ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle,

L^3 is $-C(=O)-$, $-S(=O)-$, or $-S(=O)_2-$,

L^4 is

1) a single bond,
2) a C_{1-6} alkylene group,
3) a C_{3-10} cycloalkylene group,
4) a C_{6-10} arylene group,
5) a 5- or 6-membered heteroarylene group,
6) a 4- to 10-membered non-aryl heterocyclylene group, or
7) $-C(=N-OR^{h1})-$,

(wherein each substituent from 2) to 6) is optionally substituted), and

R^5 is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) a 4- to 10-membered non-aryl heterocycle,
5) C_{6-10} aryl,
6) 5- or 6-membered heteroaryl,
7) a C_{1-6} alkylthio group,

(wherein each substituent from 2) to 7) is optionally substituted), or

8) $-NR^{e1}OH$, ,

the remaining two (without the structure of formula (2) among R^1, R^2, and R^3) are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6} alkylthio group, an optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$,

R^d, R^{e1}, R^{e2}, R^{f1}, R^{f2}, R^{g1}, R^{g2}, R^{h1}, R^{h2}, R^{i1}, R^{i2}, and R^j are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{3-10} alicyclic group, optionally

substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, or an optionally substituted 4- to 10-membered non-aryl heterocycle,

a combination of R^{e1} and R^{f1} or R^{e2} and R^{f2}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^4 is

1) $-C(=O)R^8$,

2) $-SO_2-L^6-R^8$,

(wherein R^8 in 1) and 2) is $-NR^{a5}R^{b4}$, $-NR^{a5}-L^7-B(OR^{m1})_2$, $-OR^{m1}$, or an optionally substituted C_{1-6} alkyl group, and L^6 is a single bond or $-NR^{a6}-$),

3) $-NR^{a4}R^{b3}$,

4) $-B(OR^{m1})_2$,

5) $-PO(OR^{m1})(OR^{m2})$,

6) optionally substituted 5-membered heteroaryl,

7) an optionally substituted 5-membered non-aryl heterocycle, or

8) a bioisostere of one of 1) to 7),

(wherein the formulas of 2), 4), 5), and 6) include a carboxylic acid isostere, and 8) may include them in duplicates),

R^{a3}, R^{a4}, R^{a5}, R^{a6}, R^{b2}, R^{b3}, and R^{b4} are the same or different, each independently having the same definition as R^{a1}, R^{a2}, and R^{b1}, wherein a combination of R^{a3} and R^{b2}, R^{a4} and R^{b3}, or R^{a5} and R^{b4}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{m1} is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl,

5) 5- or 6-membered heteroaryl, or

6) a 4- to 10-membered non-aryl heterocycle,

(wherein each substituent from 2) to 6) is optionally substituted),

wherein if R^{m1} is attached to a boron atom via an oxygen atom, two R^{m1}, as C_{2-4} alkylene, together with the boron atom and two oxygen atoms, may form a 5- to 7-membered non-aryl heterocycle (wherein an alkylene moiety is optionally substituted in the non-aryl heterocycle),

R^{m2} is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group, and

L^7 is an optionally substituted C_{1-3} alkylene group.

[0079]

In some embodiments, $Z-L^2-L^1$ is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{1-6} alkylthio group. In one embodiment, L^1 is a single bond.

[0080]

In some embodiments, L^2 is a single bond or an optionally substituted C_{1-6} alkylene group. In one embodiment, L^2 is a single bond.

[0081]

In some embodiments, Z is

1) a hydrogen atom,
2) a hydroxyl group,
3) a cyano group,
4) a carboxyl group,
5) a C_{3-10} alicyclic group,
6) C_{6-10} aryl,
7) 5- or 6-membered heteroaryl,
8) a 4- to 10-membered non-aryl heterocycle,
9) a C_{1-6} alkoxy group,
10) a C_{3-10} alicyclic oxy group,
11) a C_{6-10} aryloxy group,
12) a 5- or 6-membered heteroaryloxy group,
13) a 4- to 10-membered non-aryl heterocyclyl oxy group,
14) a C_{1-6} alkylthio group,

15) a C_{3-10} alicyclic thio group,

16) a C_{6-10} arylthio group,

17) a 5- or 6-membered heteroarylthio group,

18) a 4- to 10-membered non-aryl heterocyclyl thio group,

(wherein each substituent from 5) to 18) is optionally substituted),

19) $-SO_2-NR^{e1}R^{f1}$,

20) $-NR^{e1}-C(=O)OR^{f1}$,

21) $-NR^{g1}-C(=O)NR^{e1}R^{f1}$,

22) $-NR^{e1}-C(=S)R^{f1}$,

23) $-NR^{e1}-C(=S)OR^{f1}$,

24) $-NR^{g1}-C(=S)NR^{e1}R^{f1}$,

25) $-NR^{g1}-CR^{e1}(=NR^{f1})$,

26) $-NR^{g1}-CR^{e1}(=N-OR^{f1})$,

27) $-NR^{h1}-C(=NR^{g1})NR^{e1}R^{f1}$,

28) $-NR^{h1}-C(=N-OR^{g1})NR^{e1}R^{f1}$,

29) $-NR^{i1}-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

30) $-NR^{i1}-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

31) $-NR^{e1}-SO_2-R^{f1}$,

32) $-NR^{g1}-SO_2-NR^{e1}R^{f1}$,

33) $-C(=O)OR^{e1}$,

34) $-C(=S)OR^{e1}$,

35) $-C(=S)NR^{e1}R^{f1}$,

36) $-C(=S)NR^{e1}OR^{f1}$,

37) $-C(=S)NR^{g1}-NR^{e1}R^{f1}$,

38) $-C(=NR^{e1})R^{f1}$,

39) $-C(=N-OR^{e1})R^{f1}$,

40) $-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

41) $-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,

42) $-NR^{e1}R^{f1}$,

43) $-NR^{g1}-NR^{e1}R^{f1}$,

44) $-NR^{e1}OR^{f1}$,

45) $-NR^{e1}-C(=O)R^{f1}$,

46) $-C(=O)NR^{e1}R^{f1}$,

47) $-C(=O)NR^{e1}OR^{f1}$,

48) $-C(=O)NR^{g1}-NR^{e1}R^{f1}$,

49) $-C(=O)R^{e1}$,

50) $-C(=NR^{g1})NR^{e1}R^{f1}$, or

51) $-C(=N-OR^{h1})NR^{e1}R^{f1}$.

The R^{e1}, R^{f1}, R^{g1}, and R^{h1} are the same as the definitions herein. In a preferred embodiment, Z is one of 1), 2), 5) to 8), 39), and 42). In one embodiment, Z is a hydrogen atom. Alternatively, in another embodiment, Z is an optionally substituted C_{1-6} alkylthio group. In still another embodiment, Z is an optionally substituted C_{1-6} alkyl group.

[0082]

In a preferred embodiment, $Z-L^2-L^1$ is a hydrogen atom. Alternatively, in another embodiment, $Z-L^2-L^1$ is an optionally substituted C_{1-6} alkylthio group. In still another embodiment, $Z-L^2-L^1$ is an optionally substituted C_{1-6} alkyl group.

[0083]

In some embodiments, G is an oxygen atom, a sulfur atom, or $-NR^{a1}-$. In one embodiment, G is an oxygen atom or a sulfur atom. In a preferred embodiment, G is an oxygen atom. The R^{a1} is the same as the definition herein.

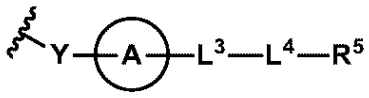
[0084]

In some embodiments, X is a hydroxyl group, an optionally substituted C_{1-6} alkoxy group, or $-NR^{a2}R^{b1}$. In one embodiment, X is a hydroxyl group or an optionally substituted C_{1-6} alkoxy group. In a preferred embodiment, X is a hydroxyl group. The R^{a2} and R^{b1} are the same as the definitions herein.

[0085]

In some embodiments, one of R^1, R^2, and R^3 is a group represented by formula (2):

[Chemical Formula 639]



(2)

wherein

Y is an oxygen atom, a sulfur atom, or $-NR^j-$,

ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle,

L^3 is $-C(=O)-$, $-S(=O)-$, or $-S(=O)_2-$,

L^4 is

1) a single bond,

2) a C_{1-6} alkylene group,

3) a C_{3-10} cycloalkylene group,

4) a C_{6-10} arylene group

5) a 5- or 6-membered heteroarylene group,

6) a 4- to 10-membered non-aryl heterocyclylene group, or

7) $-C(=N-OR^{h1})-$,

(wherein each substituent from 2) to 6) is optionally substituted), and

R^5 is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) a 4- to 10-membered non-aryl heterocycle,

5) C_{6-10} aryl,

6) 5- or 6-membered heteroaryl,

7) a C_{1-6} alkylthio group,

(wherein each substituent from 2) to 7) is optionally substituted), or

8) $-NR^{e1}OH$], and

the remaining two (without the structure of formula (2) among R^1, R^2, and R^3) are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6} alkylthio group, optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$, wherein R^{a3} and R^{b2} are the same as the definitions herein. In a preferred embodiment, R^3 has the structure of formula (2).

[0086]

In one embodiment, if R^5 in formula (2) is 2) a C_{1-6} alkyl group, 3) a C_{3-10} alicyclic group, 4) a 4- to 10-membered non-aryl heterocycle, 5) C_{6-10} aryl, 6) 5- or 6-membered heteroaryl, or 7) a C_{1-6} alkylthio group, 2), 3), 4), 5), 6), and 7) are optionally substituted with a carboxyl group or a C_{1-6} alkyl group substituted with a carboxyl group. In one embodiment, said 2), 3), 4), 5), 6), and 7) are optionally substituted with a carboxyl group. In one embodiment, said 2), 3), 4), 5), 6), and 7) are optionally substituted with a C_{1-6} alkyl group substituted with a carboxyl group.

[0087]

In one embodiment, if one of R^1, R^2, and R^3 is represented by formula (2), the remaining two without the structure of formula (2) among R^1, R^2, and R^3 are each independently selected from the group consisting of a hydrogen atom, a halogen atom, methyl, trifluoromethyl, methoxy, and trifluoromethoxy. In a preferred embodiment, R^3 is represented by formula (2), and R^1 and R^2 are each independently selected from the group consisting of a hydrogen atom, a halogen atom, methyl, trifluoromethyl, methoxy, and trifluoromethoxy.

[0088]

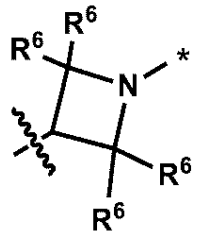
In some embodiments, Y is an oxygen atom, a sulfur atom, or $-NR^j-$. In one embodiment, Y is an oxygen atom or a sulfur atom. In a preferred embodiment, Y is an oxygen atom. The R^j is the same as the definition herein.

[0089]

In some embodiments, ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle. In one embodiment, ring A is an optionally substituted 4- to 10-membered non-aryl heterocycle. In one embodiment, ring A is an optionally substituted 4- to 7-membered non-aryl heterocycle. In one embodiment, ring A is an optionally substituted 4- to 7-membered nitrogen-containing non-aryl heterocycle. In one embodiment, ring A is an optionally

substituted 4- to 6-membered non-aryl heterocycle. In one embodiment, ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle. In one embodiment, ring A is an optionally substituted azetidine ring. In a specific embodiment of said embodiment, ring A is

[Chemical Formula 640-1]



,

wherein R^6 represents a substituent on an azetidine ring and is defined the same as R^{6a}, a bond that is orthogonal to a wavy line indicates a bond with Y, and a bond with * indicates a bond with L^3. In a preferred embodiment, R^6 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom,
3) a C_{1-6} alkyl group, and
4) a C_{1-6} alkoxy group

(wherein each of substituents 3) and 4) is optionally substituted with a halogen atom), and

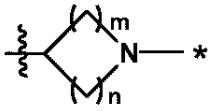
in a preferred embodiment, are selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom, and
3) a C_{1-6} alkyl group optionally substituted with a halogen atom, and

most preferably are hydrogen atoms.

In a specific embodiment, ring A is

[Chemical Formula 640-2]



,

wherein m is 1, 2, or 3, n is 1, 2, or 3, m + n is 2, 3, 4, or 5, a bond that is orthogonal to a wavy line indicates a bond with Y, and a bond with * indicates a bond with L^3. In one embodiment, m + n is 2, 3, or 4. In one embodiment, m + n is 2 or 3. In a preferred embodiment, m + n is 2. In a more preferred embodiment, m = 1 and n = 1.

[0090]

In some embodiments, L^3 is -C(=O)-, -S(=O)-, or -$S(=O)_2$-. In one embodiment, L^3 is -C(=O)- or -$S(=O)_2$-. In a preferred embodiment, L^3 is -C(=O)-.

[0091]

In some embodiments, L^4 is

1) a single bond,
2) a C_{1-6} alkylene group,
3) a C_{3-10} cycloalkylene group,
4) a C_{6-10} arylene group
5) a 5- or 6-membered heteroarylene group,
6) a 4- to 10-membered non-aryl heterocyclylene group, or
7) -C(=N-OR^{h1})-,

(wherein each substituent from 2) to 6) is optionally substituted).

In one embodiment, L^4 is a single bond, -C(=N-OR^{h1})- or an optionally substituted C_{1-6} alkylene group, wherein R^{h1} is an optionally substituted C_{1-6} alkyl group. In one embodiment, L^4 is a single bond or a C_{1-6} alkylene group optionally substituted with -$NR^{21}R^{22}$ or =NOR^{23}, wherein R^{21}, R^{22}, and R^{23} are each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted 4- to 10-membered non-aryl heterocyclyl carbonyl group. In a preferred embodiment, L^4 is a bond, -CH_2-, -$CH(NH_2)$-, or -$CH(NH_2)$-CH_2-, wherein if an amino group is present in L^4, carbon that attaches to the amino group

attaches to L^3.

[0092]

In one embodiment, L^4 is a single bond, $-CH_2-$, $-CMe(NH_2)-$, $-CH(NHMe)-$, $-CD(NH_2)-$ (wherein D represents a heavy hydrogen atom), $-CH(NH_2)-$, or $-CH_2CH_2-$. In one embodiment, L^4 is a single bond, $-CH_2-$, or $-CH(NH_2)-$.

[0093]

In one embodiment, L^4 is

1) $-(CH_2)_p-CR^{10}(NHR^{11})-$,

2) $-(CH_2)_q-CR^{12}R^{13}-$, or

3) $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CR^{12}R^{13}-$, wherein p and q are independently 0 or 1, R^{10} is

1) a hydrogen atom,

2) a carboxyl group, or

3) $-C(=O)NR^{10a}R^{10b}$,

R^{11} is

1) a hydrogen atom,

2) $-C(=O)R^{11a}$, or

3) an optionally substituted 5- or 6-membered non-aryl heterocyclyl carbonyl group,

wherein if R^{10} is $-C(=O)NR^{10a}R^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$,

R^{12} is

1) a hydrogen atom, or

2) an optionally substituted C_{1-4} alkyl group,

R^{13} is

1) a hydrogen atom,

2) a hydroxyl group

3) an optionally substituted C_{1-4} alkyl group

4) a sulfanyl group,

5) a carboxyl group,

6) an optionally substituted C_{1-4} alkylthio group,

7) $-NR^{13a}R^{13b}$,

8) $-NR^{13a}-C(=O)R^{13b}$,

9) an optionally substituted 5- or 6-membered non-aryl heterocyclyl carbonylamino group,

10) $-NR^{13a}-C(=O)NR^{13b}R^{13c}$,
11) $-C(=O)NR^{13a}R^{13b}$,
12) $-C(=O)NR^{13a}OR^{13b}$,
13) $-S(=O)_2-R^{13a}$,
14) $-S(=O)_2-NR^{13a}R^{13b}$,
15) $-C(=O)NR^{13a}-S(=O)_2-R^{13b}$, or
16) $-C(=O)NR^{13a}-S(=O)_2-NR^{13b}R^{13c}$, and
R^{10a}, R^{10b}, R^{11a}, R^{13a}, R^{13b}, and R^{13c} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.
[0094]
In one embodiment, L^4 is $-CH(NH_2)-CHR^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,
R^5 is a hydrogen atom, and
R^{13} is
1) $-NH-C(=O)CH_3$,
2) $-NH-C(=O)NH_2$,
3) $-NH-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
4) $-NH-C(=O)CH_2-NH_2$,
5) $-NH-C(=O)CH(NH_2)-CH_2OH$, or
6) a pyrrolidin-2-ylcarbonylamino group.
[0095]
In one embodiment, L^4 is $-CH(NH_2)-CR^{12}R^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,
R^5 is a hydrogen atom or methyl,
R^{12} is a hydrogen atom or methyl, and
R^{13} is a benzylthio group or a sulfanyl group.
[0096]
In one embodiment, L^4 is $-CH(NH_2)-(CH_2)_q-CHR^{13}-$, wherein q is 0 or 1, and carbon that attaches to the NH_2 attaches to L^3,
R^5 is a hydrogen atom, and
R^{13} is
1) a carboxyl group,
2) $-C(=O)NH_2$,
3) $-C(=O)NH(CH_3)$,
4) $-C(=O)N(CH_3)_2$,

5) $-C(=O)NH-(CH_2)_2-OH$,
6) $-C(=O)NH-(CH_2)_2-NH_2$,
7) $-C(=O)NH-S(=O)_2-CH_3$,
8) $-C(=O)NHOH$,
9) $-S(=O)_2-NH_2$,
10) $-S(=O)_2-CH_3$, or
11) a hydroxyl group.

[0097]

In one embodiment, L^4 is $-CH(NHR^{11})-CH_2-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,
R^5 is hydrogen, and
R^{11} is
1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
2) $-C(=O)CH_2-NH_2$,
3) $-C(=O)CH(CH_3)-NH_2$,
4) $-C(=O)CH(NH_2)-CH_2OH$, or
5) pyrrolidin-2-ylcarbonyl.

[0098]

In one embodiment, L^4 is $-CH(NHR^{11})-CH(COOH)-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,
R^5 is hydrogen, and
R^{11} is
1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
2) $-C(=O)CH_2-NH_2$,
3) $-C(=O)CH(CH_3)-NH_2$,
4) $-C(=O)CH(NH_2)-CH_2OH$, or
5) pyrrolidin-2-ylcarbonyl.

[0099]

In one embodiment, L^4 is $-CHR^{13}-$ or $-CH_2-CHR^{13}-$,
R^5 is hydrogen, and
R^{13} is $-C(=O)NH_2$ or $-C(=O)NHOH$.

[0100]

In one embodiment, L^4 is $-CH_2-CR^{10}(NH_2)-$, and the CH_2 group attaches to L^3,
R^5 is hydrogen, and
R^{10} is a carboxy group or $-C(=O)NH_2$.

[0101]

In one embodiment, L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$ or $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$, wherein q is 0 or 1,
R^5 is hydrogen,
(1) if L^4 is $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$,
carbon of the $-CHR^{13}-$ group attaches to L^3,
p is 0,
R^{10} is a hydrogen atom, a carboxyl group, or $-C(=O)NHR^{10b}$,
R^{11} is a hydrogen atom,
R^{10b} is a hydrogen atom,
wherein if R^{10} is $-C(=O)NHR^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$, and
R^{13} is a hydrogen atom, and
(2) if L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$,
carbon of the $-(CH_2)_p-$ group attaches to L^3,
p is 1,
R^{10} and R^{11} are both hydrogen atoms,
R^{13} is a carboxyl group or $-C(=O)NR^{13a}R^{13b}$, and
R^{13a} and R^{13b} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[0102]

In one embodiment, L^4 is $-CR^{12}(NH_2)-$,
R^{12} is a hydrogen atom or a methyl group, and
R^5 is a C_{1-4} alkyl group optionally substituted with a hydroxyl group.

[0103]

In some embodiments, R^5 is
1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) a 4- to 10-membered non-aryl heterocycle,
5) C_{6-10} aryl,
6) 5- or 6-membered heteroaryl,
7) a C_{1-6} alkylthio group,
(wherein each substituent from 2) to 7) is optionally substituted), or

8) $-NR^{e1}OH$.

In one embodiment, R^5 is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted 4- to 10-membered non-aryl heterocycle, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, an optionally substituted C_{1-6} alkylthio group, or $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group. In one embodiment, R^5 is an optionally substituted 5- or 6-membered heteroaryl or optionally substituted C_{6-10} aryl.

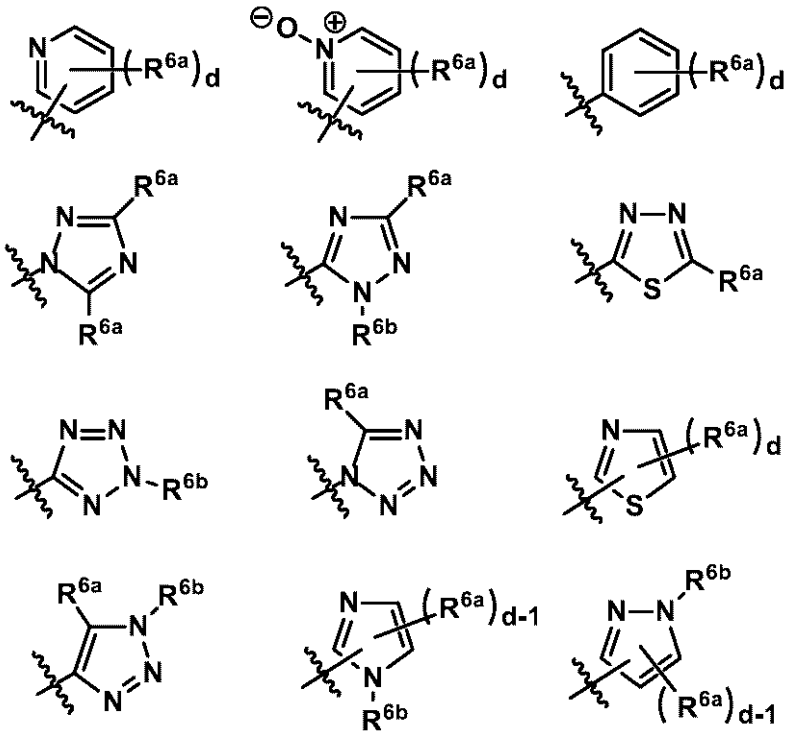
[0104]

In one embodiment, R^5 is optionally substituted 5- or 6-membered heteroaryl. In one embodiment, R^5 is an optionally substituted 4- to 10-membered non-aryl heterocycle. In one embodiment, R^5 is a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

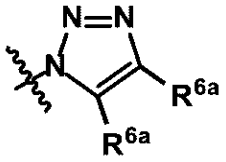
[0105]

In one embodiment, R^5 is selected from the group consisting of

[Chemical Formula 641]



[Chemical Formula 642]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) a nitro group,

5) halogen,

6) a C_{1-4} alkyl group,

7) a C_{3-10} alicyclic group,

8) a C_{1-4} alkoxy group,

9) a C_{3-10} alicyclic oxy group,

10) a C_{6-10} aryloxy group,

11) a 5- or 6-membered heteroaryloxy group,

12) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 6) to 12) is optionally substituted),

13) $-SO_2-NR^{e2}R^{f2}$,

14) $-NR^{g2}-CR^{e2}(=NR^{f2})$,

15) $-NR^{g2}-CR^{e2}(=N-OR^{f2})$,

16) $-NR^{h2}-C(=NR^{g2})NR^{e2}R^{f2}$,

17) $-NR^{h2}-C(=N-OR^{g2})NR^{e2}R^{f2}$,

18) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

19) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

20) $-C(=NR^{e2})R^{f2}$,

21) $-C(=N-OR^{e2})R^{f2}$,

22) $-C(=NR^{h2})-NR^{e2}R^{f2}$,

23) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

24) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

25) $-NR^{e2}R^{f2}$,

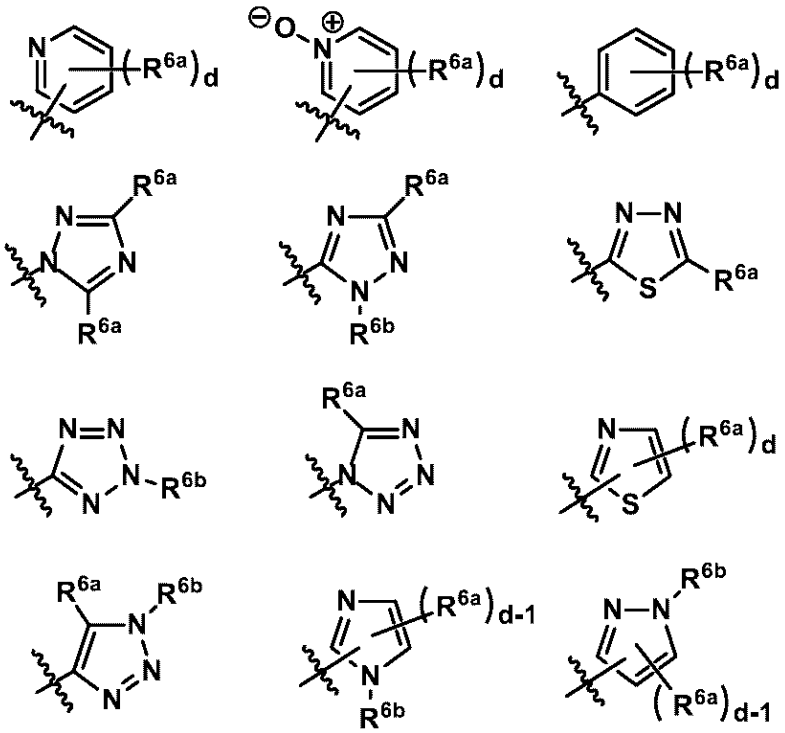
26) $-NR^{g2}-NR^{e2}R^{f2}$,
27) $-NR^{e2}OR^{f2}$,
28) $-NR^{e2}-C(=O)R^{f2}$,
29) $-C(=O)NR^{e2}R^{f2}$,
30) $-C(=O)NR^{e2}OR^{f2}$,
31) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,
32) $-C(=O)R^{e2}$,
33) $-C(=O)OR^{e2}$, and
34) $-C(=N-OR^{h2})NR^{e2}R^{f2}$, and

each R^{6b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted),
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e2})R^{f2}$,
6) $-C(=N-OR^{e2})R^{f2}$,
7) $-SO_2-NR^{e2}R^{f2}$,
8) $-C(=NR^{h2})-NR^{e2}R^{f2}$,
9) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
10) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
11) $-C(=O)NR^{e2}R^{f2}$,
12) $-C(=O)NR^{e2}OR^{f2}$,
13) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,
14) $-C(=O)R^{e2}$, and
15) $-C(=N-OR^{h2})NR^{e2}R^{f2}$.

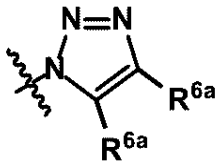
[0106]

In one embodiment, R^5 is 5- or 6-membered aryl or heteroaryl selected from the group consisting of

[Chemical Formula 643]



[Chemical Formula 644]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f2}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e2}R^{f2}$, and

7) $-C(=O)OR^{e2}$, and

each R^{6b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, $-C(=O)NR^{e2}R^{f2}$, $-C(=O)OR^{f2}$, or a hydroxyl group).

[0107]

In one embodiment, R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group. In one embodiment, R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom or an optionally substituted C_{1-6} alkyl group. In one embodiment, R^{e2} and R^{f2} are hydrogen atoms. In one embodiment, R^{6a} is $-NR^{e2}R^{f2}$, and one of R^{e2} and R^{f2} is a hydrogen atom and the other is a C_{1-4} alkyl group (wherein the alkyl group is optionally substituted with an amino group or a hydroxyl group).

[0108]

In one embodiment, each R^{6a} may be independently halogen.

[0109]

In one embodiment, each R^{6a} may be independently an alkylamino group substituted with an amino group. In one embodiment, each R^{6a} may be independently $NR^{e2}R^{f2}$, wherein R^{e2} is a C_{1-6} alkyl group, the C_{1-6} alkyl group is substituted with $-NR^{10a}R^{11a}$, and R^{10a} and R^{11a} are each independently defined the same as the description herein.

[0110]

In one embodiment, each R^{6a} may be independently $-C(=O)OH$.

[0111]

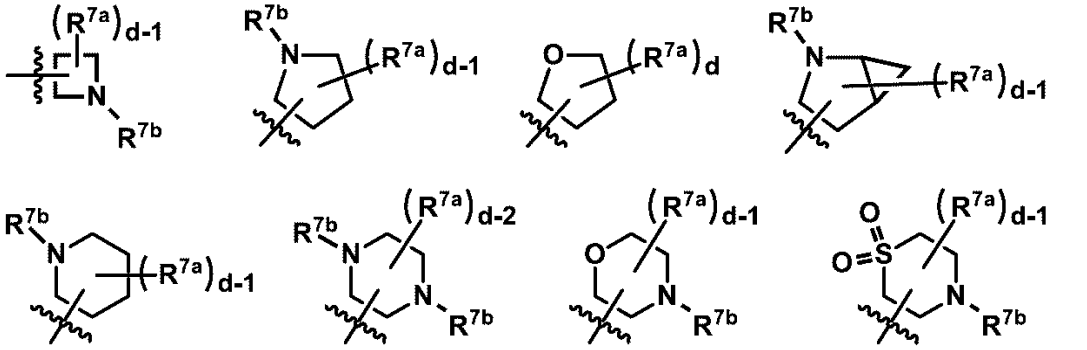
In one embodiment, each R^{6a} and/or each R^{6b} may be independently an alkyl group substituted with a carboxyl group. In one embodiment, each R^{6a} and/or each R^{6b} may be

independently a C_{1-4} alkyl group substituted with a -C(=O)OH group.

[0112]

In one embodiment, R^5 is a 4- to 6-membered non-aryl heterocycle selected from the group consisting of

[Chemical Formula 645]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) halogen,

5) a C_{1-4} alkyl group,

6) a C_{3-10} alicyclic group,

7) a C_{1-4} alkoxy group,

8) a C_{3-10} alicyclic oxy group,

9) a C_{6-10} aryloxy group,

10) a 5- or 6-membered heteroaryloxy group,

11) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 5) to 11) is optionally substituted),

12) $-SO_2-NR^{e3}R^{f3}$,

13) $-NR^{g2}-CR^{e3}(=NR^{f3})$,

14) $-NR^{g2}-CR^{e3}(=N-OR^{f3})$,

15) $-NR^{h2}-C(=NR^{g2})NR^{e3}R^{f3}$,

16) $-NR^{h2}-C(=N-OR^{g2})NR^{e3}R^{f3}$,

17) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
18) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
19) $-C(=NR^{e3})R^{f3}$,
20) $-C(=N-OR^{e3})R^{f3}$,
21) $-C(=NR^{h2})$ $-NR^{e3}R^{f3}$,
22) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
23) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
24) $-NR^{e3}R^{f3}$,
25) $-NR^{g2}-NR^{e3}R^{f3}$,
26) $-NR^{e3}OR^{f3}$,
27) $-NR^{e3}-C(=O)R^{f3}$,
28) $-C(=O)NR^{e3}R^{f3}$,
29) $-C(=O)NR^{e3}OR^{f3}$,
30) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,
31) $-C(=O)R^{e3}$,
32) $-C(=O)OR^{e3}$, and
33) $-C(=N-OR^{h2})NR^{e3}R^{f3}$,

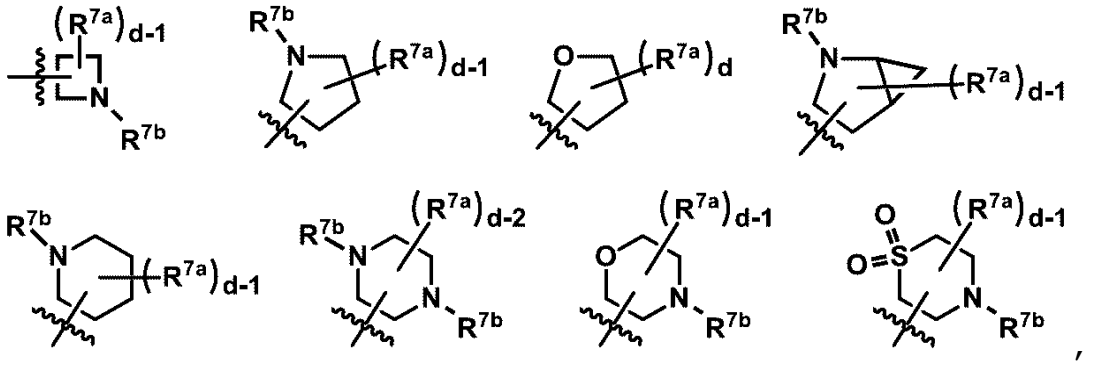
each R^{7b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted),
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e3})R^{f3}$,
6) $-C(=N-OR^{e3})R^{f3}$,
7) $-SO_2-NR^{e3}R^{f3}$,
8) $-C(=NR^{h2})-NR^{e3}R^{f3}$,
9) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
10) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
11) $-C(=O)NR^{e3}R^{f3}$,
12) $-C(=O)NR^{e3}OR^{f3}$,
13) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,
14) $-C(=O)R^{e3}$, and
15) $-C(=N-OR^{h2})NR^{e3}R^{f3}$, and

R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to item B1.

[0113]

In one embodiment, R^5 is a 4- to 6-membered non-aryl heterocycle selected from the group consisting of

[Chemical Formula 646]



subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e3}R^{f3}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f3}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e3}R^{f3}$,

7) $-C(=O)OR^{e3}$,

8) C_{6-10} aryl, and

9) $-C(=O)NR^{e3}R^{f3}$,

each R^{7b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with

$NR^{e3}R^{f3}$, $-C(=O)OR^{f3}$, or a hydroxyl group), and

R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to any one of items B38 to B40.

[0114]

In some embodiments, if one of R^1, R^2, and R^3 is represented by formula (2), the remaining two are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6} alkylthio group, optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$, wherein R^{a3} and R^{b2} are the same as the descriptions herein. In a preferred embodiment, R^3 is represented by formula (2).

[0115]

In one embodiment where R^3 is represented by formula (2), R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom,
3) a C_{1-6} alkyl group,
4) a C_{1-6} alkoxy group, and
5) a C_{1-6} alkylthio group,

(wherein each substituent from 3) to 5) is optionally substituted).

[0116]

In said embodiment, R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom, and
3) an optionally substituted C_{1-6} alkyl group.

In a preferred embodiment, R^1 and R^2 are both hydrogen atoms.

[0117]

In some embodiments, R^4 in formulas (1a) and (1b) is

1) $-C(=O)R^8$,
2) $-SO_2-L^6-R^8$,

(wherein R^8 in 1) and 2) is $-NR^{a5}R^{b4}$, $-NR^{a5}-L^7-B(OR^{m1})_2$, $-OR^{m1}$, or an optionally substituted C_{1-6} alkyl group, and L^6 is a single bond or $-NR^{a6}-$),

3) $-NR^{a4}R^{b3}$,

4) $-B(OR^{m1})_2$,

5) $-PO(OR^{m1})(OR^{m2})$,

6) optionally substituted 5-membered heteroaryl,

7) an optionally substituted 5-membered non-aryl heterocycle, or

8) a bioisostere of one of 1) to 7),

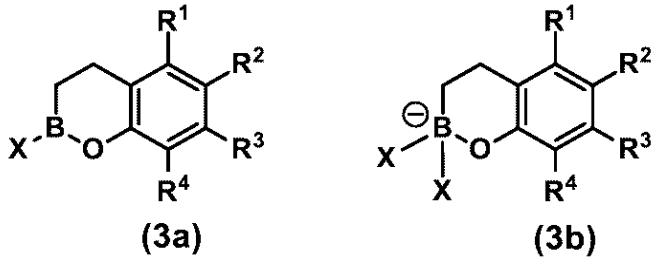
(wherein the formulas of 2), 4), 5), and 6) include a carboxylic acid isostere, and 8) may include them in duplicates).

In one embodiment, R^4 is $-C(=O)-OR^{m1}$ or a carboxylic acid isostere thereof. In a preferred embodiment, R^4 is 1) –COOH (i.e., a carboxyl group), or 2) a carboxylic acid isostere. The R^{a4}, R^{a5}, R^{a6}, R^{b3}, R^{b4}, L^7, R^{m1}, and R^{m2} are the same as the definitions herein.

[0118]

A specific example of a specific embodiment of the compound of the invention includes a compound represented by formula (3a) or (3b):

[Chemical Formula 647]



or a pharmaceutically acceptable salt thereof. X, R^1, R^2, and R^3 in formula (3a) or (3b) are defined the same as the definitions herein, and R^4 is selected from the group consisting of

1) $-COOR^{m1}$ (wherein R^{m1} is a hydrogen atom, a C_{1-6} alkyl group, a C_{3-10} alicyclic group, C_{6-10} aryl, 5- or 6-membered heteroaryl, or a 4- to 10-membered non-aryl heterocycle,

wherein the C_{1-6} alkyl group, the C_{3-10} alicyclic group, the C_{6-10} aryl, the 5- or 6-membered heteroaryl, and the 4- to 10-membered non-aryl heterocycle are each optionally substituted), and

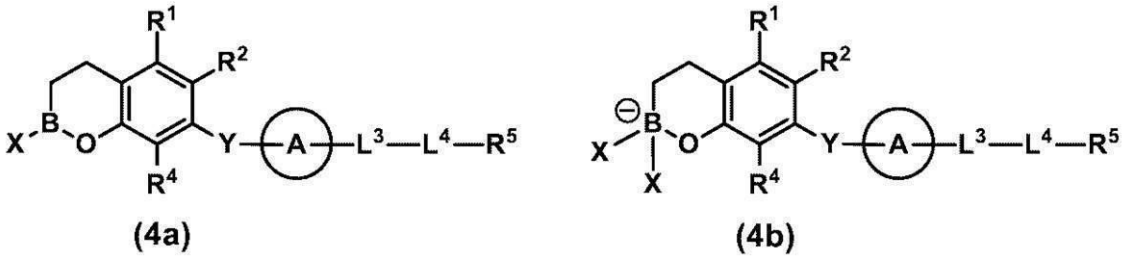
2) a bioisostere of 1).

In a preferred embodiment, R^4 is 1) –COOH (i.e., a carboxyl group) or 2) a carboxylic acid isostere.

[0119]

A specific example of a preferred embodiment of the compound of the invention includes compounds represented by formulas (4a) and (4b):

[Chemical Formula 648]



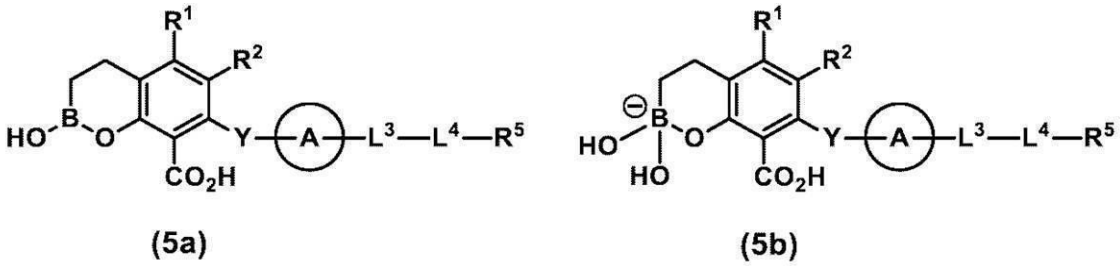
(4a) (4b)

or a pharmaceutically acceptable salt thereof. X, R^4, Y, ring A, L^3, L^4, and R^5 in formulas (4a) and (4b) are defined the same as the definitions herein, and R^1 and R^2 are the same or different, each independently a hydrogen atom, a halogen atom, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group (wherein the C_{1-6} alkyl group and C_{1-6} alkoxy group are optionally substituted with 1 to 5 halogens).

[0120]

A specific example of a still more preferred embodiment of the compound of the invention includes compounds represented by formulas (5a) and (5b):

[Chemical Formula 649]



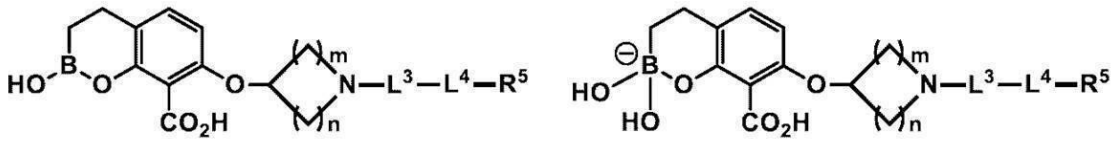
(5a) (5b)

or a pharmaceutically acceptable salt thereof. R^1, R^2, Y, L^3, L^4, R^5, and ring A in formulas (5a) and (5b) are defined the same as the definitions herein, and ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[0121]

A specific example of a yet still more preferred embodiment of the compound of the invention includes compounds represented by formulas (6a) and (6b):

[Chemical Formula 650]



(6a) (6b)

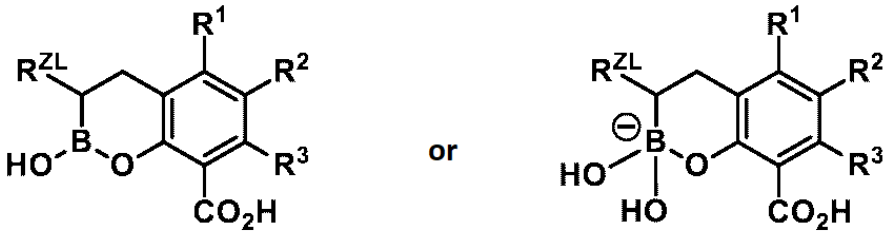
or a pharmaceutically acceptable salt thereof. L^3, L^4, and R^5 in formulas (6a) and (6b) are defined the same as the definitions herein, m is an integer 1, 2, or 3, n is an integer 1, 2, or 3, and m + n is 2, 3, or 4. In one embodiment, m is 1 or 2, n is 1 or 2, and m + n is 2 or 3. In a preferred embodiment, m is 1, and n is 1.

[0122]

A specific example of a preferred embodiment of the compound of the invention includes the following compound:

a compound represented by

[Chemical Formula 651]

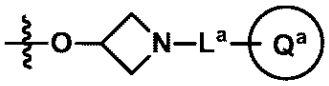


or a pharmaceutically acceptable salt thereof, wherein

R^{ZL} is a substituent selected from the group consisting of the Z1 to Z4 described below,

one of R^1, R^2, and R^3 is

[Chemical Formula 652]

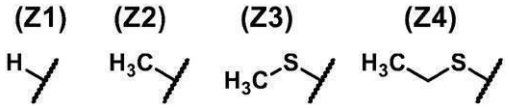


and

the remaining two are hydrogen atoms, linking group L^a is a substituent selected from the group consisting of L1 to L36 described below, and substituent Q^a is a substituent selected from the group consisting of Q1 to Q103 described below;

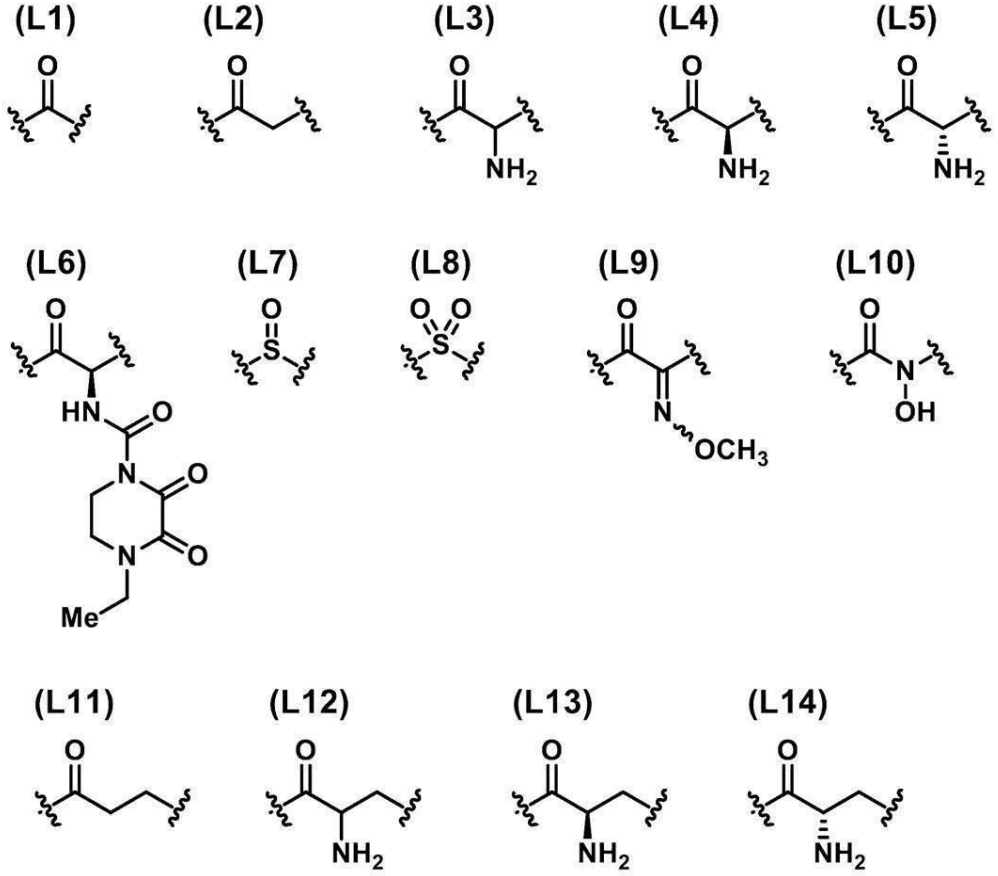
R^{ZL}:

[Chemical Formula 653]

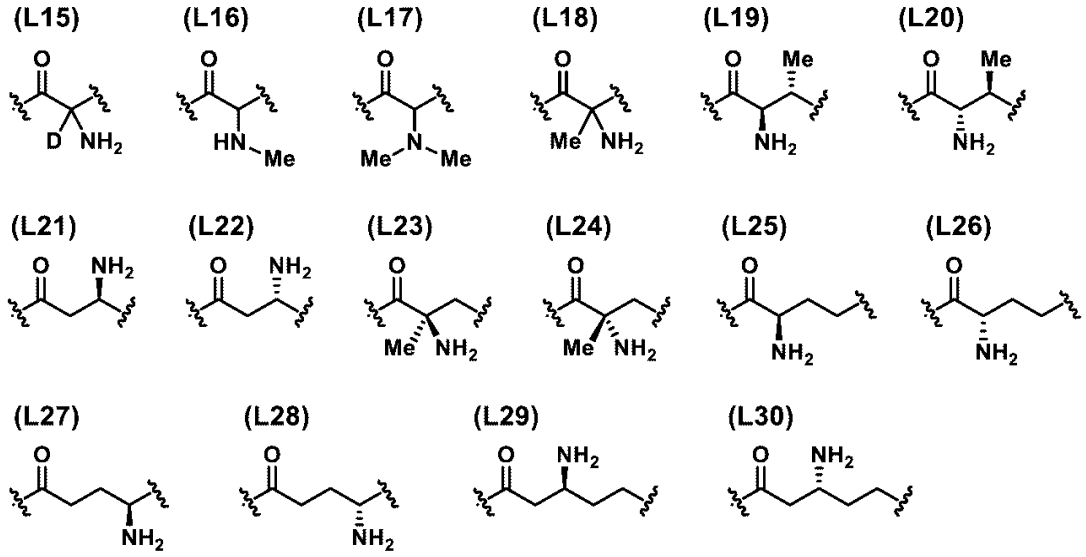


linking group L^a:

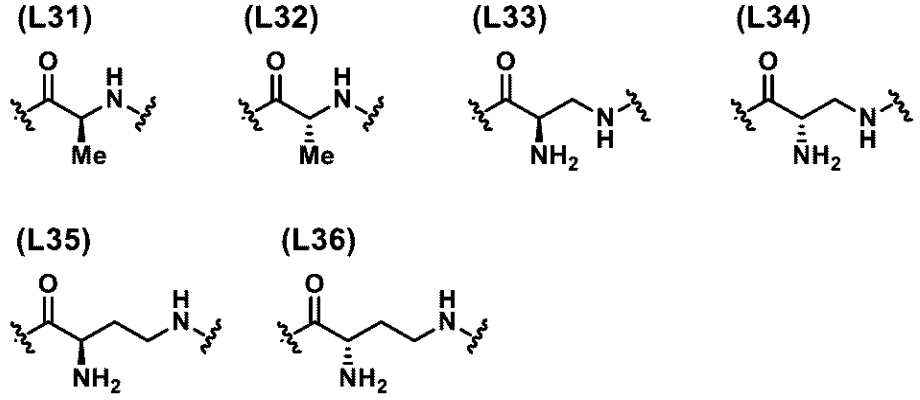
[Chemical Formula 654]



[Chemical Formula 655]



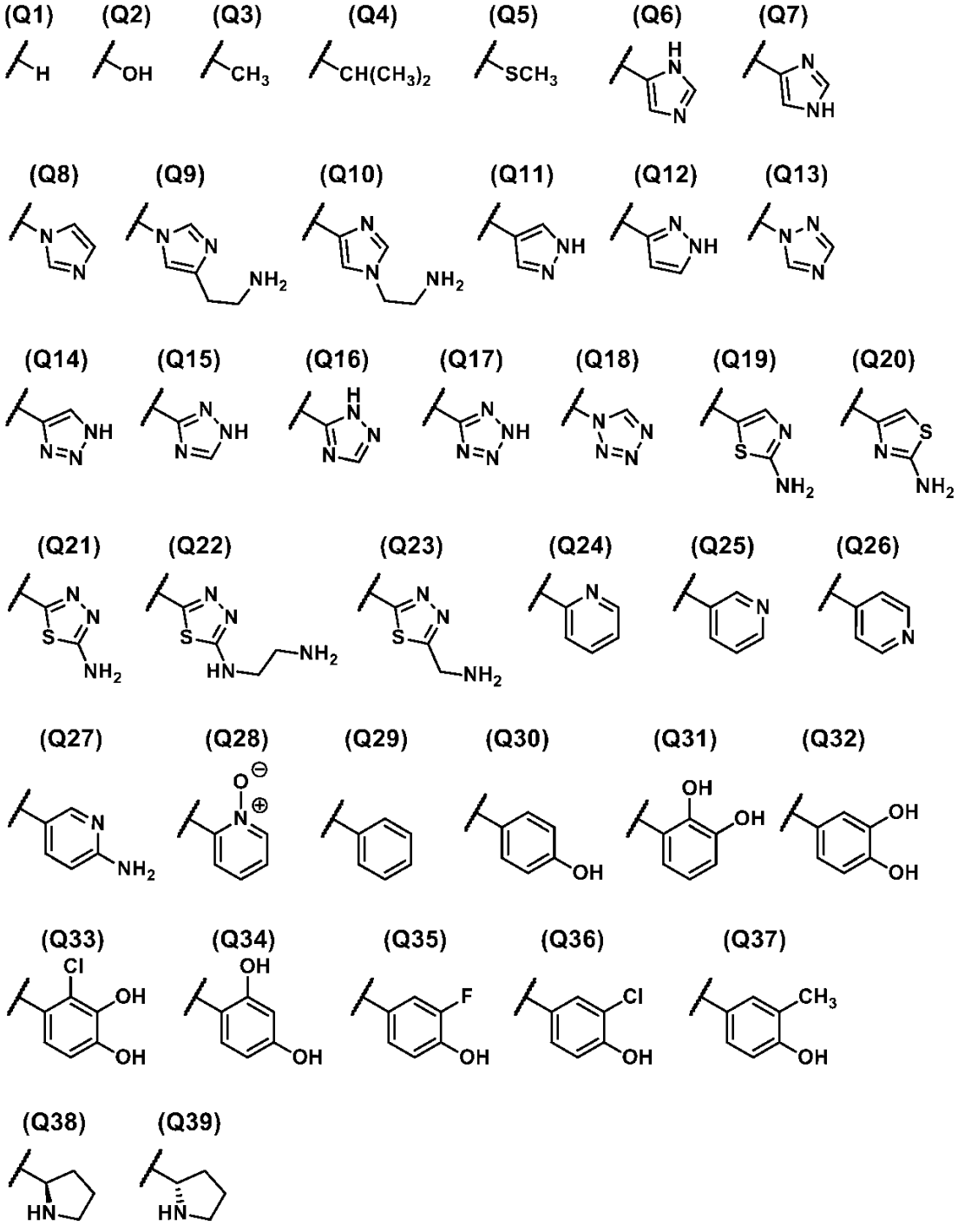
[Chemical Formula 656]



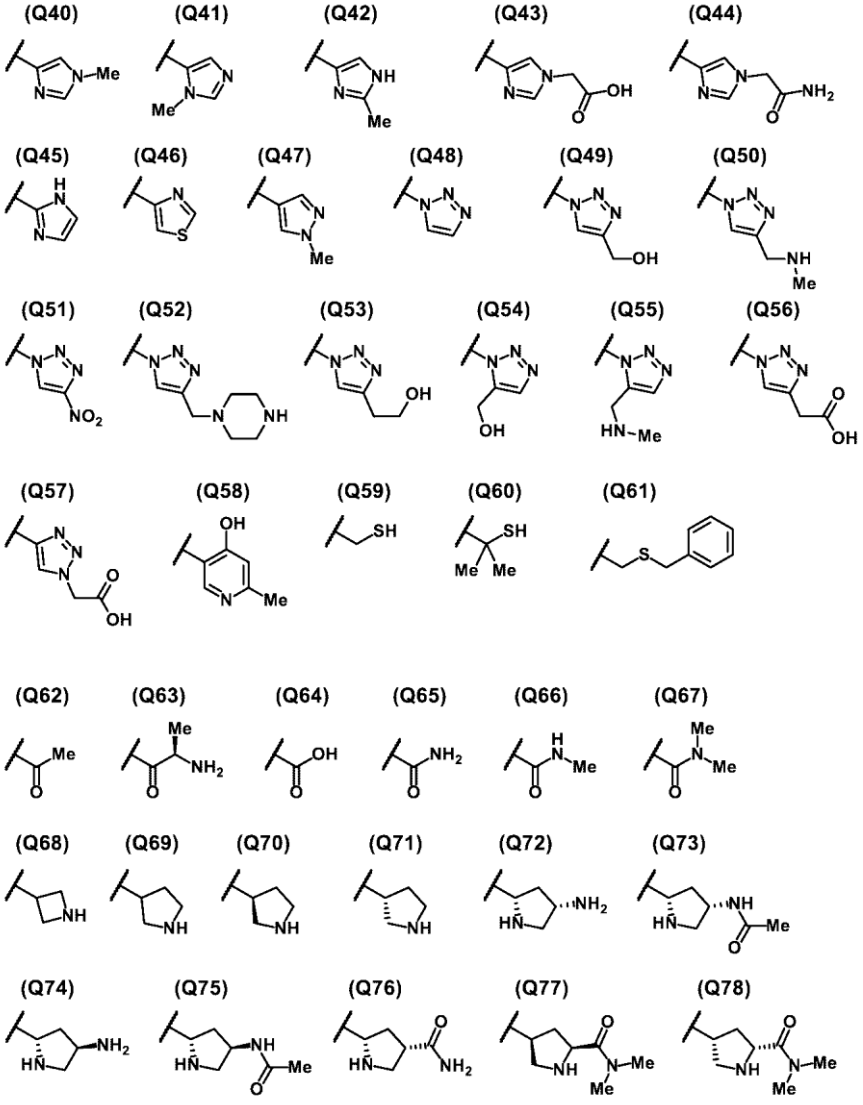
, and

substituent Q^a:

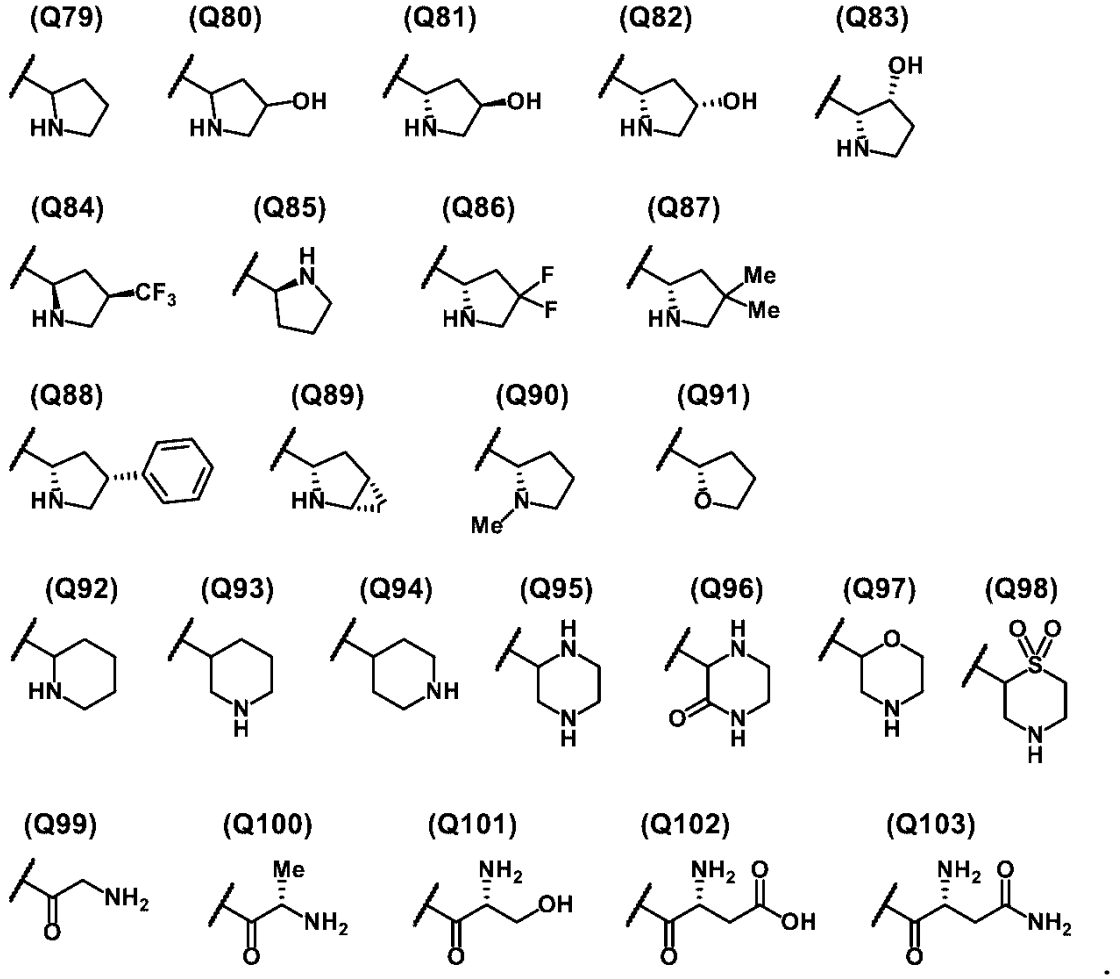
[Chemical Formula 657]



[Chemical Formula 658]



[Chemical Formula 659]

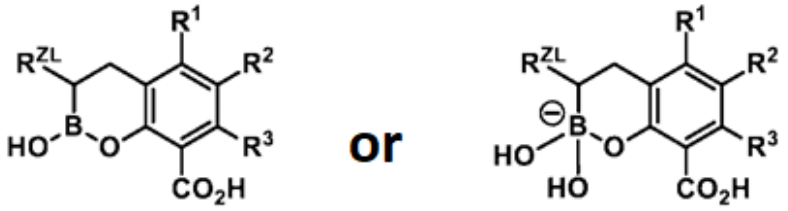


[0123]

A specific example of a more preferred embodiment of the compound of the invention includes a compound of the following formula:

a compound represented by

[Chemical Formula 660]



or a pharmaceutically acceptable salt thereof, wherein

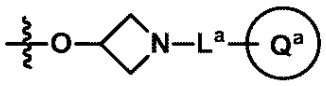
R^{ZL} is a substituent selected from the group consisting of

Z1 to Z4 described above,

R^1 and R^2 are hydrogen atoms, and

R^3 is

[Chemical Formula 661]



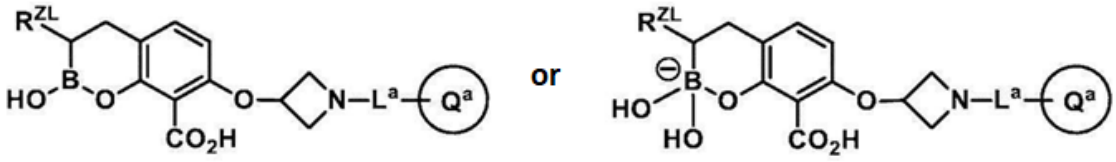
,

wherein linking group L^a is a substituent selected from the group consisting of L1 to L36 described above, and substituent Q^a is a substituent selected from the group consisting of Q1 to Q103 described above.

[0124]

Examples of a more preferred embodiment of the compound of the invention include the compounds of the following Table (1) or a pharmaceutically acceptable salt thereof.

[Chemical Formula 662]



[Table 1-1]

Example	R^{ZL}	L^a	Q^a
1	Z1	L1	Q1
2	Z1	L1	Q2
3	Z1	L1	Q3
4	Z1	L1	Q4
5	Z1	L1	Q5
6	Z1	L1	Q6
7	Z1	L1	Q7
8	Z1	L1	Q8
9	Z1	L1	Q9
10	Z1	L1	Q10
11	Z1	L1	Q11
12	Z1	L1	Q12
13	Z1	L1	Q13
14	Z1	L1	Q14
15	Z1	L1	Q15
16	Z1	L1	Q16
17	Z1	L1	Q17
18	Z1	L1	Q18
19	Z1	L1	Q19
20	Z1	L1	Q20
21	Z1	L1	Q21
22	Z1	L1	Q22
23	Z1	L1	Q23
24	Z1	L1	Q24
25	Z1	L1	Q25
26	Z1	L1	Q26
27	Z1	L1	Q27
28	Z1	L1	Q28
29	Z1	L1	Q29
30	Z1	L1	Q30
31	Z1	L1	Q31
32	Z1	L1	Q32
33	Z1	L1	Q33
34	Z1	L1	Q34
35	Z1	L1	Q35
36	Z1	L1	Q36
37	Z1	L1	Q37
38	Z1	L1	Q38
39	Z1	L1	Q39
40	Z1	L2	Q1
41	Z1	L2	Q2
42	Z1	L2	Q3
43	Z1	L2	Q4
44	Z1	L2	Q5
45	Z1	L2	Q6
46	Z1	L2	Q7
47	Z1	L2	Q8
48	Z1	L2	Q9
49	Z1	L2	Q10
50	Z1	L2	Q11
51	Z1	L2	Q12
52	Z1	L2	Q13
53	Z1	L2	Q14
54	Z1	L2	Q15
55	Z1	L2	Q16
56	Z1	L2	Q17
57	Z1	L2	Q18
58	Z1	L2	Q19
59	Z1	L2	Q20
60	Z1	L2	Q21
61	Z1	L2	Q22
62	Z1	L2	Q23
63	Z1	L2	Q24
64	Z1	L2	Q25
65	Z1	L2	Q26
66	Z1	L2	Q27
67	Z1	L2	Q28
68	Z1	L2	Q29
69	Z1	L2	Q30
70	Z1	L2	Q31
71	Z1	L2	Q32
72	Z1	L2	Q33
73	Z1	L2	Q34
74	Z1	L2	Q35
75	Z1	L2	Q36
76	Z1	L2	Q37
77	Z1	L2	Q38
78	Z1	L2	Q39
79	Z1	L3	Q1
80	Z1	L3	Q2

[Table 1-2]

81	Z1	L3	Q3
82	Z1	L3	Q4
83	Z1	L3	Q5
84	Z1	L3	Q6
85	Z1	L3	Q7
86	Z1	L3	Q8
87	Z1	L3	Q9
88	Z1	L3	Q10
89	Z1	L3	Q11
90	Z1	L3	Q12
91	Z1	L3	Q13
92	Z1	L3	Q14
93	Z1	L3	Q15
94	Z1	L3	Q16
95	Z1	L3	Q17
96	Z1	L3	Q18
97	Z1	L3	Q19
98	Z1	L3	Q20
99	Z1	L3	Q21
100	Z1	L3	Q22
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110	Z1	L3	Q32
111	Z1	L3	Q33
112	Z1	L3	Q34
113	Z1	L3	Q35
114	Z1	L3	Q36
115	Z1	L3	Q37
116	Z1	L3	Q38
117	Z1	L3	Q39
118	Z1	L4	Q1
119	Z1	L4	Q2
120	Z1	L4	Q3
121	Z1	L4	Q4
122	Z1	L4	Q5
123	Z1	L4	Q6
124	Z1	L4	Q7
125	Z1	L4	Q8
126	Z1	L4	Q9
127	Z1	L4	Q10
128	Z1	L4	Q11
129	Z1	L4	Q12
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131	Z1	L4	Q14
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133	Z1	L4	Q16
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136	Z1	L4	Q19
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145	Z1	L4	Q28
146	Z1	L4	Q29
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151	Z1	L4	Q34
152	Z1	L4	Q35
153	Z1	L4	Q36
154	Z1	L4	Q37
155	Z1	L4	Q38
156	Z1	L4	Q39
157	Z1	L5	Q1
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159	Z1	L5	Q3
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161	Z1	L5	Q5
162	Z1	L5	Q6
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[Table 1-3]

222	Z1	L6	Q27
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362	Z1	L10	Q11

[Table 1-4]

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448	Z1	L12	Q19
449	Z1	L12	Q20
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451	Z1	L12	Q22
452	Z1	L12	Q23
453	Z1	L12	Q24
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455	Z1	L12	Q26
456	Z1	L12	Q27
457	Z1	L12	Q28
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475	Z1	L13	Q7
476	Z1	L13	Q8
477	Z1	L13	Q9
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492	Z1	L13	Q24
493	Z1	L13	Q25
494	Z1	L13	Q26
495	Z1	L13	Q27
496	Z1	L13	Q28
497	Z1	L13	Q29
498	Z1	L13	Q30
499	Z1	L13	Q31
500	Z1	L13	Q32
501	Z1	L13	Q33
502	Z1	L13	Q34
503	Z1	L13	Q35

[Table 1-5]

504	Z1	L13	Q36
505	Z1	L13	Q37
506	Z1	L13	Q38
507	Z1	L13	Q39
508	Z1	L14	Q1
509	Z1	L14	Q2
510	Z1	L14	Q3
511	Z1	L14	Q4
512	Z1	L14	Q5
513	Z1	L14	Q6
514	Z1	L14	Q7
515	Z1	L14	Q8
516	Z1	L14	Q9
517	Z1	L14	Q10
518	Z1	L14	Q11
519	Z1	L14	Q12
520	Z1	L14	Q13
521	Z1	L14	Q14
522	Z1	L14	Q15
523	Z1	L14	Q16
524	Z1	L14	Q17
525	Z1	L14	Q18
526	Z1	L14	Q19
527	Z1	L14	Q20
528	Z1	L14	Q21
529	Z1	L14	Q22
530	Z1	L14	Q23
531	Z1	L14	Q24
532	Z1	L14	Q25
533	Z1	L14	Q26
534	Z1	L14	Q27
535	Z1	L14	Q28
536	Z1	L14	Q29
537	Z1	L14	Q30
538	Z1	L14	Q31
539	Z1	L14	Q32
540	Z1	L14	Q33
541	Z1	L14	Q34
542	Z1	L14	Q35
543	Z1	L14	Q36
544	Z1	L14	Q37
545	Z1	L14	Q38
546	Z1	L14	Q39
547	Z2	L1	Q1
548	Z2	L1	Q2
549	Z2	L1	Q3
550	Z2	L1	Q4
551	Z2	L1	Q5
552	Z2	L1	Q6
553	Z2	L1	Q7
554	Z2	L1	Q8
555	Z2	L1	Q9
556	Z2	L1	Q10
557	Z2	L1	Q11
558	Z2	L1	Q12
559	Z2	L1	Q13
560	Z2	L1	Q14
561	Z2	L1	Q15
562	Z2	L1	Q16
563	Z2	L1	Q17
564	Z2	L1	Q18
565	Z2	L1	Q19
566	Z2	L1	Q20
567	Z2	L1	Q21
568	Z2	L1	Q22
569	Z2	L1	Q23
570	Z2	L1	Q24
571	Z2	L1	Q25
572	Z2	L1	Q26
573	Z2	L1	Q27
574	Z2	L1	Q28
575	Z2	L1	Q29
576	Z2	L1	Q30
577	Z2	L1	Q31
578	Z2	L1	Q32
579	Z2	L1	Q33
580	Z2	L1	Q34
581	Z2	L1	Q35
582	Z2	L1	Q36
583	Z2	L1	Q37
584	Z2	L1	Q38
585	Z2	L1	Q39
586	Z2	L2	Q1
587	Z2	L2	Q2
588	Z2	L2	Q3
589	Z2	L2	Q4
590	Z2	L2	Q5
591	Z2	L2	Q6
592	Z2	L2	Q7
593	Z2	L2	Q8
594	Z2	L2	Q9
595	Z2	L2	Q10
596	Z2	L2	Q11
597	Z2	L2	Q12
598	Z2	L2	Q13
599	Z2	L2	Q14
600	Z2	L2	Q15
601	Z2	L2	Q16
602	Z2	L2	Q17
603	Z2	L2	Q18
604	Z2	L2	Q19
605	Z2	L2	Q20
606	Z2	L2	Q21
607	Z2	L2	Q22
608	Z2	L2	Q23
609	Z2	L2	Q24
610	Z2	L2	Q25
611	Z2	L2	Q26
612	Z2	L2	Q27
613	Z2	L2	Q28
614	Z2	L2	Q29
615	Z2	L2	Q30
616	Z2	L2	Q31
617	Z2	L2	Q32
618	Z2	L2	Q33
619	Z2	L2	Q34
620	Z2	L2	Q35
621	Z2	L2	Q36
622	Z2	L2	Q37
623	Z2	L2	Q38
624	Z2	L2	Q39
625	Z2	L3	Q1
626	Z2	L3	Q2
627	Z2	L3	Q3
628	Z2	L3	Q4
629	Z2	L3	Q5
630	Z2	L3	Q6
631	Z2	L3	Q7
632	Z2	L3	Q8
633	Z2	L3	Q9
634	Z2	L3	Q10
635	Z2	L3	Q11
636	Z2	L3	Q12
637	Z2	L3	Q13
638	Z2	L3	Q14
639	Z2	L3	Q15
640	Z2	L3	Q16
641	Z2	L3	Q17
642	Z2	L3	Q18
643	Z2	L3	Q19
644	Z2	L3	Q20

[Table 1-6]

645	Z2	L3	Q21
646	Z2	L3	Q22
647	Z2	L3	Q23
648	Z2	L3	Q24
649	Z2	L3	Q25
650	Z2	L3	Q26
651	Z2	L3	Q27
652	Z2	L3	Q28
653	Z2	L3	Q29
654	Z2	L3	Q30
655	Z2	L3	Q31
656	Z2	L3	Q32
657	Z2	L3	Q33
658	Z2	L3	Q34
659	Z2	L3	Q35
660	Z2	L3	Q36
661	Z2	L3	Q37
662	Z2	L3	Q38
663	Z2	L3	Q39
664	Z2	L4	Q1
665	Z2	L4	Q2
666	Z2	L4	Q3
667	Z2	L4	Q4
668	Z2	L4	Q5
669	Z2	L4	Q6
670	Z2	L4	Q7
671	Z2	L4	Q8
672	Z2	L4	Q9
673	Z2	L4	Q10
674	Z2	L4	Q11
675	Z2	L4	Q12
676	Z2	L4	Q13
677	Z2	L4	Q14
678	Z2	L4	Q15
679	Z2	L4	Q16
680	Z2	L4	Q17
681	Z2	L4	Q18
682	Z2	L4	Q19
683	Z2	L4	Q20
684	Z2	L4	Q21
685	Z2	L4	Q22
686	Z2	L4	Q23
687	Z2	L4	Q24
688	Z2	L4	Q25
689	Z2	L4	Q26
690	Z2	L4	Q27
691	Z2	L4	Q28
692	Z2	L4	Q29
693	Z2	L4	Q30
694	Z2	L4	Q31
695	Z2	L4	Q32
696	Z2	L4	Q33
697	Z2	L4	Q34
698	Z2	L4	Q35
699	Z2	L4	Q36
700	Z2	L4	Q37
701	Z2	L4	Q38
702	Z2	L4	Q39
703	Z2	L5	Q1
704	Z2	L5	Q2
705	Z2	L5	Q3
706	Z2	L5	Q4
707	Z2	L5	Q5
708	Z2	L5	Q6
709	Z2	L5	Q7
710	Z2	L5	Q8
711	Z2	L5	Q9
712	Z2	L5	Q10
713	Z2	L5	Q11
714	Z2	L5	Q12
715	Z2	L5	Q13
716	Z2	L5	Q14
717	Z2	L5	Q15
718	Z2	L5	Q16
719	Z2	L5	Q17
720	Z2	L5	Q18
721	Z2	L5	Q19
722	Z2	L5	Q20
723	Z2	L5	Q21
724	Z2	L5	Q22
725	Z2	L5	Q23
726	Z2	L5	Q24
727	Z2	L5	Q25
728	Z2	L5	Q26
729	Z2	L5	Q27
730	Z2	L5	Q28
731	Z2	L5	Q29
732	Z2	L5	Q30
733	Z2	L5	Q31
734	Z2	L5	Q32
735	Z2	L5	Q33
736	Z2	L5	Q34
737	Z2	L5	Q35
738	Z2	L5	Q36
739	Z2	L5	Q37
740	Z2	L5	Q38
741	Z2	L5	Q39
742	Z2	L6	Q1
743	Z2	L6	Q2
744	Z2	L6	Q3
745	Z2	L6	Q4
746	Z2	L6	Q5
747	Z2	L6	Q6
748	Z2	L6	Q7
749	Z2	L6	Q8
750	Z2	L6	Q9
751	Z2	L6	Q10
752	Z2	L6	Q11
753	Z2	L6	Q12
754	Z2	L6	Q13
755	Z2	L6	Q14
756	Z2	L6	Q15
757	Z2	L6	Q16
758	Z2	L6	Q17
759	Z2	L6	Q18
760	Z2	L6	Q19
761	Z2	L6	Q20
762	Z2	L6	Q21
763	Z2	L6	Q22
764	Z2	L6	Q23
765	Z2	L6	Q24
766	Z2	L6	Q25
767	Z2	L6	Q26
768	Z2	L6	Q27
769	Z2	L6	Q28
770	Z2	L6	Q29
771	Z2	L6	Q30
772	Z2	L6	Q31
773	Z2	L6	Q32
774	Z2	L6	Q33
775	Z2	L6	Q34
776	Z2	L6	Q35
777	Z2	L6	Q36
778	Z2	L6	Q37
779	Z2	L6	Q38
780	Z2	L6	Q39
781	Z2	L7	Q1
782	Z2	L7	Q2
783	Z2	L7	Q3
784	Z2	L7	Q4
785	Z2	L7	Q5

[Table 1-7]

786	Z2	L7	Q6
787	Z2	L7	Q7
788	Z2	L7	Q8
789	Z2	L7	Q9
790	Z2	L7	Q10
791	Z2	L7	Q11
792	Z2	L7	Q12
793	Z2	L7	Q13
794	Z2	L7	Q14
795	Z2	L7	Q15
796	Z2	L7	Q16
797	Z2	L7	Q17
798	Z2	L7	Q18
799	Z2	L7	Q19
800	Z2	L7	Q20
801	Z2	L7	Q21
802	Z2	L7	Q22
803	Z2	L7	Q23
804	Z2	L7	Q24
805	Z2	L7	Q25
806	Z2	L7	Q26
807	Z2	L7	Q27
808	Z2	L7	Q28
809	Z2	L7	Q29
810	Z2	L7	Q30
811	Z2	L7	Q31
812	Z2	L7	Q32
813	Z2	L7	Q33
814	Z2	L7	Q34
815	Z2	L7	Q35
816	Z2	L7	Q36
817	Z2	L7	Q37
818	Z2	L7	Q38
819	Z2	L7	Q39
820	Z2	L8	Q1
821	Z2	L8	Q2
822	Z2	L8	Q3
823	Z2	L8	Q4
824	Z2	L8	Q5
825	Z2	L8	Q6
826	Z2	L8	Q7
827	Z2	L8	Q8
828	Z2	L8	Q9
829	Z2	L8	Q10
830	Z2	L8	Q11
831	Z2	L8	Q12
832	Z2	L8	Q13
833	Z2	L8	Q14
834	Z2	L8	Q15
835	Z2	L8	Q16
836	Z2	L8	Q17
837	Z2	L8	Q18
838	Z2	L8	Q19
839	Z2	L8	Q20
840	Z2	L8	Q21
841	Z2	L8	Q22
842	Z2	L8	Q23
843	Z2	L8	Q24
844	Z2	L8	Q25
845	Z2	L8	Q26
846	Z2	L8	Q27
847	Z2	L8	Q28
848	Z2	L8	Q29
849	Z2	L8	Q30
850	Z2	L8	Q31
851	Z2	L8	Q32
852	Z2	L8	Q33
853	Z2	L8	Q34
854	Z2	L8	Q35
855	Z2	L8	Q36
856	Z2	L8	Q37
857	Z2	L8	Q38
858	Z2	L8	Q39
859	Z2	L9	Q1
860	Z2	L9	Q2
861	Z2	L9	Q3
862	Z2	L9	Q4
863	Z2	L9	Q5
864	Z2	L9	Q6
865	Z2	L9	Q7
866	Z2	L9	Q8
867	Z2	L9	Q9
868	Z2	L9	Q10
869	Z2	L9	Q11
870	Z2	L9	Q12
871	Z2	L9	Q13
872	Z2	L9	Q14
873	Z2	L9	Q15
874	Z2	L9	Q16
875	Z2	L9	Q17
876	Z2	L9	Q18
877	Z2	L9	Q19
878	Z2	L9	Q20
879	Z2	L9	Q21
880	Z2	L9	Q22
881	Z2	L9	Q23
882	Z2	L9	Q24
883	Z2	L9	Q25
884	Z2	L9	Q26
885	Z2	L9	Q27
886	Z2	L9	Q28
887	Z2	L9	Q29
888	Z2	L9	Q30
889	Z2	L9	Q31
890	Z2	L9	Q32
891	Z2	L9	Q33
892	Z2	L9	Q34
893	Z2	L9	Q35
894	Z2	L9	Q36
895	Z2	L9	Q37
896	Z2	L9	Q38
897	Z2	L9	Q39
898	Z2	L10	Q1
899	Z2	L10	Q2
900	Z2	L10	Q3
901	Z2	L10	Q4
902	Z2	L10	Q5
903	Z2	L10	Q6
904	Z2	L10	Q7
905	Z2	L10	Q8
906	Z2	L10	Q9
907	Z2	L10	Q10
908	Z2	L10	Q11
909	Z2	L10	Q12
910	Z2	L10	Q13
911	Z2	L10	Q14
912	Z2	L10	Q15
913	Z2	L10	Q16
914	Z2	L10	Q17
915	Z2	L10	Q18
916	Z2	L10	Q19
917	Z2	L10	Q20
918	Z2	L10	Q21
919	Z2	L10	Q22
920	Z2	L10	Q23
921	Z2	L10	Q24
922	Z2	L10	Q25
923	Z2	L10	Q26
924	Z2	L10	Q27
925	Z2	L10	Q28
926	Z2	L10	Q29

[Table 1-8]

927	Z2	L10	Q30
928	Z2	L10	Q31
929	Z2	L10	Q32
930	Z2	L10	Q33
931	Z2	L10	Q34
932	Z2	L10	Q35
933	Z2	L10	Q36
934	Z2	L10	Q37
935	Z2	L10	Q38
936	Z2	L10	Q39
937	Z2	L11	Q1
938	Z2	L11	Q2
939	Z2	L11	Q3
940	Z2	L11	Q4
941	Z2	L11	Q5
942	Z2	L11	Q6
943	Z2	L11	Q7
944	Z2	L11	Q8
945	Z2	L11	Q9
946	Z2	L11	Q10
947	Z2	L11	Q11
948	Z2	L11	Q12
949	Z2	L11	Q13
950	Z2	L11	Q14
951	Z2	L11	Q15
952	Z2	L11	Q16
953	Z2	L11	Q17
954	Z2	L11	Q18
955	Z2	L11	Q19
956	Z2	L11	Q20
957	Z2	L11	Q21
958	Z2	L11	Q22
959	Z2	L11	Q23
960	Z2	L11	Q24
961	Z2	L11	Q25
962	Z2	L11	Q26
963	Z2	L11	Q27
964	Z2	L11	Q28
965	Z2	L11	Q29
966	Z2	L11	Q30
967	Z2	L11	Q31
968	Z2	L11	Q32
969	Z2	L11	Q33
970	Z2	L11	Q34
971	Z2	L11	Q35
972	Z2	L11	Q36
973	Z2	L11	Q37
974	Z2	L11	Q38
975	Z2	L11	Q39
976	Z2	L12	Q1
977	Z2	L12	Q2
978	Z2	L12	Q3
979	Z2	L12	Q4
980	Z2	L12	Q5
981	Z2	L12	Q6
982	Z2	L12	Q7
983	Z2	L12	Q8
984	Z2	L12	Q9
985	Z2	L12	Q10
986	Z2	L12	Q11
987	Z2	L12	Q12
988	Z2	L12	Q13
989	Z2	L12	Q14
990	Z2	L12	Q15
991	Z2	L12	Q16
992	Z2	L12	Q17
993	Z2	L12	Q18
994	Z2	L12	Q19
995	Z2	L12	Q20
996	Z2	L12	Q21
997	Z2	L12	Q22
998	Z2	L12	Q23
999	Z2	L12	Q24
1000	Z2	L12	Q25
1001	Z2	L12	Q26
1002	Z2	L12	Q27
1003	Z2	L12	Q28
1004	Z2	L12	Q29
1005	Z2	L12	Q30
1006	Z2	L12	Q31
1007	Z2	L12	Q32
1008	Z2	L12	Q33
1009	Z2	L12	Q34
1010	Z2	L12	Q35
1011	Z2	L12	Q36
1012	Z2	L12	Q37
1013	Z2	L12	Q38
1014	Z2	L12	Q39
1015	Z2	L13	Q1
1016	Z2	L13	Q2
1017	Z2	L13	Q3
1018	Z2	L13	Q4
1019	Z2	L13	Q5
1020	Z2	L13	Q6
1021	Z2	L13	Q7
1022	Z2	L13	Q8
1023	Z2	L13	Q9
1024	Z2	L13	Q10
1025	Z2	L13	Q11
1026	Z2	L13	Q12
1027	Z2	L13	Q13
1028	Z2	L13	Q14
1029	Z2	L13	Q15
1030	Z2	L13	Q16
1031	Z2	L13	Q17
1032	Z2	L13	Q18
1033	Z2	L13	Q19
1034	Z2	L13	Q20
1035	Z2	L13	Q21
1036	Z2	L13	Q22
1037	Z2	L13	Q23
1038	Z2	L13	Q24
1039	Z2	L13	Q25
1040	Z2	L13	Q26
1041	Z2	L13	Q27
1042	Z2	L13	Q28
1043	Z2	L13	Q29
1044	Z2	L13	Q30
1045	Z2	L13	Q31
1046	Z2	L13	Q32
1047	Z2	L13	Q33
1048	Z2	L13	Q34
1049	Z2	L13	Q35
1050	Z2	L13	Q36
1051	Z2	L13	Q37
1052	Z2	L13	Q38
1053	Z2	L13	Q39
1054	Z2	L14	Q1
1055	Z2	L14	Q2
1056	Z2	L14	Q3
1057	Z2	L14	Q4
1058	Z2	L14	Q5
1059	Z2	L14	Q6
1060	Z2	L14	Q7
1061	Z2	L14	Q8
1062	Z2	L14	Q9
1063	Z2	L14	Q10
1064	Z2	L14	Q11
1065	Z2	L14	Q12
1066	Z2	L14	Q13
1067	Z2	L14	Q14

[Table 1-9]

1068	Z2	L14	Q15
1069	Z2	L14	Q16
1070	Z2	L14	Q17
1071	Z2	L14	Q18
1072	Z2	L14	Q19
1073	Z2	L14	Q20
1074	Z2	L14	Q21
1075	Z2	L14	Q22
1076	Z2	L14	Q23
1077	Z2	L14	Q24
1078	Z2	L14	Q25
1079	Z2	L14	Q26
1080	Z2	L14	Q27
1081	Z2	L14	Q28
1082	Z2	L14	Q29
1083	Z2	L14	Q30
1084	Z2	L14	Q31
1085	Z2	L14	Q32
1086	Z2	L14	Q33
1087	Z2	L14	Q34
1088	Z2	L14	Q35
1089	Z2	L14	Q36
1090	Z2	L14	Q37
1091	Z2	L14	Q38
1092	Z2	L14	Q39
1093	Z3	L1	Q1
1094	Z3	L1	Q2
1095	Z3	L1	Q3
1096	Z3	L1	Q4
1097	Z3	L1	Q5
1098	Z3	L1	Q6
1099	Z3	L1	Q7
1100	Z3	L1	Q8
1101	Z3	L1	Q9
1102	Z3	L1	Q10
1103	Z3	L1	Q11
1104	Z3	L1	Q12
1105	Z3	L1	Q13
1106	Z3	L1	Q14
1107	Z3	L1	Q15
1108	Z3	L1	Q16
1109	Z3	L1	Q17
1110	Z3	L1	Q18
1111	Z3	L1	Q19
1112	Z3	L1	Q20
1113	Z3	L1	Q21
1114	Z3	L1	Q22
1115	Z3	L1	Q23
1116	Z3	L1	Q24
1117	Z3	L1	Q25
1118	Z3	L1	Q26
1119	Z3	L1	Q27
1120	Z3	L1	Q28
1121	Z3	L1	Q29
1122	Z3	L1	Q30
1123	Z3	L1	Q31
1124	Z3	L1	Q32
1125	Z3	L1	Q33
1126	Z3	L1	Q34
1127	Z3	L1	Q35
1128	Z3	L1	Q36
1129	Z3	L1	Q37
1130	Z3	L1	Q38
1131	Z3	L1	Q39
1132	Z3	L2	Q1
1133	Z3	L2	Q2
1134	Z3	L2	Q3
1135	Z3	L2	Q4
1136	Z3	L2	Q5
1137	Z3	L2	Q6
1138	Z3	L2	Q7
1139	Z3	L2	Q8
1140	Z3	L2	Q9
1141	Z3	L2	Q10
1142	Z3	L2	Q11
1143	Z3	L2	Q12
1144	Z3	L2	Q13
1145	Z3	L2	Q14
1146	Z3	L2	Q15
1147	Z3	L2	Q16
1148	Z3	L2	Q17
1149	Z3	L2	Q18
1150	Z3	L2	Q19
1151	Z3	L2	Q20
1152	Z3	L2	Q21
1153	Z3	L2	Q22
1154	Z3	L2	Q23
1155	Z3	L2	Q24
1156	Z3	L2	Q25
1157	Z3	L2	Q26
1158	Z3	L2	Q27
1159	Z3	L2	Q28
1160	Z3	L2	Q29
1161	Z3	L2	Q30
1162	Z3	L2	Q31
1163	Z3	L2	Q32
1164	Z3	L2	Q33
1165	Z3	L2	Q34
1166	Z3	L2	Q35
1167	Z3	L2	Q36
1168	Z3	L2	Q37
1169	Z3	L2	Q38
1170	Z3	L2	Q39
1171	Z3	L3	Q1
1172	Z3	L3	Q2
1173	Z3	L3	Q3
1174	Z3	L3	Q4
1175	Z3	L3	Q5
1176	Z3	L3	Q6
1177	Z3	L3	Q7
1178	Z3	L3	Q8
1179	Z3	L3	Q9
1180	Z3	L3	Q10
1181	Z3	L3	Q11
1182	Z3	L3	Q12
1183	Z3	L3	Q13
1184	Z3	L3	Q14
1185	Z3	L3	Q15
1186	Z3	L3	Q16
1187	Z3	L3	Q17
1188	Z3	L3	Q18
1189	Z3	L3	Q19
1190	Z3	L3	Q20
1191	Z3	L3	Q21
1192	Z3	L3	Q22
1193	Z3	L3	Q23
1194	Z3	L3	Q24
1195	Z3	L3	Q25
1196	Z3	L3	Q26
1197	Z3	L3	Q27
1198	Z3	L3	Q28
1199	Z3	L3	Q29
1200	Z3	L3	Q30
1201	Z3	L3	Q31
1202	Z3	L3	Q32
1203	Z3	L3	Q33
1204	Z3	L3	Q34
1205	Z3	L3	Q35
1206	Z3	L3	Q36
1207	Z3	L3	Q37
1208	Z3	L3	Q38

[Table 1-10]

1209	Z3	L3	Q39
1210	Z3	L4	Q1
1211	Z3	L4	Q2
1212	Z3	L4	Q3
1213	Z3	L4	Q4
1214	Z3	L4	Q5
1215	Z3	L4	Q6
1216	Z3	L4	Q7
1217	Z3	L4	Q8
1218	Z3	L4	Q9
1219	Z3	L4	Q10
1220	Z3	L4	Q11
1221	Z3	L4	Q12
1222	Z3	L4	Q13
1223	Z3	L4	Q14
1224	Z3	L4	Q15
1225	Z3	L4	Q16
1226	Z3	L4	Q17
1227	Z3	L4	Q18
1228	Z3	L4	Q19
1229	Z3	L4	Q20
1230	Z3	L4	Q21
1231	Z3	L4	Q22
1232	Z3	L4	Q23
1233	Z3	L4	Q24
1234	Z3	L4	Q25
1235	Z3	L4	Q26
1236	Z3	L4	Q27
1237	Z3	L4	Q28
1238	Z3	L4	Q29
1239	Z3	L4	Q30
1240	Z3	L4	Q31
1241	Z3	L4	Q32
1242	Z3	L4	Q33
1243	Z3	L4	Q34
1244	Z3	L4	Q35
1245	Z3	L4	Q36
1246	Z3	L4	Q37
1247	Z3	L4	Q38
1248	Z3	L4	Q39
1249	Z3	L5	Q1
1250	Z3	L5	Q2
1251	Z3	L5	Q3
1252	Z3	L5	Q4
1253	Z3	L5	Q5
1254	Z3	L5	Q6
1255	Z3	L5	Q7
1256	Z3	L5	Q8
1257	Z3	L5	Q9
1258	Z3	L5	Q10
1259	Z3	L5	Q11
1260	Z3	L5	Q12
1261	Z3	L5	Q13
1262	Z3	L5	Q14
1263	Z3	L5	Q15
1264	Z3	L5	Q16
1265	Z3	L5	Q17
1266	Z3	L5	Q18
1267	Z3	L5	Q19
1268	Z3	L5	Q20
1269	Z3	L5	Q21
1270	Z3	L5	Q22
1271	Z3	L5	Q23
1272	Z3	L5	Q24
1273	Z3	L5	Q25
1274	Z3	L5	Q26
1275	Z3	L5	Q27
1276	Z3	L5	Q28
1277	Z3	L5	Q29
1278	Z3	L5	Q30
1279	Z3	L5	Q31
1280	Z3	L5	Q32
1281	Z3	L5	Q33
1282	Z3	L5	Q34
1283	Z3	L5	Q35
1284	Z3	L5	Q36
1285	Z3	L5	Q37
1286	Z3	L5	Q38
1287	Z3	L5	Q39
1288	Z3	L6	Q1
1289	Z3	L6	Q2
1290	Z3	L6	Q3
1291	Z3	L6	Q4
1292	Z3	L6	Q5
1293	Z3	L6	Q6
1294	Z3	L6	Q7
1295	Z3	L6	Q8
1296	Z3	L6	Q9
1297	Z3	L6	Q10
1298	Z3	L6	Q11
1299	Z3	L6	Q12
1300	Z3	L6	Q13
1301	Z3	L6	Q14
1302	Z3	L6	Q15
1303	Z3	L6	Q16
1304	Z3	L6	Q17
1305	Z3	L6	Q18
1306	Z3	L6	Q19
1307	Z3	L6	Q20
1308	Z3	L6	Q21
1309	Z3	L6	Q22
1310	Z3	L6	Q23
1311	Z3	L6	Q24
1312	Z3	L6	Q25
1313	Z3	L6	Q26
1314	Z3	L6	Q27
1315	Z3	L6	Q28
1316	Z3	L6	Q29
1317	Z3	L6	Q30
1318	Z3	L6	Q31
1319	Z3	L6	Q32
1320	Z3	L6	Q33
1321	Z3	L6	Q34
1322	Z3	L6	Q35
1323	Z3	L6	Q36
1324	Z3	L6	Q37
1325	Z3	L6	Q38
1326	Z3	L6	Q39
1327	Z3	L7	Q1
1328	Z3	L7	Q2
1329	Z3	L7	Q3
1330	Z3	L7	Q4
1331	Z3	L7	Q5
1332	Z3	L7	Q6
1333	Z3	L7	Q7
1334	Z3	L7	Q8
1335	Z3	L7	Q9
1336	Z3	L7	Q10
1337	Z3	L7	Q11
1338	Z3	L7	Q12
1339	Z3	L7	Q13
1340	Z3	L7	Q14
1341	Z3	L7	Q15
1342	Z3	L7	Q16
1343	Z3	L7	Q17
1344	Z3	L7	Q18
1345	Z3	L7	Q19
1346	Z3	L7	Q20
1347	Z3	L7	Q21
1348	Z3	L7	Q22
1349	Z3	L7	Q23

[Table 1-11]

1350	Z3	L7	Q24
1351	Z3	L7	Q25
1352	Z3	L7	Q26
1353	Z3	L7	Q27
1354	Z3	L7	Q28
1355	Z3	L7	Q29
1356	Z3	L7	Q30
1357	Z3	L7	Q31
1358	Z3	L7	Q32
1359	Z3	L7	Q33
1360	Z3	L7	Q34
1361	Z3	L7	Q35
1362	Z3	L7	Q36
1363	Z3	L7	Q37
1364	Z3	L7	Q38
1365	Z3	L7	Q39
1366	Z3	L8	Q1
1367	Z3	L8	Q2
1368	Z3	L8	Q3
1369	Z3	L8	Q4
1370	Z3	L8	Q5
1371	Z3	L8	Q6
1372	Z3	L8	Q7
1373	Z3	L8	Q8
1374	Z3	L8	Q9
1375	Z3	L8	Q10
1376	Z3	L8	Q11
1377	Z3	L8	Q12
1378	Z3	L8	Q13
1379	Z3	L8	Q14
1380	Z3	L8	Q15
1381	Z3	L8	Q16
1382	Z3	L8	Q17
1383	Z3	L8	Q18
1384	Z3	L8	Q19
1385	Z3	L8	Q20
1386	Z3	L8	Q21
1387	Z3	L8	Q22
1388	Z3	L8	Q23
1389	Z3	L8	Q24
1390	Z3	L8	Q25
1391	Z3	L8	Q26
1392	Z3	L8	Q27
1393	Z3	L8	Q28
1394	Z3	L8	Q29
1395	Z3	L8	Q30
1396	Z3	L8	Q31
1397	Z3	L8	Q32
1398	Z3	L8	Q33
1399	Z3	L8	Q34
1400	Z3	L8	Q35
1401	Z3	L8	Q36
1402	Z3	L8	Q37
1403	Z3	L8	Q38
1404	Z3	L8	Q39
1405	Z3	L9	Q1
1406	Z3	L9	Q2
1407	Z3	L9	Q3
1408	Z3	L9	Q4
1409	Z3	L9	Q5
1410	Z3	L9	Q6
1411	Z3	L9	Q7
1412	Z3	L9	Q8
1413	Z3	L9	Q9
1414	Z3	L9	Q10
1415	Z3	L9	Q11
1416	Z3	L9	Q12
1417	Z3	L9	Q13
1418	Z3	L9	Q14
1419	Z3	L9	Q15
1420	Z3	L9	Q16
1421	Z3	L9	Q17
1422	Z3	L9	Q18
1423	Z3	L9	Q19
1424	Z3	L9	Q20
1425	Z3	L9	Q21
1426	Z3	L9	Q22
1427	Z3	L9	Q23
1428	Z3	L9	Q24
1429	Z3	L9	Q25
1430	Z3	L9	Q26
1431	Z3	L9	Q27
1432	Z3	L9	Q28
1433	Z3	L9	Q29
1434	Z3	L9	Q30
1435	Z3	L9	Q31
1436	Z3	L9	Q32
1437	Z3	L9	Q33
1438	Z3	L9	Q34
1439	Z3	L9	Q35
1440	Z3	L9	Q36
1441	Z3	L9	Q37
1442	Z3	L9	Q38
1443	Z3	L9	Q39
1444	Z3	L10	Q1
1445	Z3	L10	Q2
1446	Z3	L10	Q3
1447	Z3	L10	Q4
1448	Z3	L10	Q5
1449	Z3	L10	Q6
1450	Z3	L10	Q7
1451	Z3	L10	Q8
1452	Z3	L10	Q9
1453	Z3	L10	Q10
1454	Z3	L10	Q11
1455	Z3	L10	Q12
1456	Z3	L10	Q13
1457	Z3	L10	Q14
1458	Z3	L10	Q15
1459	Z3	L10	Q16
1460	Z3	L10	Q17
1461	Z3	L10	Q18
1462	Z3	L10	Q19
1463	Z3	L10	Q20
1464	Z3	L10	Q21
1465	Z3	L10	Q22
1466	Z3	L10	Q23
1467	Z3	L10	Q24
1468	Z3	L10	Q25
1469	Z3	L10	Q26
1470	Z3	L10	Q27
1471	Z3	L10	Q28
1472	Z3	L10	Q29
1473	Z3	L10	Q30
1474	Z3	L10	Q31
1475	Z3	L10	Q32
1476	Z3	L10	Q33
1477	Z3	L10	Q34
1478	Z3	L10	Q35
1479	Z3	L10	Q36
1480	Z3	L10	Q37
1481	Z3	L10	Q38
1482	Z3	L10	Q39
1483	Z3	L11	Q1
1484	Z3	L11	Q2
1485	Z3	L11	Q3
1486	Z3	L11	Q4
1487	Z3	L11	Q5
1488	Z3	L11	Q6
1489	Z3	L11	Q7
1490	Z3	L11	Q8

[Table 1-12]

1491	Z3	L11	Q9
1492	Z3	L11	Q10
1493	Z3	L11	Q11
1494	Z3	L11	Q12
1495	Z3	L11	Q13
1496	Z3	L11	Q14
1497	Z3	L11	Q15
1498	Z3	L11	Q16
1499	Z3	L11	Q17
1500	Z3	L11	Q18
1501	Z3	L11	Q19
1502	Z3	L11	Q20
1503	Z3	L11	Q21
1504	Z3	L11	Q22
1505	Z3	L11	Q23
1506	Z3	L11	Q24
1507	Z3	L11	Q25
1508	Z3	L11	Q26
1509	Z3	L11	Q27
1510	Z3	L11	Q28
1511	Z3	L11	Q29
1512	Z3	L11	Q30
1513	Z3	L11	Q31
1514	Z3	L11	Q32
1515	Z3	L11	Q33
1516	Z3	L11	Q34
1517	Z3	L11	Q35
1518	Z3	L11	Q36
1519	Z3	L11	Q37
1520	Z3	L11	Q38
1521	Z3	L11	Q39
1522	Z3	L12	Q1
1523	Z3	L12	Q2
1524	Z3	L12	Q3
1525	Z3	L12	Q4
1526	Z3	L12	Q5
1527	Z3	L12	Q6
1528	Z3	L12	Q7
1529	Z3	L12	Q8
1530	Z3	L12	Q9
1531	Z3	L12	Q10
1532	Z3	L12	Q11
1533	Z3	L12	Q12
1534	Z3	L12	Q13
1535	Z3	L12	Q14
1536	Z3	L12	Q15
1537	Z3	L12	Q16
1538	Z3	L12	Q17
1539	Z3	L12	Q18
1540	Z3	L12	Q19
1541	Z3	L12	Q20
1542	Z3	L12	Q21
1543	Z3	L12	Q22
1544	Z3	L12	Q23
1545	Z3	L12	Q24
1546	Z3	L12	Q25
1547	Z3	L12	Q26
1548	Z3	L12	Q27
1549	Z3	L12	Q28
1550	Z3	L12	Q29
1551	Z3	L12	Q30
1552	Z3	L12	Q31
1553	Z3	L12	Q32
1554	Z3	L12	Q33
1555	Z3	L12	Q34
1556	Z3	L12	Q35
1557	Z3	L12	Q36
1558	Z3	L12	Q37
1559	Z3	L12	Q38
1560	Z3	L12	Q39
1561	Z3	L13	Q1
1562	Z3	L13	Q2
1563	Z3	L13	Q3
1564	Z3	L13	Q4
1565	Z3	L13	Q5
1566	Z3	L13	Q6
1567	Z3	L13	Q7
1568	Z3	L13	Q8
1569	Z3	L13	Q9
1570	Z3	L13	Q10
1571	Z3	L13	Q11
1572	Z3	L13	Q12
1573	Z3	L13	Q13
1574	Z3	L13	Q14
1575	Z3	L13	Q15
1576	Z3	L13	Q16
1577	Z3	L13	Q17
1578	Z3	L13	Q18
1579	Z3	L13	Q19
1580	Z3	L13	Q20
1581	Z3	L13	Q21
1582	Z3	L13	Q22
1583	Z3	L13	Q23
1584	Z3	L13	Q24
1585	Z3	L13	Q25
1586	Z3	L13	Q26
1587	Z3	L13	Q27
1588	Z3	L13	Q28
1589	Z3	L13	Q29
1590	Z3	L13	Q30
1591	Z3	L13	Q31
1592	Z3	L13	Q32
1593	Z3	L13	Q33
1594	Z3	L13	Q34
1595	Z3	L13	Q35
1596	Z3	L13	Q36
1597	Z3	L13	Q37
1598	Z3	L13	Q38
1599	Z3	L13	Q39
1600	Z3	L14	Q1
1601	Z3	L14	Q2
1602	Z3	L14	Q3
1603	Z3	L14	Q4
1604	Z3	L14	Q5
1605	Z3	L14	Q6
1606	Z3	L14	Q7
1607	Z3	L14	Q8
1608	Z3	L14	Q9
1609	Z3	L14	Q10
1610	Z3	L14	Q11
1611	Z3	L14	Q12
1612	Z3	L14	Q13
1613	Z3	L14	Q14
1614	Z3	L14	Q15
1615	Z3	L14	Q16
1616	Z3	L14	Q17
1617	Z3	L14	Q18
1618	Z3	L14	Q19
1619	Z3	L14	Q20
1620	Z3	L14	Q21
1621	Z3	L14	Q22
1622	Z3	L14	Q23
1623	Z3	L14	Q24
1624	Z3	L14	Q25
1625	Z3	L14	Q26
1626	Z3	L14	Q27
1627	Z3	L14	Q28
1628	Z3	L14	Q29
1629	Z3	L14	Q30
1630	Z3	L14	Q31
1631	Z3	L14	Q32

[Table 1-13]

1632	Z3	L14	Q33
1633	Z3	L14	Q34
1634	Z3	L14	Q35
1635	Z3	L14	Q36
1636	Z3	L14	Q37
1637	Z3	L14	Q38
1638	Z3	L14	Q39
1639	Z4	L1	Q1
1640	Z4	L1	Q2
1641	Z4	L1	Q3
1642	Z4	L1	Q4
1643	Z4	L1	Q5
1644	Z4	L1	Q6
1645	Z4	L1	Q7
1646	Z4	L1	Q8
1647	Z4	L1	Q9
1648	Z4	L1	Q10
1649	Z4	L1	Q11
1650	Z4	L1	Q12
1651	Z4	L1	Q13
1652	Z4	L1	Q14
1653	Z4	L1	Q15
1654	Z4	L1	Q16
1655	Z4	L1	Q17
1656	Z4	L1	Q18
1657	Z4	L1	Q19
1658	Z4	L1	Q20
1659	Z4	L1	Q21
1660	Z4	L1	Q22
1661	Z4	L1	Q23
1662	Z4	L1	Q24
1663	Z4	L1	Q25
1664	Z4	L1	Q26
1665	Z4	L1	Q27
1666	Z4	L1	Q28
1667	Z4	L1	Q29
1668	Z4	L1	Q30
1669	Z4	L1	Q31
1670	Z4	L1	Q32
1671	Z4	L1	Q33
1672	Z4	L1	Q34
1673	Z4	L1	Q35
1674	Z4	L1	Q36
1675	Z4	L1	Q37
1676	Z4	L1	Q38
1677	Z4	L1	Q39
1678	Z4	L2	Q1
1679	Z4	L2	Q2
1680	Z4	L2	Q3
1681	Z4	L2	Q4
1682	Z4	L2	Q5
1683	Z4	L2	Q6
1684	Z4	L2	Q7
1685	Z4	L2	Q8
1686	Z4	L2	Q9
1687	Z4	L2	Q10
1688	Z4	L2	Q11
1689	Z4	L2	Q12
1690	Z4	L2	Q13
1691	Z4	L2	Q14
1692	Z4	L2	Q15
1693	Z4	L2	Q16
1694	Z4	L2	Q17
1695	Z4	L2	Q18
1696	Z4	L2	Q19
1697	Z4	L2	Q20
1698	Z4	L2	Q21
1699	Z4	L2	Q22
1700	Z4	L2	Q23
1701	Z4	L2	Q24
1702	Z4	L2	Q25
1703	Z4	L2	Q26
1704	Z4	L2	Q27
1705	Z4	L2	Q28
1706	Z4	L2	Q29
1707	Z4	L2	Q30
1708	Z4	L2	Q31
1709	Z4	L2	Q32
1710	Z4	L2	Q33
1711	Z4	L2	Q34
1712	Z4	L2	Q35
1713	Z4	L2	Q36
1714	Z4	L2	Q37
1715	Z4	L2	Q38
1716	Z4	L2	Q39
1717	Z4	L3	Q1
1718	Z4	L3	Q2
1719	Z4	L3	Q3
1720	Z4	L3	Q4
1721	Z4	L3	Q5
1722	Z4	L3	Q6
1723	Z4	L3	Q7
1724	Z4	L3	Q8
1725	Z4	L3	Q9
1726	Z4	L3	Q10
1727	Z4	L3	Q11
1728	Z4	L3	Q12
1729	Z4	L3	Q13
1730	Z4	L3	Q14
1731	Z4	L3	Q15
1732	Z4	L3	Q16
1733	Z4	L3	Q17
1734	Z4	L3	Q18
1735	Z4	L3	Q19
1736	Z4	L3	Q20
1737	Z4	L3	Q21
1738	Z4	L3	Q22
1739	Z4	L3	Q23
1740	Z4	L3	Q24
1741	Z4	L3	Q25
1742	Z4	L3	Q26
1743	Z4	L3	Q27
1744	Z4	L3	Q28
1745	Z4	L3	Q29
1746	Z4	L3	Q30
1747	Z4	L3	Q31
1748	Z4	L3	Q32
1749	Z4	L3	Q33
1750	Z4	L3	Q34
1751	Z4	L3	Q35
1752	Z4	L3	Q36
1753	Z4	L3	Q37
1754	Z4	L3	Q38
1755	Z4	L3	Q39
1756	Z4	L4	Q1
1757	Z4	L4	Q2
1758	Z4	L4	Q3
1759	Z4	L4	Q4
1760	Z4	L4	Q5
1761	Z4	L4	Q6
1762	Z4	L4	Q7
1763	Z4	L4	Q8
1764	Z4	L4	Q9
1765	Z4	L4	Q10
1766	Z4	L4	Q11
1767	Z4	L4	Q12
1768	Z4	L4	Q13
1769	Z4	L4	Q14
1770	Z4	L4	Q15
1771	Z4	L4	Q16
1772	Z4	L4	Q17

[Table 1-14]

1773	Z4	L4	Q18
1774	Z4	L4	Q19
1775	Z4	L4	Q20
1776	Z4	L4	Q21
1777	Z4	L4	Q22
1778	Z4	L4	Q23
1779	Z4	L4	Q24
1780	Z4	L4	Q25
1781	Z4	L4	Q26
1782	Z4	L4	Q27
1783	Z4	L4	Q28
1784	Z4	L4	Q29
1785	Z4	L4	Q30
1786	Z4	L4	Q31
1787	Z4	L4	Q32
1788	Z4	L4	Q33
1789	Z4	L4	Q34
1790	Z4	L4	Q35
1791	Z4	L4	Q36
1792	Z4	L4	Q37
1793	Z4	L4	Q38
1794	Z4	L4	Q39
1795	Z4	L5	Q1
1796	Z4	L5	Q2
1797	Z4	L5	Q3
1798	Z4	L5	Q4
1799	Z4	L5	Q5
1800	Z4	L5	Q6
1801	Z4	L5	Q7
1802	Z4	L5	Q8
1803	Z4	L5	Q9
1804	Z4	L5	Q10
1805	Z4	L5	Q11
1806	Z4	L5	Q12
1807	Z4	L5	Q13
1808	Z4	L5	Q14
1809	Z4	L5	Q15
1810	Z4	L5	Q16
1811	Z4	L5	Q17
1812	Z4	L5	Q18
1813	Z4	L5	Q19
1814	Z4	L5	Q20
1815	Z4	L5	Q21
1816	Z4	L5	Q22
1817	Z4	L5	Q23
1818	Z4	L5	Q24
1819	Z4	L5	Q25
1820	Z4	L5	Q26
1821	Z4	L5	Q27
1822	Z4	L5	Q28
1823	Z4	L5	Q29
1824	Z4	L5	Q30
1825	Z4	L5	Q31
1826	Z4	L5	Q32
1827	Z4	L5	Q33
1828	Z4	L5	Q34
1829	Z4	L5	Q35
1830	Z4	L5	Q36
1831	Z4	L5	Q37
1832	Z4	L5	Q38
1833	Z4	L5	Q39
1834	Z4	L6	Q1
1835	Z4	L6	Q2
1836	Z4	L6	Q3
1837	Z4	L6	Q4
1838	Z4	L6	Q5
1839	Z4	L6	Q6
1840	Z4	L6	Q7
1841	Z4	L6	Q8
1842	Z4	L6	Q9
1843	Z4	L6	Q10
1844	Z4	L6	Q11
1845	Z4	L6	Q12
1846	Z4	L6	Q13
1847	Z4	L6	Q14
1848	Z4	L6	Q15
1849	Z4	L6	Q16
1850	Z4	L6	Q17
1851	Z4	L6	Q18
1852	Z4	L6	Q19
1853	Z4	L6	Q20
1854	Z4	L6	Q21
1855	Z4	L6	Q22
1856	Z4	L6	Q23
1857	Z4	L6	Q24
1858	Z4	L6	Q25
1859	Z4	L6	Q26
1860	Z4	L6	Q27
1861	Z4	L6	Q28
1862	Z4	L6	Q29
1863	Z4	L6	Q30
1864	Z4	L6	Q31
1865	Z4	L6	Q32
1866	Z4	L6	Q33
1867	Z4	L6	Q34
1868	Z4	L6	Q35
1869	Z4	L6	Q36
1870	Z4	L6	Q37
1871	Z4	L6	Q38
1872	Z4	L6	Q39
1873	Z4	L7	Q1
1874	Z4	L7	Q2
1875	Z4	L7	Q3
1876	Z4	L7	Q4
1877	Z4	L7	Q5
1878	Z4	L7	Q6
1879	Z4	L7	Q7
1880	Z4	L7	Q8
1881	Z4	L7	Q9
1882	Z4	L7	Q10
1883	Z4	L7	Q11
1884	Z4	L7	Q12
1885	Z4	L7	Q13
1886	Z4	L7	Q14
1887	Z4	L7	Q15
1888	Z4	L7	Q16
1889	Z4	L7	Q17
1890	Z4	L7	Q18
1891	Z4	L7	Q19
1892	Z4	L7	Q20
1893	Z4	L7	Q21
1894	Z4	L7	Q22
1895	Z4	L7	Q23
1896	Z4	L7	Q24
1897	Z4	L7	Q25
1898	Z4	L7	Q26
1899	Z4	L7	Q27
1900	Z4	L7	Q28
1901	Z4	L7	Q29
1902	Z4	L7	Q30
1903	Z4	L7	Q31
1904	Z4	L7	Q32
1905	Z4	L7	Q33
1906	Z4	L7	Q34
1907	Z4	L7	Q35
1908	Z4	L7	Q36
1909	Z4	L7	Q37
1910	Z4	L7	Q38
1911	Z4	L7	Q39
1912	Z4	L8	Q1
1913	Z4	L8	Q2

[Table 1-15]

1914	Z4	L8	Q3
1915	Z4	L8	Q4
1916	Z4	L8	Q5
1917	Z4	L8	Q6
1918	Z4	L8	Q7
1919	Z4	L8	Q8
1920	Z4	L8	Q9
1921	Z4	L8	Q10
1922	Z4	L8	Q11
1923	Z4	L8	Q12
1924	Z4	L8	Q13
1925	Z4	L8	Q14
1926	Z4	L8	Q15
1927	Z4	L8	Q16
1928	Z4	L8	Q17
1929	Z4	L8	Q18
1930	Z4	L8	Q19
1931	Z4	L8	Q20
1932	Z4	L8	Q21
1933	Z4	L8	Q22
1934	Z4	L8	Q23
1935	Z4	L8	Q24
1936	Z4	L8	Q25
1937	Z4	L8	Q26
1938	Z4	L8	Q27
1939	Z4	L8	Q28
1940	Z4	L8	Q29
1941	Z4	L8	Q30
1942	Z4	L8	Q31
1943	Z4	L8	Q32
1944	Z4	L8	Q33
1945	Z4	L8	Q34
1946	Z4	L8	Q35
1947	Z4	L8	Q36
1948	Z4	L8	Q37
1949	Z4	L8	Q38
1950	Z4	L8	Q39
1951	Z4	L9	Q1
1952	Z4	L9	Q2
1953	Z4	L9	Q3
1954	Z4	L9	Q4
1955	Z4	L9	Q5
1956	Z4	L9	Q6
1957	Z4	L9	Q7
1958	Z4	L9	Q8
1959	Z4	L9	Q9
1960	Z4	L9	Q10
1961	Z4	L9	Q11
1962	Z4	L9	Q12
1963	Z4	L9	Q13
1964	Z4	L9	Q14
1965	Z4	L9	Q15
1966	Z4	L9	Q16
1967	Z4	L9	Q17
1968	Z4	L9	Q18
1969	Z4	L9	Q19
1970	Z4	L9	Q20
1971	Z4	L9	Q21
1972	Z4	L9	Q22
1973	Z4	L9	Q23
1974	Z4	L9	Q24
1975	Z4	L9	Q25
1976	Z4	L9	Q26
1977	Z4	L9	Q27
1978	Z4	L9	Q28
1979	Z4	L9	Q29
1980	Z4	L9	Q30
1981	Z4	L9	Q31
1982	Z4	L9	Q32
1983	Z4	L9	Q33
1984	Z4	L9	Q34
1985	Z4	L9	Q35
1986	Z4	L9	Q36
1987	Z4	L9	Q37
1988	Z4	L9	Q38
1989	Z4	L9	Q39
1990	Z4	L10	Q1
1991	Z4	L10	Q2
1992	Z4	L10	Q3
1993	Z4	L10	Q4
1994	Z4	L10	Q5
1995	Z4	L10	Q6
1996	Z4	L10	Q7
1997	Z4	L10	Q8
1998	Z4	L10	Q9
1999	Z4	L10	Q10
2000	Z4	L10	Q11
2001	Z4	L10	Q12
2002	Z4	L10	Q13
2003	Z4	L10	Q14
2004	Z4	L10	Q15
2005	Z4	L10	Q16
2006	Z4	L10	Q17
2007	Z4	L10	Q18
2008	Z4	L10	Q19
2009	Z4	L10	Q20
2010	Z4	L10	Q21
2011	Z4	L10	Q22
2012	Z4	L10	Q23
2013	Z4	L10	Q24
2014	Z4	L10	Q25
2015	Z4	L10	Q26
2016	Z4	L10	Q27
2017	Z4	L10	Q28
2018	Z4	L10	Q29
2019	Z4	L10	Q30
2020	Z4	L10	Q31
2021	Z4	L10	Q32
2022	Z4	L10	Q33
2023	Z4	L10	Q34
2024	Z4	L10	Q35
2025	Z4	L10	Q36
2026	Z4	L10	Q37
2027	Z4	L10	Q38
2028	Z4	L10	Q39
2029	Z4	L11	Q1
2030	Z4	L11	Q2
2031	Z4	L11	Q3
2032	Z4	L11	Q4
2033	Z4	L11	Q5
2034	Z4	L11	Q6
2035	Z4	L11	Q7
2036	Z4	L11	Q8
2037	Z4	L11	Q9
2038	Z4	L11	Q10
2039	Z4	L11	Q11
2040	Z4	L11	Q12
2041	Z4	L11	Q13
2042	Z4	L11	Q14
2043	Z4	L11	Q15
2044	Z4	L11	Q16
2045	Z4	L11	Q17
2046	Z4	L11	Q18
2047	Z4	L11	Q19
2048	Z4	L11	Q20
2049	Z4	L11	Q21
2050	Z4	L11	Q22
2051	Z4	L11	Q23
2052	Z4	L11	Q24
2053	Z4	L11	Q25
2054	Z4	L11	Q26

[Table 1-16]

2055	Z4	L11	Q27
2056	Z4	L11	Q28
2057	Z4	L11	Q29
2058	Z4	L11	Q30
2059	Z4	L11	Q31
2060	Z4	L11	Q32
2061	Z4	L11	Q33
2062	Z4	L11	Q34
2063	Z4	L11	Q35
2064	Z4	L11	Q36
2065	Z4	L11	Q37
2066	Z4	L11	Q38
2067	Z4	L11	Q39
2068	Z4	L12	Q1
2069	Z4	L12	Q2
2070	Z4	L12	Q3
2071	Z4	L12	Q4
2072	Z4	L12	Q5
2073	Z4	L12	Q6
2074	Z4	L12	Q7
2075	Z4	L12	Q8
2076	Z4	L12	Q9
2077	Z4	L12	Q10
2078	Z4	L12	Q11
2079	Z4	L12	Q12
2080	Z4	L12	Q13
2081	Z4	L12	Q14
2082	Z4	L12	Q15
2083	Z4	L12	Q16
2084	Z4	L12	Q17
2085	Z4	L12	Q18
2086	Z4	L12	Q19
2087	Z4	L12	Q20
2088	Z4	L12	Q21
2089	Z4	L12	Q22
2090	Z4	L12	Q23
2091	Z4	L12	Q24
2092	Z4	L12	Q25
2093	Z4	L12	Q26
2094	Z4	L12	Q27
2095	Z4	L12	Q28
2096	Z4	L12	Q29
2097	Z4	L12	Q30
2098	Z4	L12	Q31
2099	Z4	L12	Q32
2100	Z4	L12	Q33
2101	Z4	L12	Q34
2102	Z4	L12	Q35
2103	Z4	L12	Q36
2104	Z4	L12	Q37
2105	Z4	L12	Q38
2106	Z4	L12	Q39
2107	Z4	L13	Q1
2108	Z4	L13	Q2
2109	Z4	L13	Q3
2110	Z4	L13	Q4
2111	Z4	L13	Q5
2112	Z4	L13	Q6
2113	Z4	L13	Q7
2114	Z4	L13	Q8
2115	Z4	L13	Q9
2116	Z4	L13	Q10
2117	Z4	L13	Q11
2118	Z4	L13	Q12
2119	Z4	L13	Q13
2120	Z4	L13	Q14
2121	Z4	L13	Q15
2122	Z4	L13	Q16
2123	Z4	L13	Q17
2124	Z4	L13	Q18
2125	Z4	L13	Q19
2126	Z4	L13	Q20
2127	Z4	L13	Q21
2128	Z4	L13	Q22
2129	Z4	L13	Q23
2130	Z4	L13	Q24
2131	Z4	L13	Q25
2132	Z4	L13	Q26
2133	Z4	L13	Q27
2134	Z4	L13	Q28
2135	Z4	L13	Q29
2136	Z4	L13	Q30
2137	Z4	L13	Q31
2138	Z4	L13	Q32
2139	Z4	L13	Q33
2140	Z4	L13	Q34
2141	Z4	L13	Q35
2142	Z4	L13	Q36
2143	Z4	L13	Q37
2144	Z4	L13	Q38
2145	Z4	L13	Q39
2146	Z4	L14	Q1
2147	Z4	L14	Q2
2148	Z4	L14	Q3
2149	Z4	L14	Q4
2150	Z4	L14	Q5
2151	Z4	L14	Q6
2152	Z4	L14	Q7
2153	Z4	L14	Q8
2154	Z4	L14	Q9
2155	Z4	L14	Q10
2156	Z4	L14	Q11
2157	Z4	L14	Q12
2158	Z4	L14	Q13
2159	Z4	L14	Q14
2160	Z4	L14	Q15
2161	Z4	L14	Q16
2162	Z4	L14	Q17
2163	Z4	L14	Q18
2164	Z4	L14	Q19
2165	Z4	L14	Q20
2166	Z4	L14	Q21
2167	Z4	L14	Q22
2168	Z4	L14	Q23
2169	Z4	L14	Q24
2170	Z4	L14	Q25
2171	Z4	L14	Q26
2172	Z4	L14	Q27
2173	Z4	L14	Q28
2174	Z4	L14	Q29
2175	Z4	L14	Q30
2176	Z4	L14	Q31
2177	Z4	L14	Q32
2178	Z4	L14	Q33
2179	Z4	L14	Q34
2180	Z4	L14	Q35
2181	Z4	L14	Q36
2182	Z4	L14	Q37
2183	Z4	L14	Q38
2184	Z4	L14	Q39

[Table 1-17]

Example	R[2L]	L*	Q*
2185	Z1	L1	Q40
2186	Z1	L1	Q41
2187	Z1	L1	Q42
2188	Z1	L1	Q43
2189	Z1	L1	Q44
2190	Z1	L1	Q45
2191	Z1	L1	Q46
2192	Z1	L1	Q47
2193	Z1	L1	Q48
2194	Z1	L1	Q49
2195	Z1	L1	Q50
2196	Z1	L1	Q51
2197	Z1	L1	Q52
2198	Z1	L1	Q53
2199	Z1	L1	Q54
2200	Z1	L1	Q55
2201	Z1	L1	Q56
2202	Z1	L1	Q57
2203	Z1	L1	Q58
2204	Z1	L1	Q59
2205	Z1	L1	Q60
2206	Z1	L1	Q61
2207	Z1	L1	Q62
2208	Z1	L1	Q63
2209	Z1	L1	Q64
2210	Z1	L1	Q65
2211	Z1	L1	Q66
2212	Z1	L1	Q67
2213	Z1	L1	Q68
2214	Z1	L1	Q69
2215	Z1	L1	Q70
2216	Z1	L1	Q71
2217	Z1	L1	Q72
2218	Z1	L1	Q73
2219	Z1	L1	Q74
2220	Z1	L1	Q75
2221	Z1	L1	Q76
2222	Z1	L1	Q77
2223	Z1	L1	Q78
2224	Z1	L1	Q79
2225	Z1	L1	Q80
2226	Z1	L1	Q81
2227	Z1	L1	Q82
2228	Z1	L1	Q83
2229	Z1	L1	Q84
2230	Z1	L1	Q85
2231	Z1	L1	Q86
2232	Z1	L1	Q87
2233	Z1	L1	Q88
2234	Z1	L1	Q89
2235	Z1	L1	Q90
2236	Z1	L1	Q91
2237	Z1	L1	Q92
2238	Z1	L1	Q93
2239	Z1	L1	Q94
2240	Z1	L1	Q95
2241	Z1	L1	Q96
2242	Z1	L1	Q97
2243	Z1	L1	Q98
2244	Z1	L1	Q99
2245	Z1	L1	Q100
2246	Z1	L1	Q101
2247	Z1	L1	Q102
2248	Z1	L1	Q103
2249	Z1	L2	Q40
2250	Z1	L2	Q41
2251	Z1	L2	Q42
2252	Z1	L2	Q43
2253	Z1	L2	Q44
2254	Z1	L2	Q45
2255	Z1	L2	Q46
2256	Z1	L2	Q47
2257	Z1	L2	Q48
2258	Z1	L2	Q49
2259	Z1	L2	Q50
2260	Z1	L2	Q51
2261	Z1	L2	Q52
2262	Z1	L2	Q53
2263	Z1	L2	Q54
2264	Z1	L2	Q55
2265	Z1	L2	Q56
2266	Z1	L2	Q57
2267	Z1	L2	Q58
2268	Z1	L2	Q59
2269	Z1	L2	Q60
2270	Z1	L2	Q61
2271	Z1	L2	Q62
2272	Z1	L2	Q63
2273	Z1	L2	Q64
2274	Z1	L2	Q65
2275	Z1	L2	Q66
2276	Z1	L2	Q67
2277	Z1	L2	Q68
2278	Z1	L2	Q69
2279	Z1	L2	Q70
2280	Z1	L2	Q71
2281	Z1	L2	Q72
2282	Z1	L2	Q73
2283	Z1	L2	Q74
2284	Z1	L2	Q75
2285	Z1	L2	Q76
2286	Z1	L2	Q77
2287	Z1	L2	Q78
2288	Z1	L2	Q79
2289	Z1	L2	Q80
2290	Z1	L2	Q81
2291	Z1	L2	Q82
2292	Z1	L2	Q83
2293	Z1	L2	Q84
2294	Z1	L2	Q85
2295	Z1	L2	Q86
2296	Z1	L2	Q87
2297	Z1	L2	Q88
2298	Z1	L2	Q89
2299	Z1	L2	Q90
2300	Z1	L2	Q91
2301	Z1	L2	Q92
2302	Z1	L2	Q93
2303	Z1	L2	Q94
2304	Z1	L2	Q95
2305	Z1	L2	Q96
2306	Z1	L2	Q97
2307	Z1	L2	Q98
2308	Z1	L2	Q99
2309	Z1	L2	Q100
2310	Z1	L2	Q101
2311	Z1	L2	Q102
2312	Z1	L2	Q103
2313	Z1	L3	Q40
2314	Z1	L3	Q41
2315	Z1	L3	Q42
2316	Z1	L3	Q43
2317	Z1	L3	Q44
2318	Z1	L3	Q45
2319	Z1	L3	Q46
2320	Z1	L3	Q47
2321	Z1	L3	Q48
2322	Z1	L3	Q49
2323	Z1	L3	Q50
2324	Z1	L3	Q51
2325	Z1	L3	Q52
2326	Z1	L3	Q53
2327	Z1	L3	Q54
2328	Z1	L3	Q55
2329	Z1	L3	Q56
2330	Z1	L3	Q57
2331	Z1	L3	Q58
2332	Z1	L3	Q59
2333	Z1	L3	Q60
2334	Z1	L3	Q61
2335	Z1	L3	Q62
2336	Z1	L3	Q63
2337	Z1	L3	Q64
2338	Z1	L3	Q65
2339	Z1	L3	Q66
2340	Z1	L3	Q67
2341	Z1	L3	Q68
2342	Z1	L3	Q69
2343	Z1	L3	Q70
2344	Z1	L3	Q71
2345	Z1	L3	Q72
2346	Z1	L3	Q73
2347	Z1	L3	Q74
2348	Z1	L3	Q75
2349	Z1	L3	Q76
2350	Z1	L3	Q77
2351	Z1	L3	Q78
2352	Z1	L3	Q79
2353	Z1	L3	Q80
2354	Z1	L3	Q81
2355	Z1	L3	Q82
2356	Z1	L3	Q83
2357	Z1	L3	Q84
2358	Z1	L3	Q85
2359	Z1	L3	Q86
2360	Z1	L3	Q87
2361	Z1	L3	Q88
2362	Z1	L3	Q89
2363	Z1	L3	Q90
2364	Z1	L3	Q91
2365	Z1	L3	Q92
2366	Z1	L3	Q93
2367	Z1	L3	Q94
2368	Z1	L3	Q95
2369	Z1	L3	Q96
2370	Z1	L3	Q97
2371	Z1	L3	Q98
2372	Z1	L3	Q99
2373	Z1	L3	Q100
2374	Z1	L3	Q101
2375	Z1	L3	Q102
2376	Z1	L3	Q103
2377	Z1	L4	Q40
2378	Z1	L4	Q41
2379	Z1	L4	Q42
2380	Z1	L4	Q43
2381	Z1	L4	Q44
2382	Z1	L4	Q45
2383	Z1	L4	Q46
2384	Z1	L4	Q47

[Table 1-18]

2385	Z1	L4	Q48
2386	Z1	L4	Q49
2387	Z1	L4	Q50
2388	Z1	L4	Q51
2389	Z1	L4	Q52
2390	Z1	L4	Q53
2391	Z1	L4	Q54
2392	Z1	L4	Q55
2393	Z1	L4	Q56
2394	Z1	L4	Q57
2395	Z1	L4	Q58
2396	Z1	L4	Q59
2397	Z1	L4	Q60
2398	Z1	L4	Q61
2399	Z1	L4	Q62
2400	Z1	L4	Q63
2401	Z1	L4	Q64
2402	Z1	L4	Q65
2403	Z1	L4	Q66
2404	Z1	L4	Q67
2405	Z1	L4	Q68
2406	Z1	L4	Q69
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2408	Z1	L4	Q71
2409	Z1	L4	Q72
2410	Z1	L4	Q73
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2412	Z1	L4	Q75
2413	Z1	L4	Q76
2414	Z1	L4	Q77
2415	Z1	L4	Q78
2416	Z1	L4	Q79
2417	Z1	L4	Q80
2418	Z1	L4	Q81
2419	Z1	L4	Q82
2420	Z1	L4	Q83
2421	Z1	L4	Q84
2422	Z1	L4	Q85
2423	Z1	L4	Q86
2424	Z1	L4	Q87
2425	Z1	L4	Q88
2426	Z1	L4	Q89
2427	Z1	L4	Q90
2428	Z1	L4	Q91
2429	Z1	L4	Q92
2430	Z1	L4	Q93
2431	Z1	L4	Q94
2432	Z1	L4	Q95
2433	Z1	L4	Q96
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2477	Z1	L5	Q76
2478	Z1	L5	Q77
2479	Z1	L5	Q78
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2517	Z1	L6	Q52
2518	Z1	L6	Q53
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2520	Z1	L6	Q55
2521	Z1	L6	Q56
2522	Z1	L6	Q57
2523	Z1	L6	Q58
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2534	Z1	L6	Q69
2535	Z1	L6	Q70
2536	Z1	L6	Q71
2537	Z1	L6	Q72
2538	Z1	L6	Q73
2539	Z1	L6	Q74
2540	Z1	L6	Q75
2541	Z1	L6	Q76
2542	Z1	L6	Q77
2543	Z1	L6	Q78
2544	Z1	L6	Q79
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2547	Z1	L6	Q82
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2550	Z1	L6	Q85
2551	Z1	L6	Q86
2552	Z1	L6	Q87
2553	Z1	L6	Q88
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2572	Z1	L7	Q43
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2575	Z1	L7	Q46
2576	Z1	L7	Q47
2577	Z1	L7	Q48
2578	Z1	L7	Q49
2579	Z1	L7	Q50
2580	Z1	L7	Q51
2581	Z1	L7	Q52
2582	Z1	L7	Q53
2583	Z1	L7	Q54
2584	Z1	L7	Q55
2585	Z1	L7	Q56

[Table 1-19]

2586	Z1	L7	Q57
2587	Z1	L7	Q58
2588	Z1	L7	Q59
2589	Z1	L7	Q60
2590	Z1	L7	Q61
2591	Z1	L7	Q62
2592	Z1	L7	Q63
2593	Z1	L7	Q64
2594	Z1	L7	Q65
2595	Z1	L7	Q66
2596	Z1	L7	Q67
2597	Z1	L7	Q68
2598	Z1	L7	Q69
2599	Z1	L7	Q70
2600	Z1	L7	Q71
2601	Z1	L7	Q72
2602	Z1	L7	Q73
2603	Z1	L7	Q74
2604	Z1	L7	Q75
2605	Z1	L7	Q76
2606	Z1	L7	Q77
2607	Z1	L7	Q78
2608	Z1	L7	Q79
2609	Z1	L7	Q80
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2617	Z1	L7	Q88
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2642	Z1	L8	Q49
2643	Z1	L8	Q50
2644	Z1	L8	Q51
2645	Z1	L8	Q52
2646	Z1	L8	Q53
2647	Z1	L8	Q54
2648	Z1	L8	Q55
2649	Z1	L8	Q56
2650	Z1	L8	Q57
2651	Z1	L8	Q58
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2699	Z1	L9	Q42
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2701	Z1	L9	Q44
2702	Z1	L9	Q45
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2726	Z1	L9	Q69
2727	Z1	L9	Q70
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2729	Z1	L9	Q72
2730	Z1	L9	Q73
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2733	Z1	L9	Q76
2734	Z1	L9	Q77
2735	Z1	L9	Q78
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2756	Z1	L9	Q99
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2758	Z1	L9	Q101
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2760	Z1	L9	Q103
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2777	Z1	L10	Q56
2778	Z1	L10	Q57
2779	Z1	L10	Q58
2780	Z1	L10	Q59
2781	Z1	L10	Q60
2782	Z1	L10	Q61
2783	Z1	L10	Q62
2784	Z1	L10	Q63
2785	Z1	L10	Q64
2786	Z1	L10	Q65

[Table 1-20]

2787	Z1	L10	Q66
2788	Z1	L10	Q67
2789	Z1	L10	Q68
2790	Z1	L10	Q69
2791	Z1	L10	Q70
2792	Z1	L10	Q71
2793	Z1	L10	Q72
2794	Z1	L10	Q73
2795	Z1	L10	Q74
2796	Z1	L10	Q75
2797	Z1	L10	Q76
2798	Z1	L10	Q77
2799	Z1	L10	Q78
2800	Z1	L10	Q79
2801	Z1	L10	Q80
2802	Z1	L10	Q81
2803	Z1	L10	Q82
2804	Z1	L10	Q83
2805	Z1	L10	Q84
2806	Z1	L10	Q85
2807	Z1	L10	Q86
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2818	Z1	L10	Q97
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2820	Z1	L10	Q99
2821	Z1	L10	Q100
2822	Z1	L10	Q101
2823	Z1	L10	Q102
2824	Z1	L10	Q103
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2826	Z1	L11	Q41
2827	Z1	L11	Q42
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2834	Z1	L11	Q49
2835	Z1	L11	Q50
2836	Z1	L11	Q51
2837	Z1	L11	Q52
2838	Z1	L11	Q53
2839	Z1	L11	Q54
2840	Z1	L11	Q55
2841	Z1	L11	Q56
2842	Z1	L11	Q57
2843	Z1	L11	Q58
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2845	Z1	L11	Q60
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2854	Z1	L11	Q69
2855	Z1	L11	Q70
2856	Z1	L11	Q71
2857	Z1	L11	Q72
2858	Z1	L11	Q73
2859	Z1	L11	Q74
2860	Z1	L11	Q75
2861	Z1	L11	Q76
2862	Z1	L11	Q77
2863	Z1	L11	Q78
2864	Z1	L11	Q79
2865	Z1	L11	Q80
2866	Z1	L11	Q81
2867	Z1	L11	Q82
2868	Z1	L11	Q83
2869	Z1	L11	Q84
2870	Z1	L11	Q85
2871	Z1	L11	Q86
2872	Z1	L11	Q87
2873	Z1	L11	Q88
2874	Z1	L11	Q89
2875	Z1	L11	Q90
2876	Z1	L11	Q91
2877	Z1	L11	Q92
2878	Z1	L11	Q93
2879	Z1	L11	Q94
2880	Z1	L11	Q95
2881	Z1	L11	Q96
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2918	Z1	L12	Q69
2919	Z1	L12	Q70
2920	Z1	L12	Q71
2921	Z1	L12	Q72
2922	Z1	L12	Q73
2923	Z1	L12	Q74
2924	Z1	L12	Q75
2925	Z1	L12	Q76
2926	Z1	L12	Q77
2927	Z1	L12	Q78
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2982	Z1	L13	Q69
2983	Z1	L13	Q70
2984	Z1	L13	Q71
2985	Z1	L13	Q72
2986	Z1	L13	Q73
2987	Z1	L13	Q74

[Table 1-21]

2988	Z1	L13	Q75
2989	Z1	L13	Q76
2990	Z1	L13	Q77
2991	Z1	L13	Q78
2992	Z1	L13	Q79
2993	Z1	L13	Q80
2994	Z1	L13	Q81
2995	Z1	L13	Q82
2996	Z1	L13	Q83
2997	Z1	L13	Q84
2998	Z1	L13	Q85
2999	Z1	L13	Q86
3000	Z1	L13	Q87
3001	Z1	L13	Q88
3002	Z1	L13	Q89
3003	Z1	L13	Q90
3004	Z1	L13	Q91
3005	Z1	L13	Q92
3006	Z1	L13	Q93
3007	Z1	L13	Q94
3008	Z1	L13	Q95
3009	Z1	L13	Q96
3010	Z1	L13	Q97
3011	Z1	L13	Q98
3012	Z1	L13	Q99
3013	Z1	L13	Q100
3014	Z1	L13	Q101
3015	Z1	L13	Q102
3016	Z1	L13	Q103
3017	Z1	L14	Q40
3018	Z1	L14	Q41
3019	Z1	L14	Q42
3020	Z1	L14	Q43
3021	Z1	L14	Q44
3022	Z1	L14	Q45
3023	Z1	L14	Q46
3024	Z1	L14	Q47
3025	Z1	L14	Q48
3026	Z1	L14	Q49
3027	Z1	L14	Q50
3028	Z1	L14	Q51
3029	Z1	L14	Q52
3030	Z1	L14	Q53
3031	Z1	L14	Q54
3032	Z1	L14	Q55
3033	Z1	L14	Q56
3034	Z1	L14	Q57
3035	Z1	L14	Q58
3036	Z1	L14	Q59
3037	Z1	L14	Q60
3038	Z1	L14	Q61
3039	Z1	L14	Q62
3040	Z1	L14	Q63
3041	Z1	L14	Q64
3042	Z1	L14	Q65
3043	Z1	L14	Q66
3044	Z1	L14	Q67
3045	Z1	L14	Q68
3046	Z1	L14	Q69
3047	Z1	L14	Q70
3048	Z1	L14	Q71
3049	Z1	L14	Q72
3050	Z1	L14	Q73
3051	Z1	L14	Q74
3052	Z1	L14	Q75
3053	Z1	L14	Q76
3054	Z1	L14	Q77
3055	Z1	L14	Q78
3056	Z1	L14	Q79
3057	Z1	L14	Q80
3058	Z1	L14	Q81
3059	Z1	L14	Q82
3060	Z1	L14	Q83
3061	Z1	L14	Q84
3062	Z1	L14	Q85
3063	Z1	L14	Q86
3064	Z1	L14	Q87
3065	Z1	L14	Q88
3066	Z1	L14	Q89
3067	Z1	L14	Q90
3068	Z1	L14	Q91
3069	Z1	L14	Q92
3070	Z1	L14	Q93
3071	Z1	L14	Q94
3072	Z1	L14	Q95
3073	Z1	L14	Q96
3074	Z1	L14	Q97
3075	Z1	L14	Q98
3076	Z1	L14	Q99
3077	Z1	L14	Q100
3078	Z1	L14	Q101
3079	Z1	L14	Q102
3080	Z1	L14	Q103
3081	Z2	L1	Q40
3082	Z2	L1	Q41
3083	Z2	L1	Q42
3084	Z2	L1	Q43
3085	Z2	L1	Q44
3086	Z2	L1	Q45
3087	Z2	L1	Q46
3088	Z2	L1	Q47
3089	Z2	L1	Q48
3090	Z2	L1	Q49
3091	Z2	L1	Q50
3092	Z2	L1	Q51
3093	Z2	L1	Q52
3094	Z2	L1	Q53
3095	Z2	L1	Q54
3096	Z2	L1	Q55
3097	Z2	L1	Q56
3098	Z2	L1	Q57
3099	Z2	L1	Q58
3100	Z2	L1	Q59
3101	Z2	L1	Q60
3102	Z2	L1	Q61
3103	Z2	L1	Q62
3104	Z2	L1	Q63
3105	Z2	L1	Q64
3106	Z2	L1	Q65
3107	Z2	L1	Q66
3108	Z2	L1	Q67
3109	Z2	L1	Q68
3110	Z2	L1	Q69
3111	Z2	L1	Q70
3112	Z2	L1	Q71
3113	Z2	L1	Q72
3114	Z2	L1	Q73
3115	Z2	L1	Q74
3116	Z2	L1	Q75
3117	Z2	L1	Q76
3118	Z2	L1	Q77
3119	Z2	L1	Q78
3120	Z2	L1	Q79
3121	Z2	L1	Q80
3122	Z2	L1	Q81
3123	Z2	L1	Q82
3124	Z2	L1	Q83
3125	Z2	L1	Q84
3126	Z2	L1	Q85
3127	Z2	L1	Q86
3128	Z2	L1	Q87
3129	Z2	L1	Q88
3130	Z2	L1	Q89
3131	Z2	L1	Q90
3132	Z2	L1	Q91
3133	Z2	L1	Q92
3134	Z2	L1	Q93
3135	Z2	L1	Q94
3136	Z2	L1	Q95
3137	Z2	L1	Q96
3138	Z2	L1	Q97
3139	Z2	L1	Q98
3140	Z2	L1	Q99
3141	Z2	L1	Q100
3142	Z2	L1	Q101
3143	Z2	L1	Q102
3144	Z2	L1	Q103
3145	Z2	L2	Q40
3146	Z2	L2	Q41
3147	Z2	L2	Q42
3148	Z2	L2	Q43
3149	Z2	L2	Q44
3150	Z2	L2	Q45
3151	Z2	L2	Q46
3152	Z2	L2	Q47
3153	Z2	L2	Q48
3154	Z2	L2	Q49
3155	Z2	L2	Q50
3156	Z2	L2	Q51
3157	Z2	L2	Q52
3158	Z2	L2	Q53
3159	Z2	L2	Q54
3160	Z2	L2	Q55
3161	Z2	L2	Q56
3162	Z2	L2	Q57
3163	Z2	L2	Q58
3164	Z2	L2	Q59
3165	Z2	L2	Q60
3166	Z2	L2	Q61
3167	Z2	L2	Q62
3168	Z2	L2	Q63
3169	Z2	L2	Q64
3170	Z2	L2	Q65
3171	Z2	L2	Q66
3172	Z2	L2	Q67
3173	Z2	L2	Q68
3174	Z2	L2	Q69
3175	Z2	L2	Q70
3176	Z2	L2	Q71
3177	Z2	L2	Q72
3178	Z2	L2	Q73
3179	Z2	L2	Q74
3180	Z2	L2	Q75
3181	Z2	L2	Q76
3182	Z2	L2	Q77
3183	Z2	L2	Q78
3184	Z2	L2	Q79
3185	Z2	L2	Q80
3186	Z2	L2	Q81
3187	Z2	L2	Q82
3188	Z2	L2	Q83

[Table 1-22]

3189	Z2	L2	Q84
3190	Z2	L2	Q85
3191	Z2	L2	Q86
3192	Z2	L2	Q87
3193	Z2	L2	Q88
3194	Z2	L2	Q89
3195	Z2	L2	Q90
3196	Z2	L2	Q91
3197	Z2	L2	Q92
3198	Z2	L2	Q93
3199	Z2	L2	Q94
3200	Z2	L2	Q95
3201	Z2	L2	Q96
3202	Z2	L2	Q97
3203	Z2	L2	Q98
3204	Z2	L2	Q99
3205	Z2	L2	Q100
3206	Z2	L2	Q101
3207	Z2	L2	Q102
3208	Z2	L2	Q103
3209	Z2	L3	Q40
3210	Z2	L3	Q41
3211	Z2	L3	Q42
3212	Z2	L3	Q43
3213	Z2	L3	Q44
3214	Z2	L3	Q45
3215	Z2	L3	Q46
3216	Z2	L3	Q47
3217	Z2	L3	Q48
3218	Z2	L3	Q49
3219	Z2	L3	Q50
3220	Z2	L3	Q51
3221	Z2	L3	Q52
3222	Z2	L3	Q53
3223	Z2	L3	Q54
3224	Z2	L3	Q55
3225	Z2	L3	Q56
3226	Z2	L3	Q57
3227	Z2	L3	Q58
3228	Z2	L3	Q59
3229	Z2	L3	Q60
3230	Z2	L3	Q61
3231	Z2	L3	Q62
3232	Z2	L3	Q63
3233	Z2	L3	Q64
3234	Z2	L3	Q65
3235	Z2	L3	Q66
3236	Z2	L3	Q67
3237	Z2	L3	Q68
3238	Z2	L3	Q69
3239	Z2	L3	Q70
3240	Z2	L3	Q71
3241	Z2	L3	Q72
3242	Z2	L3	Q73
3243	Z2	L3	Q74
3244	Z2	L3	Q75
3245	Z2	L3	Q76
3246	Z2	L3	Q77
3247	Z2	L3	Q78
3248	Z2	L3	Q79
3249	Z2	L3	Q80
3250	Z2	L3	Q81
3251	Z2	L3	Q82
3252	Z2	L3	Q83
3253	Z2	L3	Q84
3254	Z2	L3	Q85
3255	Z2	L3	Q86
3256	Z2	L3	Q87
3257	Z2	L3	Q88
3258	Z2	L3	Q89
3259	Z2	L3	Q90
3260	Z2	L3	Q91
3261	Z2	L3	Q92
3262	Z2	L3	Q93
3263	Z2	L3	Q94
3264	Z2	L3	Q95
3265	Z2	L3	Q96
3266	Z2	L3	Q97
3267	Z2	L3	Q98
3268	Z2	L3	Q99
3269	Z2	L3	Q100
3270	Z2	L3	Q101
3271	Z2	L3	Q102
3272	Z2	L3	Q103
3273	Z2	L4	Q40
3274	Z2	L4	Q41
3275	Z2	L4	Q42
3276	Z2	L4	Q43
3277	Z2	L4	Q44
3278	Z2	L4	Q45
3279	Z2	L4	Q46
3280	Z2	L4	Q47
3281	Z2	L4	Q48
3282	Z2	L4	Q49
3283	Z2	L4	Q50
3284	Z2	L4	Q51
3285	Z2	L4	Q52
3286	Z2	L4	Q53
3287	Z2	L4	Q54
3288	Z2	L4	Q55
3289	Z2	L4	Q56
3290	Z2	L4	Q57
3291	Z2	L4	Q58
3292	Z2	L4	Q59
3293	Z2	L4	Q60
3294	Z2	L4	Q61
3295	Z2	L4	Q62
3296	Z2	L4	Q63
3297	Z2	L4	Q64
3298	Z2	L4	Q65
3299	Z2	L4	Q66
3300	Z2	L4	Q67
3301	Z2	L4	Q68
3302	Z2	L4	Q69
3303	Z2	L4	Q70
3304	Z2	L4	Q71
3305	Z2	L4	Q72
3306	Z2	L4	Q73
3307	Z2	L4	Q74
3308	Z2	L4	Q75
3309	Z2	L4	Q76
3310	Z2	L4	Q77
3311	Z2	L4	Q78
3312	Z2	L4	Q79
3313	Z2	L4	Q80
3314	Z2	L4	Q81
3315	Z2	L4	Q82
3316	Z2	L4	Q83
3317	Z2	L4	Q84
3318	Z2	L4	Q85
3319	Z2	L4	Q86
3320	Z2	L4	Q87
3321	Z2	L4	Q88
3322	Z2	L4	Q89
3323	Z2	L4	Q90
3324	Z2	L4	Q91
3325	Z2	L4	Q92
3326	Z2	L4	Q93
3327	Z2	L4	Q94
3328	Z2	L4	Q95
3329	Z2	L4	Q96
3330	Z2	L4	Q97
3331	Z2	L4	Q98
3332	Z2	L4	Q99
3333	Z2	L4	Q100
3334	Z2	L4	Q101
3335	Z2	L4	Q102
3336	Z2	L4	Q103
3337	Z2	L5	Q40
3338	Z2	L5	Q41
3339	Z2	L5	Q42
3340	Z2	L5	Q43
3341	Z2	L5	Q44
3342	Z2	L5	Q45
3343	Z2	L5	Q46
3344	Z2	L5	Q47
3345	Z2	L5	Q48
3346	Z2	L5	Q49
3347	Z2	L5	Q50
3348	Z2	L5	Q51
3349	Z2	L5	Q52
3350	Z2	L5	Q53
3351	Z2	L5	Q54
3352	Z2	L5	Q55
3353	Z2	L5	Q56
3354	Z2	L5	Q57
3355	Z2	L5	Q58
3356	Z2	L5	Q59
3357	Z2	L5	Q60
3358	Z2	L5	Q61
3359	Z2	L5	Q62
3360	Z2	L5	Q63
3361	Z2	L5	Q64
3362	Z2	L5	Q65
3363	Z2	L5	Q66
3364	Z2	L5	Q67
3365	Z2	L5	Q68
3366	Z2	L5	Q69
3367	Z2	L5	Q70
3368	Z2	L5	Q71
3369	Z2	L5	Q72
3370	Z2	L5	Q73
3371	Z2	L5	Q74
3372	Z2	L5	Q75
3373	Z2	L5	Q76
3374	Z2	L5	Q77
3375	Z2	L5	Q78
3376	Z2	L5	Q79
3377	Z2	L5	Q80
3378	Z2	L5	Q81
3379	Z2	L5	Q82
3380	Z2	L5	Q83
3381	Z2	L5	Q84
3382	Z2	L5	Q85
3383	Z2	L5	Q86
3384	Z2	L5	Q87
3385	Z2	L5	Q88
3386	Z2	L5	Q89
3387	Z2	L5	Q90
3388	Z2	L5	Q91
3389	Z2	L5	Q92

[Table 1-23]

3390	Z2	L5	Q93
3391	Z2	L5	Q94
3392	Z2	L5	Q95
3393	Z2	L5	Q96
3394	Z2	L5	Q97
3395	Z2	L5	Q98
3396	Z2	L5	Q99
3397	Z2	L5	Q100
3398	Z2	L5	Q101
3399	Z2	L5	Q102
3400	Z2	L5	Q103
3401	Z2	L6	Q40
3402	Z2	L6	Q41
3403	Z2	L6	Q42
3404	Z2	L6	Q43
3405	Z2	L6	Q44
3406	Z2	L6	Q45
3407	Z2	L6	Q46
3408	Z2	L6	Q47
3409	Z2	L6	Q48
3410	Z2	L6	Q49
3411	Z2	L6	Q50
3412	Z2	L6	Q51
3413	Z2	L6	Q52
3414	Z2	L6	Q53
3415	Z2	L6	Q54
3416	Z2	L6	Q55
3417	Z2	L6	Q56
3418	Z2	L6	Q57
3419	Z2	L6	Q58
3420	Z2	L6	Q59
3421	Z2	L6	Q60
3422	Z2	L6	Q61
3423	Z2	L6	Q62
3424	Z2	L6	Q63
3425	Z2	L6	Q64
3426	Z2	L6	Q65
3427	Z2	L6	Q66
3428	Z2	L6	Q67
3429	Z2	L6	Q68
3430	Z2	L6	Q69
3431	Z2	L6	Q70
3432	Z2	L6	Q71
3433	Z2	L6	Q72
3434	Z2	L6	Q73
3435	Z2	L6	Q74
3436	Z2	L6	Q75
3437	Z2	L6	Q76
3438	Z2	L6	Q77
3439	Z2	L6	Q78
3440	Z2	L6	Q79
3441	Z2	L6	Q80
3442	Z2	L6	Q81
3443	Z2	L6	Q82
3444	Z2	L6	Q83
3445	Z2	L6	Q84
3446	Z2	L6	Q85
3447	Z2	L6	Q86
3448	Z2	L6	Q87
3449	Z2	L6	Q88
3450	Z2	L6	Q89
3451	Z2	L6	Q90
3452	Z2	L6	Q91
3453	Z2	L6	Q92
3454	Z2	L6	Q93
3455	Z2	L6	Q94
3456	Z2	L6	Q95
3457	Z2	L6	Q96
3458	Z2	L6	Q97
3459	Z2	L6	Q98
3460	Z2	L6	Q99
3461	Z2	L6	Q100
3462	Z2	L6	Q101
3463	Z2	L6	Q102
3464	Z2	L6	Q103
3465	Z2	L7	Q40
3466	Z2	L7	Q41
3467	Z2	L7	Q42
3468	Z2	L7	Q43
3469	Z2	L7	Q44
3470	Z2	L7	Q45
3471	Z2	L7	Q46
3472	Z2	L7	Q47
3473	Z2	L7	Q48
3474	Z2	L7	Q49
3475	Z2	L7	Q50
3476	Z2	L7	Q51
3477	Z2	L7	Q52
3478	Z2	L7	Q53
3479	Z2	L7	Q54
3480	Z2	L7	Q55
3481	Z2	L7	Q56
3482	Z2	L7	Q57
3483	Z2	L7	Q58
3484	Z2	L7	Q59
3485	Z2	L7	Q60
3486	Z2	L7	Q61
3487	Z2	L7	Q62
3488	Z2	L7	Q63
3489	Z2	L7	Q64
3490	Z2	L7	Q65
3491	Z2	L7	Q66
3492	Z2	L7	Q67
3493	Z2	L7	Q68
3494	Z2	L7	Q69
3495	Z2	L7	Q70
3496	Z2	L7	Q71
3497	Z2	L7	Q72
3498	Z2	L7	Q73
3499	Z2	L7	Q74
3500	Z2	L7	Q75
3501	Z2	L7	Q76
3502	Z2	L7	Q77
3503	Z2	L7	Q78
3504	Z2	L7	Q79
3505	Z2	L7	Q80
3506	Z2	L7	Q81
3507	Z2	L7	Q82
3508	Z2	L7	Q83
3509	Z2	L7	Q84
3510	Z2	L7	Q85
3511	Z2	L7	Q86
3512	Z2	L7	Q87
3513	Z2	L7	Q88
3514	Z2	L7	Q89
3515	Z2	L7	Q90
3516	Z2	L7	Q91
3517	Z2	L7	Q92
3518	Z2	L7	Q93
3519	Z2	L7	Q94
3520	Z2	L7	Q95
3521	Z2	L7	Q96
3522	Z2	L7	Q97
3523	Z2	L7	Q98
3524	Z2	L7	Q99
3525	Z2	L7	Q100
3526	Z2	L7	Q101
3527	Z2	L7	Q102
3528	Z2	L7	Q103
3529	Z2	L8	Q40
3530	Z2	L8	Q41
3531	Z2	L8	Q42
3532	Z2	L8	Q43
3533	Z2	L8	Q44
3534	Z2	L8	Q45
3535	Z2	L8	Q46
3536	Z2	L8	Q47
3537	Z2	L8	Q48
3538	Z2	L8	Q49
3539	Z2	L8	Q50
3540	Z2	L8	Q51
3541	Z2	L8	Q52
3542	Z2	L8	Q53
3543	Z2	L8	Q54
3544	Z2	L8	Q55
3545	Z2	L8	Q56
3546	Z2	L8	Q57
3547	Z2	L8	Q58
3548	Z2	L8	Q59
3549	Z2	L8	Q60
3550	Z2	L8	Q61
3551	Z2	L8	Q62
3552	Z2	L8	Q63
3553	Z2	L8	Q64
3554	Z2	L8	Q65
3555	Z2	L8	Q66
3556	Z2	L8	Q67
3557	Z2	L8	Q68
3558	Z2	L8	Q69
3559	Z2	L8	Q70
3560	Z2	L8	Q71
3561	Z2	L8	Q72
3562	Z2	L8	Q73
3563	Z2	L8	Q74
3564	Z2	L8	Q75
3565	Z2	L8	Q76
3566	Z2	L8	Q77
3567	Z2	L8	Q78
3568	Z2	L8	Q79
3569	Z2	L8	Q80
3570	Z2	L8	Q81
3571	Z2	L8	Q82
3572	Z2	L8	Q83
3573	Z2	L8	Q84
3574	Z2	L8	Q85
3575	Z2	L8	Q86
3576	Z2	L8	Q87
3577	Z2	L8	Q88
3578	Z2	L8	Q89
3579	Z2	L8	Q90
3580	Z2	L8	Q91
3581	Z2	L8	Q92
3582	Z2	L8	Q93
3583	Z2	L8	Q94
3584	Z2	L8	Q95
3585	Z2	L8	Q96
3586	Z2	L8	Q97
3587	Z2	L8	Q98
3588	Z2	L8	Q99
3589	Z2	L8	Q100
3590	Z2	L8	Q101

[Table 1-24]

3591	Z2	L8	Q102
3592	Z2	L8	Q103
3593	Z2	L9	Q40
3594	Z2	L9	Q41
3595	Z2	L9	Q42
3596	Z2	L9	Q43
3597	Z2	L9	Q44
3598	Z2	L9	Q45
3599	Z2	L9	Q46
3600	Z2	L9	Q47
3601	Z2	L9	Q48
3602	Z2	L9	Q49
3603	Z2	L9	Q50
3604	Z2	L9	Q51
3605	Z2	L9	Q52
3606	Z2	L9	Q53
3607	Z2	L9	Q54
3608	Z2	L9	Q55
3609	Z2	L9	Q56
3610	Z2	L9	Q57
3611	Z2	L9	Q58
3612	Z2	L9	Q59
3613	Z2	L9	Q60
3614	Z2	L9	Q61
3615	Z2	L9	Q62
3616	Z2	L9	Q63
3617	Z2	L9	Q64
3618	Z2	L9	Q65
3619	Z2	L9	Q66
3620	Z2	L9	Q67
3621	Z2	L9	Q68
3622	Z2	L9	Q69
3623	Z2	L9	Q70
3624	Z2	L9	Q71
3625	Z2	L9	Q72
3626	Z2	L9	Q73
3627	Z2	L9	Q74
3628	Z2	L9	Q75
3629	Z2	L9	Q76
3630	Z2	L9	Q77
3631	Z2	L9	Q78
3632	Z2	L9	Q79
3633	Z2	L9	Q80
3634	Z2	L9	Q81
3635	Z2	L9	Q82
3636	Z2	L9	Q83
3637	Z2	L9	Q84
3638	Z2	L9	Q85
3639	Z2	L9	Q86
3640	Z2	L9	Q87
3641	Z2	L9	Q88
3642	Z2	L9	Q89
3643	Z2	L9	Q90
3644	Z2	L9	Q91
3645	Z2	L9	Q92
3646	Z2	L9	Q93
3647	Z2	L9	Q94
3648	Z2	L9	Q95
3649	Z2	L9	Q96
3650	Z2	L9	Q97
3651	Z2	L9	Q98
3652	Z2	L9	Q99
3653	Z2	L9	Q100
3654	Z2	L9	Q101
3655	Z2	L9	Q102
3656	Z2	L9	Q103
3657	Z2	L10	Q40
3658	Z2	L10	Q41
3659	Z2	L10	Q42
3660	Z2	L10	Q43
3661	Z2	L10	Q44
3662	Z2	L10	Q45
3663	Z2	L10	Q46
3664	Z2	L10	Q47
3665	Z2	L10	Q48
3666	Z2	L10	Q49
3667	Z2	L10	Q50
3668	Z2	L10	Q51
3669	Z2	L10	Q52
3670	Z2	L10	Q53
3671	Z2	L10	Q54
3672	Z2	L10	Q55
3673	Z2	L10	Q56
3674	Z2	L10	Q57
3675	Z2	L10	Q58
3676	Z2	L10	Q59
3677	Z2	L10	Q60
3678	Z2	L10	Q61
3679	Z2	L10	Q62
3680	Z2	L10	Q63
3681	Z2	L10	Q64
3682	Z2	L10	Q65
3683	Z2	L10	Q66
3684	Z2	L10	Q67
3685	Z2	L10	Q68
3686	Z2	L10	Q69
3687	Z2	L10	Q70
3688	Z2	L10	Q71
3689	Z2	L10	Q72
3690	Z2	L10	Q73
3691	Z2	L10	Q74
3692	Z2	L10	Q75
3693	Z2	L10	Q76
3694	Z2	L10	Q77
3695	Z2	L10	Q78
3696	Z2	L10	Q79
3697	Z2	L10	Q80
3698	Z2	L10	Q81
3699	Z2	L10	Q82
3700	Z2	L10	Q83
3701	Z2	L10	Q84
3702	Z2	L10	Q85
3703	Z2	L10	Q86
3704	Z2	L10	Q87
3705	Z2	L10	Q88
3706	Z2	L10	Q89
3707	Z2	L10	Q90
3708	Z2	L10	Q91
3709	Z2	L10	Q92
3710	Z2	L10	Q93
3711	Z2	L10	Q94
3712	Z2	L10	Q95
3713	Z2	L10	Q96
3714	Z2	L10	Q97
3715	Z2	L10	Q98
3716	Z2	L10	Q99
3717	Z2	L10	Q100
3718	Z2	L10	Q101
3719	Z2	L10	Q102
3720	Z2	L10	Q103
3721	Z2	L11	Q40
3722	Z2	L11	Q41
3723	Z2	L11	Q42
3724	Z2	L11	Q43
3725	Z2	L11	Q44
3726	Z2	L11	Q45
3727	Z2	L11	Q46
3728	Z2	L11	Q47
3729	Z2	L11	Q48
3730	Z2	L11	Q49
3731	Z2	L11	Q50
3732	Z2	L11	Q51
3733	Z2	L11	Q52
3734	Z2	L11	Q53
3735	Z2	L11	Q54
3736	Z2	L11	Q55
3737	Z2	L11	Q56
3738	Z2	L11	Q57
3739	Z2	L11	Q58
3740	Z2	L11	Q59
3741	Z2	L11	Q60
3742	Z2	L11	Q61
3743	Z2	L11	Q62
3744	Z2	L11	Q63
3745	Z2	L11	Q64
3746	Z2	L11	Q65
3747	Z2	L11	Q66
3748	Z2	L11	Q67
3749	Z2	L11	Q68
3750	Z2	L11	Q69
3751	Z2	L11	Q70
3752	Z2	L11	Q71
3753	Z2	L11	Q72
3754	Z2	L11	Q73
3755	Z2	L11	Q74
3756	Z2	L11	Q75
3757	Z2	L11	Q76
3758	Z2	L11	Q77
3759	Z2	L11	Q78
3760	Z2	L11	Q79
3761	Z2	L11	Q80
3762	Z2	L11	Q81
3763	Z2	L11	Q82
3764	Z2	L11	Q83
3765	Z2	L11	Q84
3766	Z2	L11	Q85
3767	Z2	L11	Q86
3768	Z2	L11	Q87
3769	Z2	L11	Q88
3770	Z2	L11	Q89
3771	Z2	L11	Q90
3772	Z2	L11	Q91
3773	Z2	L11	Q92
3774	Z2	L11	Q93
3775	Z2	L11	Q94
3776	Z2	L11	Q95
3777	Z2	L11	Q96
3778	Z2	L11	Q97
3779	Z2	L11	Q98
3780	Z2	L11	Q99
3781	Z2	L11	Q100
3782	Z2	L11	Q101
3783	Z2	L11	Q102
3784	Z2	L11	Q103
3785	Z2	L12	Q40
3786	Z2	L12	Q41
3787	Z2	L12	Q42
3788	Z2	L12	Q43
3789	Z2	L12	Q44
3790	Z2	L12	Q45
3791	Z2	L12	Q46

[Table 1-25]

3792	Z2	L12	Q47
3793	Z2	L12	Q48
3794	Z2	L12	Q49
3795	Z2	L12	Q50
3796	Z2	L12	Q51
3797	Z2	L12	Q52
3798	Z2	L12	Q53
3799	Z2	L12	Q54
3800	Z2	L12	Q55
3801	Z2	L12	Q56
3802	Z2	L12	Q57
3803	Z2	L12	Q58
3804	Z2	L12	Q59
3805	Z2	L12	Q60
3806	Z2	L12	Q61
3807	Z2	L12	Q62
3808	Z2	L12	Q63
3809	Z2	L12	Q64
3810	Z2	L12	Q65
3811	Z2	L12	Q66
3812	Z2	L12	Q67
3813	Z2	L12	Q68
3814	Z2	L12	Q69
3815	Z2	L12	Q70
3816	Z2	L12	Q71
3817	Z2	L12	Q72
3818	Z2	L12	Q73
3819	Z2	L12	Q74
3820	Z2	L12	Q75
3821	Z2	L12	Q76
3822	Z2	L12	Q77
3823	Z2	L12	Q78
3824	Z2	L12	Q79
3825	Z2	L12	Q80
3826	Z2	L12	Q81
3827	Z2	L12	Q82
3828	Z2	L12	Q83
3829	Z2	L12	Q84
3830	Z2	L12	Q85
3831	Z2	L12	Q86
3832	Z2	L12	Q87
3833	Z2	L12	Q88
3834	Z2	L12	Q89
3835	Z2	L12	Q90
3836	Z2	L12	Q91
3837	Z2	L12	Q92
3838	Z2	L12	Q93
3839	Z2	L12	Q94
3840	Z2	L12	Q95
3841	Z2	L12	Q96
3842	Z2	L12	Q97
3843	Z2	L12	Q98
3844	Z2	L12	Q99
3845	Z2	L12	Q100
3846	Z2	L12	Q101
3847	Z2	L12	Q102
3848	Z2	L12	Q103
3849	Z2	L13	Q40
3850	Z2	L13	Q41
3851	Z2	L13	Q42
3852	Z2	L13	Q43
3853	Z2	L13	Q44
3854	Z2	L13	Q45
3855	Z2	L13	Q46
3856	Z2	L13	Q47
3857	Z2	L13	Q48
3858	Z2	L13	Q49
3859	Z2	L13	Q50
3860	Z2	L13	Q51
3861	Z2	L13	Q52
3862	Z2	L13	Q53
3863	Z2	L13	Q54
3864	Z2	L13	Q55
3865	Z2	L13	Q56
3866	Z2	L13	Q57
3867	Z2	L13	Q58
3868	Z2	L13	Q59
3869	Z2	L13	Q60
3870	Z2	L13	Q61
3871	Z2	L13	Q62
3872	Z2	L13	Q63
3873	Z2	L13	Q64
3874	Z2	L13	Q65
3875	Z2	L13	Q66
3876	Z2	L13	Q67
3877	Z2	L13	Q68
3878	Z2	L13	Q69
3879	Z2	L13	Q70
3880	Z2	L13	Q71
3881	Z2	L13	Q72
3882	Z2	L13	Q73
3883	Z2	L13	Q74
3884	Z2	L13	Q75
3885	Z2	L13	Q76
3886	Z2	L13	Q77
3887	Z2	L13	Q78
3888	Z2	L13	Q79
3889	Z2	L13	Q80
3890	Z2	L13	Q81
3891	Z2	L13	Q82
3892	Z2	L13	Q83
3893	Z2	L13	Q84
3894	Z2	L13	Q85
3895	Z2	L13	Q86
3896	Z2	L13	Q87
3897	Z2	L13	Q88
3898	Z2	L13	Q89
3899	Z2	L13	Q90
3900	Z2	L13	Q91
3901	Z2	L13	Q92
3902	Z2	L13	Q93
3903	Z2	L13	Q94
3904	Z2	L13	Q95
3905	Z2	L13	Q96
3906	Z2	L13	Q97
3907	Z2	L13	Q98
3908	Z2	L13	Q99
3909	Z2	L13	Q100
3910	Z2	L13	Q101
3911	Z2	L13	Q102
3912	Z2	L13	Q103
3913	Z2	L14	Q40
3914	Z2	L14	Q41
3915	Z2	L14	Q42
3916	Z2	L14	Q43
3917	Z2	L14	Q44
3918	Z2	L14	Q45
3919	Z2	L14	Q46
3920	Z2	L14	Q47
3921	Z2	L14	Q48
3922	Z2	L14	Q49
3923	Z2	L14	Q50
3924	Z2	L14	Q51
3925	Z2	L14	Q52
3926	Z2	L14	Q53
3927	Z2	L14	Q54
3928	Z2	L14	Q55
3929	Z2	L14	Q56
3930	Z2	L14	Q57
3931	Z2	L14	Q58
3932	Z2	L14	Q59
3933	Z2	L14	Q60
3934	Z2	L14	Q61
3935	Z2	L14	Q62
3936	Z2	L14	Q63
3937	Z2	L14	Q64
3938	Z2	L14	Q65
3939	Z2	L14	Q66
3940	Z2	L14	Q67
3941	Z2	L14	Q68
3942	Z2	L14	Q69
3943	Z2	L14	Q70
3944	Z2	L14	Q71
3945	Z2	L14	Q72
3946	Z2	L14	Q73
3947	Z2	L14	Q74
3948	Z2	L14	Q75
3949	Z2	L14	Q76
3950	Z2	L14	Q77
3951	Z2	L14	Q78
3952	Z2	L14	Q79
3953	Z2	L14	Q80
3954	Z2	L14	Q81
3955	Z2	L14	Q82
3956	Z2	L14	Q83
3957	Z2	L14	Q84
3958	Z2	L14	Q85
3959	Z2	L14	Q86
3960	Z2	L14	Q87
3961	Z2	L14	Q88
3962	Z2	L14	Q89
3963	Z2	L14	Q90
3964	Z2	L14	Q91
3965	Z2	L14	Q92
3966	Z2	L14	Q93
3967	Z2	L14	Q94
3968	Z2	L14	Q95
3969	Z2	L14	Q96
3970	Z2	L14	Q97
3971	Z2	L14	Q98
3972	Z2	L14	Q99
3973	Z2	L14	Q100
3974	Z2	L14	Q101
3975	Z2	L14	Q102
3976	Z2	L14	Q103
3977	Z3	L1	Q40
3978	Z3	L1	Q41
3979	Z3	L1	Q42
3980	Z3	L1	Q43
3981	Z3	L1	Q44
3982	Z3	L1	Q45
3983	Z3	L1	Q46
3984	Z3	L1	Q47
3985	Z3	L1	Q48
3986	Z3	L1	Q49
3987	Z3	L1	Q50
3988	Z3	L1	Q51
3989	Z3	L1	Q52
3990	Z3	L1	Q53
3991	Z3	L1	Q54
3992	Z3	L1	Q55

[Table 1-26]

3993	Z3	L1	Q56
3994	Z3	L1	Q57
3995	Z3	L1	Q58
3996	Z3	L1	Q59
3997	Z3	L1	Q60
3998	Z3	L1	Q61
3999	Z3	L1	Q62
4000	Z3	L1	Q63
4001	Z3	L1	Q64
4002	Z3	L1	Q65
4003	Z3	L1	Q66
4004	Z3	L1	Q67
4005	Z3	L1	Q68
4006	Z3	L1	Q69
4007	Z3	L1	Q70
4008	Z3	L1	Q71
4009	Z3	L1	Q72
4010	Z3	L1	Q73
4011	Z3	L1	Q74
4012	Z3	L1	Q75
4013	Z3	L1	Q76
4014	Z3	L1	Q77
4015	Z3	L1	Q78
4016	Z3	L1	Q79
4017	Z3	L1	Q80
4018	Z3	L1	Q81
4019	Z3	L1	Q82
4020	Z3	L1	Q83
4021	Z3	L1	Q84
4022	Z3	L1	Q85
4023	Z3	L1	Q86
4024	Z3	L1	Q87
4025	Z3	L1	Q88
4026	Z3	L1	Q89
4027	Z3	L1	Q90
4028	Z3	L1	Q91
4029	Z3	L1	Q92
4030	Z3	L1	Q93
4031	Z3	L1	Q94
4032	Z3	L1	Q95
4033	Z3	L1	Q96
4034	Z3	L1	Q97
4035	Z3	L1	Q98
4036	Z3	L1	Q99
4037	Z3	L1	Q100
4038	Z3	L1	Q101
4039	Z3	L1	Q102
4040	Z3	L1	Q103
4041	Z3	L2	Q40
4042	Z3	L2	Q41
4043	Z3	L2	Q42
4044	Z3	L2	Q43
4045	Z3	L2	Q44
4046	Z3	L2	Q45
4047	Z3	L2	Q46
4048	Z3	L2	Q47
4049	Z3	L2	Q48
4050	Z3	L2	Q49
4051	Z3	L2	Q50
4052	Z3	L2	Q51
4053	Z3	L2	Q52
4054	Z3	L2	Q53
4055	Z3	L2	Q54
4056	Z3	L2	Q55
4057	Z3	L2	Q56
4058	Z3	L2	Q57
4059	Z3	L2	Q58
4060	Z3	L2	Q59
4061	Z3	L2	Q60
4062	Z3	L2	Q61
4063	Z3	L2	Q62
4064	Z3	L2	Q63
4065	Z3	L2	Q64
4066	Z3	L2	Q65
4067	Z3	L2	Q66
4068	Z3	L2	Q67
4069	Z3	L2	Q68
4070	Z3	L2	Q69
4071	Z3	L2	Q70
4072	Z3	L2	Q71
4073	Z3	L2	Q72
4074	Z3	L2	Q73
4075	Z3	L2	Q74
4076	Z3	L2	Q75
4077	Z3	L2	Q76
4078	Z3	L2	Q77
4079	Z3	L2	Q78
4080	Z3	L2	Q79
4081	Z3	L2	Q80
4082	Z3	L2	Q81
4083	Z3	L2	Q82
4084	Z3	L2	Q83
4085	Z3	L2	Q84
4086	Z3	L2	Q85
4087	Z3	L2	Q86
4088	Z3	L2	Q87
4089	Z3	L2	Q88
4090	Z3	L2	Q89
4091	Z3	L2	Q90
4092	Z3	L2	Q91
4093	Z3	L2	Q92
4094	Z3	L2	Q93
4095	Z3	L2	Q94
4096	Z3	L2	Q95
4097	Z3	L2	Q96
4098	Z3	L2	Q97
4099	Z3	L2	Q98
4100	Z3	L2	Q99
4101	Z3	L2	Q100
4102	Z3	L2	Q101
4103	Z3	L2	Q102
4104	Z3	L2	Q103
4105	Z3	L3	Q40
4106	Z3	L3	Q41
4107	Z3	L3	Q42
4108	Z3	L3	Q43
4109	Z3	L3	Q44
4110	Z3	L3	Q45
4111	Z3	L3	Q46
4112	Z3	L3	Q47
4113	Z3	L3	Q48
4114	Z3	L3	Q49
4115	Z3	L3	Q50
4116	Z3	L3	Q51
4117	Z3	L3	Q52
4118	Z3	L3	Q53
4119	Z3	L3	Q54
4120	Z3	L3	Q55
4121	Z3	L3	Q56
4122	Z3	L3	Q57
4123	Z3	L3	Q58
4124	Z3	L3	Q59
4125	Z3	L3	Q60
4126	Z3	L3	Q61
4127	Z3	L3	Q62
4128	Z3	L3	Q63
4129	Z3	L3	Q64
4130	Z3	L3	Q65
4131	Z3	L3	Q66
4132	Z3	L3	Q67
4133	Z3	L3	Q68
4134	Z3	L3	Q69
4135	Z3	L3	Q70
4136	Z3	L3	Q71
4137	Z3	L3	Q72
4138	Z3	L3	Q73
4139	Z3	L3	Q74
4140	Z3	L3	Q75
4141	Z3	L3	Q76
4142	Z3	L3	Q77
4143	Z3	L3	Q78
4144	Z3	L3	Q79
4145	Z3	L3	Q80
4146	Z3	L3	Q81
4147	Z3	L3	Q82
4148	Z3	L3	Q83
4149	Z3	L3	Q84
4150	Z3	L3	Q85
4151	Z3	L3	Q86
4152	Z3	L3	Q87
4153	Z3	L3	Q88
4154	Z3	L3	Q89
4155	Z3	L3	Q90
4156	Z3	L3	Q91
4157	Z3	L3	Q92
4158	Z3	L3	Q93
4159	Z3	L3	Q94
4160	Z3	L3	Q95
4161	Z3	L3	Q96
4162	Z3	L3	Q97
4163	Z3	L3	Q98
4164	Z3	L3	Q99
4165	Z3	L3	Q100
4166	Z3	L3	Q101
4167	Z3	L3	Q102
4168	Z3	L3	Q103
4169	Z3	L4	Q40
4170	Z3	L4	Q41
4171	Z3	L4	Q42
4172	Z3	L4	Q43
4173	Z3	L4	Q44
4174	Z3	L4	Q45
4175	Z3	L4	Q46
4176	Z3	L4	Q47
4177	Z3	L4	Q48
4178	Z3	L4	Q49
4179	Z3	L4	Q50
4180	Z3	L4	Q51
4181	Z3	L4	Q52
4182	Z3	L4	Q53
4183	Z3	L4	Q54
4184	Z3	L4	Q55
4185	Z3	L4	Q56
4186	Z3	L4	Q57
4187	Z3	L4	Q58
4188	Z3	L4	Q59
4189	Z3	L4	Q60
4190	Z3	L4	Q61
4191	Z3	L4	Q62
4192	Z3	L4	Q63
4193	Z3	L4	Q64

[Table 1-27]

4194	Z3	L4	Q65
4195	Z3	L4	Q66
4196	Z3	L4	Q67
4197	Z3	L4	Q68
4198	Z3	L4	Q69
4199	Z3	L4	Q70
4200	Z3	L4	Q71
4201	Z3	L4	Q72
4202	Z3	L4	Q73
4203	Z3	L4	Q74
4204	Z3	L4	Q75
4205	Z3	L4	Q76
4206	Z3	L4	Q77
4207	Z3	L4	Q78
4208	Z3	L4	Q79
4209	Z3	L4	Q80
4210	Z3	L4	Q81
4211	Z3	L4	Q82
4212	Z3	L4	Q83
4213	Z3	L4	Q84
4214	Z3	L4	Q85
4215	Z3	L4	Q86
4216	Z3	L4	Q87
4217	Z3	L4	Q88
4218	Z3	L4	Q89
4219	Z3	L4	Q90
4220	Z3	L4	Q91
4221	Z3	L4	Q92
4222	Z3	L4	Q93
4223	Z3	L4	Q94
4224	Z3	L4	Q95
4225	Z3	L4	Q96
4226	Z3	L4	Q97
4227	Z3	L4	Q98
4228	Z3	L4	Q99
4229	Z3	L4	Q100
4230	Z3	L4	Q101
4231	Z3	L4	Q102
4232	Z3	L4	Q103
4233	Z3	L5	Q40
4234	Z3	L5	Q41
4235	Z3	L5	Q42
4236	Z3	L5	Q43
4237	Z3	L5	Q44
4238	Z3	L5	Q45
4239	Z3	L5	Q46
4240	Z3	L5	Q47
4241	Z3	L5	Q48
4242	Z3	L5	Q49
4243	Z3	L5	Q50
4244	Z3	L5	Q51
4245	Z3	L5	Q52
4246	Z3	L5	Q53
4247	Z3	L5	Q54
4248	Z3	L5	Q55
4249	Z3	L5	Q56
4250	Z3	L5	Q57
4251	Z3	L5	Q58
4252	Z3	L5	Q59
4253	Z3	L5	Q60
4254	Z3	L5	Q61
4255	Z3	L5	Q62
4256	Z3	L5	Q63
4257	Z3	L5	Q64
4258	Z3	L5	Q65
4259	Z3	L5	Q66
4260	Z3	L5	Q67
4261	Z3	L5	Q68
4262	Z3	L5	Q69
4263	Z3	L5	Q70
4264	Z3	L5	Q71
4265	Z3	L5	Q72
4266	Z3	L5	Q73
4267	Z3	L5	Q74
4268	Z3	L5	Q75
4269	Z3	L5	Q76
4270	Z3	L5	Q77
4271	Z3	L5	Q78
4272	Z3	L5	Q79
4273	Z3	L5	Q80
4274	Z3	L5	Q81
4275	Z3	L5	Q82
4276	Z3	L5	Q83
4277	Z3	L5	Q84
4278	Z3	L5	Q85
4279	Z3	L5	Q86
4280	Z3	L5	Q87
4281	Z3	L5	Q88
4282	Z3	L5	Q89
4283	Z3	L5	Q90
4284	Z3	L5	Q91
4285	Z3	L5	Q92
4286	Z3	L5	Q93
4287	Z3	L5	Q94
4288	Z3	L5	Q95
4289	Z3	L5	Q96
4290	Z3	L5	Q97
4291	Z3	L5	Q98
4292	Z3	L5	Q99
4293	Z3	L5	Q100
4294	Z3	L5	Q101
4295	Z3	L5	Q102
4296	Z3	L5	Q103
4297	Z3	L6	Q40
4298	Z3	L6	Q41
4299	Z3	L6	Q42
4300	Z3	L6	Q43
4301	Z3	L6	Q44
4302	Z3	L6	Q45
4303	Z3	L6	Q46
4304	Z3	L6	Q47
4305	Z3	L6	Q48
4306	Z3	L6	Q49
4307	Z3	L6	Q50
4308	Z3	L6	Q51
4309	Z3	L6	Q52
4310	Z3	L6	Q53
4311	Z3	L6	Q54
4312	Z3	L6	Q55
4313	Z3	L6	Q56
4314	Z3	L6	Q57
4315	Z3	L6	Q58
4316	Z3	L6	Q59
4317	Z3	L6	Q60
4318	Z3	L6	Q61
4319	Z3	L6	Q62
4320	Z3	L6	Q63
4321	Z3	L6	Q64
4322	Z3	L6	Q65
4323	Z3	L6	Q66
4324	Z3	L6	Q67
4325	Z3	L6	Q68
4326	Z3	L6	Q69
4327	Z3	L6	Q70
4328	Z3	L6	Q71
4329	Z3	L6	Q72
4330	Z3	L6	Q73
4331	Z3	L6	Q74
4332	Z3	L6	Q75
4333	Z3	L6	Q76
4334	Z3	L6	Q77
4335	Z3	L6	Q78
4336	Z3	L6	Q79
4337	Z3	L6	Q80
4338	Z3	L6	Q81
4339	Z3	L6	Q82
4340	Z3	L6	Q83
4341	Z3	L6	Q84
4342	Z3	L6	Q85
4343	Z3	L6	Q86
4344	Z3	L6	Q87
4345	Z3	L6	Q88
4346	Z3	L6	Q89
4347	Z3	L6	Q90
4348	Z3	L6	Q91
4349	Z3	L6	Q92
4350	Z3	L6	Q93
4351	Z3	L6	Q94
4352	Z3	L6	Q95
4353	Z3	L6	Q96
4354	Z3	L6	Q97
4355	Z3	L6	Q98
4356	Z3	L6	Q99
4357	Z3	L6	Q100
4358	Z3	L6	Q101
4359	Z3	L6	Q102
4360	Z3	L6	Q103
4361	Z3	L7	Q40
4362	Z3	L7	Q41
4363	Z3	L7	Q42
4364	Z3	L7	Q43
4365	Z3	L7	Q44
4366	Z3	L7	Q45
4367	Z3	L7	Q46
4368	Z3	L7	Q47
4369	Z3	L7	Q48
4370	Z3	L7	Q49
4371	Z3	L7	Q50
4372	Z3	L7	Q51
4373	Z3	L7	Q52
4374	Z3	L7	Q53
4375	Z3	L7	Q54
4376	Z3	L7	Q55
4377	Z3	L7	Q56
4378	Z3	L7	Q57
4379	Z3	L7	Q58
4380	Z3	L7	Q59
4381	Z3	L7	Q60
4382	Z3	L7	Q61
4383	Z3	L7	Q62
4384	Z3	L7	Q63
4385	Z3	L7	Q64
4386	Z3	L7	Q65
4387	Z3	L7	Q66
4388	Z3	L7	Q67
4389	Z3	L7	Q68
4390	Z3	L7	Q69
4391	Z3	L7	Q70
4392	Z3	L7	Q71
4393	Z3	L7	Q72
4394	Z3	L7	Q73

[Table 1-28]

4395	Z3	L7	Q74
4396	Z3	L7	Q75
4397	Z3	L7	Q76
4398	Z3	L7	Q77
4399	Z3	L7	Q78
4400	Z3	L7	Q79
4401	Z3	L7	Q80
4402	Z3	L7	Q81
4403	Z3	L7	Q82
4404	Z3	L7	Q83
4405	Z3	L7	Q84
4406	Z3	L7	Q85
4407	Z3	L7	Q86
4408	Z3	L7	Q87
4409	Z3	L7	Q88
4410	Z3	L7	Q89
4411	Z3	L7	Q90
4412	Z3	L7	Q91
4413	Z3	L7	Q92
4414	Z3	L7	Q93
4415	Z3	L7	Q94
4416	Z3	L7	Q95
4417	Z3	L7	Q96
4418	Z3	L7	Q97
4419	Z3	L7	Q98
4420	Z3	L7	Q99
4421	Z3	L7	Q100
4422	Z3	L7	Q101
4423	Z3	L7	Q102
4424	Z3	L7	Q103
4425	Z3	L8	Q40
4426	Z3	L8	Q41
4427	Z3	L8	Q42
4428	Z3	L8	Q43
4429	Z3	L8	Q44
4430	Z3	L8	Q45
4431	Z3	L8	Q46
4432	Z3	L8	Q47
4433	Z3	L8	Q48
4434	Z3	L8	Q49
4435	Z3	L8	Q50
4436	Z3	L8	Q51
4437	Z3	L8	Q52
4438	Z3	L8	Q53
4439	Z3	L8	Q54
4440	Z3	L8	Q55
4441	Z3	L8	Q56
4442	Z3	L8	Q57
4443	Z3	L8	Q58
4444	Z3	L8	Q59
4445	Z3	L8	Q60
4446	Z3	L8	Q61
4447	Z3	L8	Q62
4448	Z3	L8	Q63
4449	Z3	L8	Q64
4450	Z3	L8	Q65
4451	Z3	L8	Q66
4452	Z3	L8	Q67
4453	Z3	L8	Q68
4454	Z3	L8	Q69
4455	Z3	L8	Q70
4456	Z3	L8	Q71
4457	Z3	L8	Q72
4458	Z3	L8	Q73
4459	Z3	L8	Q74
4460	Z3	L8	Q75
4461	Z3	L8	Q76
4462	Z3	L8	Q77
4463	Z3	L8	Q78
4464	Z3	L8	Q79
4465	Z3	L8	Q80
4466	Z3	L8	Q81
4467	Z3	L8	Q82
4468	Z3	L8	Q83
4469	Z3	L8	Q84
4470	Z3	L8	Q85
4471	Z3	L8	Q86
4472	Z3	L8	Q87
4473	Z3	L8	Q88
4474	Z3	L8	Q89
4475	Z3	L8	Q90
4476	Z3	L8	Q91
4477	Z3	L8	Q92
4478	Z3	L8	Q93
4479	Z3	L8	Q94
4480	Z3	L8	Q95
4481	Z3	L8	Q96
4482	Z3	L8	Q97
4483	Z3	L8	Q98
4484	Z3	L8	Q99
4485	Z3	L8	Q100
4486	Z3	L8	Q101
4487	Z3	L8	Q102
4488	Z3	L8	Q103
4489	Z3	L9	Q40
4490	Z3	L9	Q41
4491	Z3	L9	Q42
4492	Z3	L9	Q43
4493	Z3	L9	Q44
4494	Z3	L9	Q45
4495	Z3	L9	Q46
4496	Z3	L9	Q47
4497	Z3	L9	Q48
4498	Z3	L9	Q49
4499	Z3	L9	Q50
4500	Z3	L9	Q51
4501	Z3	L9	Q52
4502	Z3	L9	Q53
4503	Z3	L9	Q54
4504	Z3	L9	Q55
4505	Z3	L9	Q56
4506	Z3	L9	Q57
4507	Z3	L9	Q58
4508	Z3	L9	Q59
4509	Z3	L9	Q60
4510	Z3	L9	Q61
4511	Z3	L9	Q62
4512	Z3	L9	Q63
4513	Z3	L9	Q64
4514	Z3	L9	Q65
4515	Z3	L9	Q66
4516	Z3	L9	Q67
4517	Z3	L9	Q68
4518	Z3	L9	Q69
4519	Z3	L9	Q70
4520	Z3	L9	Q71
4521	Z3	L9	Q72
4522	Z3	L9	Q73
4523	Z3	L9	Q74
4524	Z3	L9	Q75
4525	Z3	L9	Q76
4526	Z3	L9	Q77
4527	Z3	L9	Q78
4528	Z3	L9	Q79
4529	Z3	L9	Q80
4530	Z3	L9	Q81
4531	Z3	L9	Q82
4532	Z3	L9	Q83
4533	Z3	L9	Q84
4534	Z3	L9	Q85
4535	Z3	L9	Q86
4536	Z3	L9	Q87
4537	Z3	L9	Q88
4538	Z3	L9	Q89
4539	Z3	L9	Q90
4540	Z3	L9	Q91
4541	Z3	L9	Q92
4542	Z3	L9	Q93
4543	Z3	L9	Q94
4544	Z3	L9	Q95
4545	Z3	L9	Q96
4546	Z3	L9	Q97
4547	Z3	L9	Q98
4548	Z3	L9	Q99
4549	Z3	L9	Q100
4550	Z3	L9	Q101
4551	Z3	L9	Q102
4552	Z3	L9	Q103
4553	Z3	L10	Q40
4554	Z3	L10	Q41
4555	Z3	L10	Q42
4556	Z3	L10	Q43
4557	Z3	L10	Q44
4558	Z3	L10	Q45
4559	Z3	L10	Q46
4560	Z3	L10	Q47
4561	Z3	L10	Q48
4562	Z3	L10	Q49
4563	Z3	L10	Q50
4564	Z3	L10	Q51
4565	Z3	L10	Q52
4566	Z3	L10	Q53
4567	Z3	L10	Q54
4568	Z3	L10	Q55
4569	Z3	L10	Q56
4570	Z3	L10	Q57
4571	Z3	L10	Q58
4572	Z3	L10	Q59
4573	Z3	L10	Q60
4574	Z3	L10	Q61
4575	Z3	L10	Q62
4576	Z3	L10	Q63
4577	Z3	L10	Q64
4578	Z3	L10	Q65
4579	Z3	L10	Q66
4580	Z3	L10	Q67
4581	Z3	L10	Q68
4582	Z3	L10	Q69
4583	Z3	L10	Q70
4584	Z3	L10	Q71
4585	Z3	L10	Q72
4586	Z3	L10	Q73
4587	Z3	L10	Q74
4588	Z3	L10	Q75
4589	Z3	L10	Q76
4590	Z3	L10	Q77
4591	Z3	L10	Q78
4592	Z3	L10	Q79
4593	Z3	L10	Q80
4594	Z3	L10	Q81
4595	Z3	L10	Q82

[Table 1-29]

4596	Z3	L10	Q83
4597	Z3	L10	Q84
4598	Z3	L10	Q85
4599	Z3	L10	Q86
4600	Z3	L10	Q87
4601	Z3	L10	Q88
4602	Z3	L10	Q89
4603	Z3	L10	Q90
4604	Z3	L10	Q91
4605	Z3	L10	Q92
4606	Z3	L10	Q93
4607	Z3	L10	Q94
4608	Z3	L10	Q95
4609	Z3	L10	Q96
4610	Z3	L10	Q97
4611	Z3	L10	Q98
4612	Z3	L10	Q99
4613	Z3	L10	Q100
4614	Z3	L10	Q101
4615	Z3	L10	Q102
4616	Z3	L10	Q103
4617	Z3	L11	Q40
4618	Z3	L11	Q41
4619	Z3	L11	Q42
4620	Z3	L11	Q43
4621	Z3	L11	Q44
4622	Z3	L11	Q45
4623	Z3	L11	Q46
4624	Z3	L11	Q47
4625	Z3	L11	Q48
4626	Z3	L11	Q49
4627	Z3	L11	Q50
4628	Z3	L11	Q51
4629	Z3	L11	Q52
4630	Z3	L11	Q53
4631	Z3	L11	Q54
4632	Z3	L11	Q55
4633	Z3	L11	Q56
4634	Z3	L11	Q57
4635	Z3	L11	Q58
4636	Z3	L11	Q59
4637	Z3	L11	Q60
4638	Z3	L11	Q61
4639	Z3	L11	Q62
4640	Z3	L11	Q63
4641	Z3	L11	Q64
4642	Z3	L11	Q65
4643	Z3	L11	Q66
4644	Z3	L11	Q67
4645	Z3	L11	Q68
4646	Z3	L11	Q69
4647	Z3	L11	Q70
4648	Z3	L11	Q71
4649	Z3	L11	Q72
4650	Z3	L11	Q73
4651	Z3	L11	Q74
4652	Z3	L11	Q75
4653	Z3	L11	Q76
4654	Z3	L11	Q77
4655	Z3	L11	Q78
4656	Z3	L11	Q79
4657	Z3	L11	Q80
4658	Z3	L11	Q81
4659	Z3	L11	Q82
4660	Z3	L11	Q83
4661	Z3	L11	Q84
4662	Z3	L11	Q85
4663	Z3	L11	Q86
4664	Z3	L11	Q87
4665	Z3	L11	Q88
4666	Z3	L11	Q89
4667	Z3	L11	Q90
4668	Z3	L11	Q91
4669	Z3	L11	Q92
4670	Z3	L11	Q93
4671	Z3	L11	Q94
4672	Z3	L11	Q95
4673	Z3	L11	Q96
4674	Z3	L11	Q97
4675	Z3	L11	Q98
4676	Z3	L11	Q99
4677	Z3	L11	Q100
4678	Z3	L11	Q101
4679	Z3	L11	Q102
4680	Z3	L11	Q103
4681	Z3	L12	Q40
4682	Z3	L12	Q41
4683	Z3	L12	Q42
4684	Z3	L12	Q43
4685	Z3	L12	Q44
4686	Z3	L12	Q45
4687	Z3	L12	Q46
4688	Z3	L12	Q47
4689	Z3	L12	Q48
4690	Z3	L12	Q49
4691	Z3	L12	Q50
4692	Z3	L12	Q51
4693	Z3	L12	Q52
4694	Z3	L12	Q53
4695	Z3	L12	Q54
4696	Z3	L12	Q55
4697	Z3	L12	Q56
4698	Z3	L12	Q57
4699	Z3	L12	Q58
4700	Z3	L12	Q59
4701	Z3	L12	Q60
4702	Z3	L12	Q61
4703	Z3	L12	Q62
4704	Z3	L12	Q63
4705	Z3	L12	Q64
4706	Z3	L12	Q65
4707	Z3	L12	Q66
4708	Z3	L12	Q67
4709	Z3	L12	Q68
4710	Z3	L12	Q69
4711	Z3	L12	Q70
4712	Z3	L12	Q71
4713	Z3	L12	Q72
4714	Z3	L12	Q73
4715	Z3	L12	Q74
4716	Z3	L12	Q75
4717	Z3	L12	Q76
4718	Z3	L12	Q77
4719	Z3	L12	Q78
4720	Z3	L12	Q79
4721	Z3	L12	Q80
4722	Z3	L12	Q81
4723	Z3	L12	Q82
4724	Z3	L12	Q83
4725	Z3	L12	Q84
4726	Z3	L12	Q85
4727	Z3	L12	Q86
4728	Z3	L12	Q87
4729	Z3	L12	Q88
4730	Z3	L12	Q89
4731	Z3	L12	Q90
4732	Z3	L12	Q91
4733	Z3	L12	Q92
4734	Z3	L12	Q93
4735	Z3	L12	Q94
4736	Z3	L12	Q95
4737	Z3	L12	Q96
4738	Z3	L12	Q97
4739	Z3	L12	Q98
4740	Z3	L12	Q99
4741	Z3	L12	Q100
4742	Z3	L12	Q101
4743	Z3	L12	Q102
4744	Z3	L12	Q103
4745	Z3	L13	Q40
4746	Z3	L13	Q41
4747	Z3	L13	Q42
4748	Z3	L13	Q43
4749	Z3	L13	Q44
4750	Z3	L13	Q45
4751	Z3	L13	Q46
4752	Z3	L13	Q47
4753	Z3	L13	Q48
4754	Z3	L13	Q49
4755	Z3	L13	Q50
4756	Z3	L13	Q51
4757	Z3	L13	Q52
4758	Z3	L13	Q53
4759	Z3	L13	Q54
4760	Z3	L13	Q55
4761	Z3	L13	Q56
4762	Z3	L13	Q57
4763	Z3	L13	Q58
4764	Z3	L13	Q59
4765	Z3	L13	Q60
4766	Z3	L13	Q61
4767	Z3	L13	Q62
4768	Z3	L13	Q63
4769	Z3	L13	Q64
4770	Z3	L13	Q65
4771	Z3	L13	Q66
4772	Z3	L13	Q67
4773	Z3	L13	Q68
4774	Z3	L13	Q69
4775	Z3	L13	Q70
4776	Z3	L13	Q71
4777	Z3	L13	Q72
4778	Z3	L13	Q73
4779	Z3	L13	Q74
4780	Z3	L13	Q75
4781	Z3	L13	Q76
4782	Z3	L13	Q77
4783	Z3	L13	Q78
4784	Z3	L13	Q79
4785	Z3	L13	Q80
4786	Z3	L13	Q81
4787	Z3	L13	Q82
4788	Z3	L13	Q83
4789	Z3	L13	Q84
4790	Z3	L13	Q85
4791	Z3	L13	Q86
4792	Z3	L13	Q87
4793	Z3	L13	Q88
4794	Z3	L13	Q89
4795	Z3	L13	Q90
4796	Z3	L13	Q91

[Table 1-30]

4797	Z3	L13	Q92
4798	Z3	L13	Q93
4799	Z3	L13	Q94
4800	Z3	L13	Q95
4801	Z3	L13	Q96
4802	Z3	L13	Q97
4803	Z3	L13	Q98
4804	Z3	L13	Q99
4805	Z3	L13	Q100
4806	Z3	L13	Q101
4807	Z3	L13	Q102
4808	Z3	L13	Q103
4809	Z3	L14	Q40
4810	Z3	L14	Q41
4811	Z3	L14	Q42
4812	Z3	L14	Q43
4813	Z3	L14	Q44
4814	Z3	L14	Q45
4815	Z3	L14	Q46
4816	Z3	L14	Q47
4817	Z3	L14	Q48
4818	Z3	L14	Q49
4819	Z3	L14	Q50
4820	Z3	L14	Q51
4821	Z3	L14	Q52
4822	Z3	L14	Q53
4823	Z3	L14	Q54
4824	Z3	L14	Q55
4825	Z3	L14	Q56
4826	Z3	L14	Q57
4827	Z3	L14	Q58
4828	Z3	L14	Q59
4829	Z3	L14	Q60
4830	Z3	L14	Q61
4831	Z3	L14	Q62
4832	Z3	L14	Q63
4833	Z3	L14	Q64
4834	Z3	L14	Q65
4835	Z3	L14	Q66
4836	Z3	L14	Q67
4837	Z3	L14	Q68
4838	Z3	L14	Q69
4839	Z3	L14	Q70
4840	Z3	L14	Q71
4841	Z3	L14	Q72
4842	Z3	L14	Q73
4843	Z3	L14	Q74
4844	Z3	L14	Q75
4845	Z3	L14	Q76
4846	Z3	L14	Q77
4847	Z3	L14	Q78
4848	Z3	L14	Q79
4849	Z3	L14	Q80
4850	Z3	L14	Q81
4851	Z3	L14	Q82
4852	Z3	L14	Q83
4853	Z3	L14	Q84
4854	Z3	L14	Q85
4855	Z3	L14	Q86
4856	Z3	L14	Q87
4857	Z3	L14	Q88
4858	Z3	L14	Q89
4859	Z3	L14	Q90
4860	Z3	L14	Q91
4861	Z3	L14	Q92
4862	Z3	L14	Q93
4863	Z3	L14	Q94
4864	Z3	L14	Q95
4865	Z3	L14	Q96
4866	Z3	L14	Q97
4867	Z3	L14	Q98
4868	Z3	L14	Q99
4869	Z3	L14	Q100
4870	Z3	L14	Q101
4871	Z3	L14	Q102
4872	Z3	L14	Q103
4873	Z4	L1	Q40
4874	Z4	L1	Q41
4875	Z4	L1	Q42
4876	Z4	L1	Q43
4877	Z4	L1	Q44
4878	Z4	L1	Q45
4879	Z4	L1	Q46
4880	Z4	L1	Q47
4881	Z4	L1	Q48
4882	Z4	L1	Q49
4883	Z4	L1	Q50
4884	Z4	L1	Q51
4885	Z4	L1	Q52
4886	Z4	L1	Q53
4887	Z4	L1	Q54
4888	Z4	L1	Q55
4889	Z4	L1	Q56
4890	Z4	L1	Q57
4891	Z4	L1	Q58
4892	Z4	L1	Q59
4893	Z4	L1	Q60
4894	Z4	L1	Q61
4895	Z4	L1	Q62
4896	Z4	L1	Q63
4897	Z4	L1	Q64
4898	Z4	L1	Q65
4899	Z4	L1	Q66
4900	Z4	L1	Q67
4901	Z4	L1	Q68
4902	Z4	L1	Q69
4903	Z4	L1	Q70
4904	Z4	L1	Q71
4905	Z4	L1	Q72
4906	Z4	L1	Q73
4907	Z4	L1	Q74
4908	Z4	L1	Q75
4909	Z4	L1	Q76
4910	Z4	L1	Q77
4911	Z4	L1	Q78
4912	Z4	L1	Q79
4913	Z4	L1	Q80
4914	Z4	L1	Q81
4915	Z4	L1	Q82
4916	Z4	L1	Q83
4917	Z4	L1	Q84
4918	Z4	L1	Q85
4919	Z4	L1	Q86
4920	Z4	L1	Q87
4921	Z4	L1	Q88
4922	Z4	L1	Q89
4923	Z4	L1	Q90
4924	Z4	L1	Q91
4925	Z4	L1	Q92
4926	Z4	L1	Q93
4927	Z4	L1	Q94
4928	Z4	L1	Q95
4929	Z4	L1	Q96
4930	Z4	L1	Q97
4931	Z4	L1	Q98
4932	Z4	L1	Q99
4933	Z4	L1	Q100
4934	Z4	L1	Q101
4935	Z4	L1	Q102
4936	Z4	L1	Q103
4937	Z4	L2	Q40
4938	Z4	L2	Q41
4939	Z4	L2	Q42
4940	Z4	L2	Q43
4941	Z4	L2	Q44
4942	Z4	L2	Q45
4943	Z4	L2	Q46
4944	Z4	L2	Q47
4945	Z4	L2	Q48
4946	Z4	L2	Q49
4947	Z4	L2	Q50
4948	Z4	L2	Q51
4949	Z4	L2	Q52
4950	Z4	L2	Q53
4951	Z4	L2	Q54
4952	Z4	L2	Q55
4953	Z4	L2	Q56
4954	Z4	L2	Q57
4955	Z4	L2	Q58
4956	Z4	L2	Q59
4957	Z4	L2	Q60
4958	Z4	L2	Q61
4959	Z4	L2	Q62
4960	Z4	L2	Q63
4961	Z4	L2	Q64
4962	Z4	L2	Q65
4963	Z4	L2	Q66
4964	Z4	L2	Q67
4965	Z4	L2	Q68
4966	Z4	L2	Q69
4967	Z4	L2	Q70
4968	Z4	L2	Q71
4969	Z4	L2	Q72
4970	Z4	L2	Q73
4971	Z4	L2	Q74
4972	Z4	L2	Q75
4973	Z4	L2	Q76
4974	Z4	L2	Q77
4975	Z4	L2	Q78
4976	Z4	L2	Q79
4977	Z4	L2	Q80
4978	Z4	L2	Q81
4979	Z4	L2	Q82
4980	Z4	L2	Q83
4981	Z4	L2	Q84
4982	Z4	L2	Q85
4983	Z4	L2	Q86
4984	Z4	L2	Q87
4985	Z4	L2	Q88
4986	Z4	L2	Q89
4987	Z4	L2	Q90
4988	Z4	L2	Q91
4989	Z4	L2	Q92
4990	Z4	L2	Q93
4991	Z4	L2	Q94
4992	Z4	L2	Q95
4993	Z4	L2	Q96
4994	Z4	L2	Q97
4995	Z4	L2	Q98
4996	Z4	L2	Q99
4997	Z4	L2	Q100

[Table 1-31]

4998	Z4	L2	Q101
4999	Z4	L2	Q102
5000	Z4	L2	Q103
5001	Z4	L3	Q40
5002	Z4	L3	Q41
5003	Z4	L3	Q42
5004	Z4	L3	Q43
5005	Z4	L3	Q44
5006	Z4	L3	Q45
5007	Z4	L3	Q46
5008	Z4	L3	Q47
5009	Z4	L3	Q48
5010	Z4	L3	Q49
5011	Z4	L3	Q50
5012	Z4	L3	Q51
5013	Z4	L3	Q52
5014	Z4	L3	Q53
5015	Z4	L3	Q54
5016	Z4	L3	Q55
5017	Z4	L3	Q56
5018	Z4	L3	Q57
5019	Z4	L3	Q58
5020	Z4	L3	Q59
5021	Z4	L3	Q60
5022	Z4	L3	Q61
5023	Z4	L3	Q62
5024	Z4	L3	Q63
5025	Z4	L3	Q64
5026	Z4	L3	Q65
5027	Z4	L3	Q66
5028	Z4	L3	Q67
5029	Z4	L3	Q68
5030	Z4	L3	Q69
5031	Z4	L3	Q70
5032	Z4	L3	Q71
5033	Z4	L3	Q72
5034	Z4	L3	Q73
5035	Z4	L3	Q74
5036	Z4	L3	Q75
5037	Z4	L3	Q76
5038	Z4	L3	Q77
5039	Z4	L3	Q78
5040	Z4	L3	Q79
5041	Z4	L3	Q80
5042	Z4	L3	Q81
5043	Z4	L3	Q82
5044	Z4	L3	Q83
5045	Z4	L3	Q84
5046	Z4	L3	Q85
5047	Z4	L3	Q86
5048	Z4	L3	Q87
5049	Z4	L3	Q88
5050	Z4	L3	Q89
5051	Z4	L3	Q90
5052	Z4	L3	Q91
5053	Z4	L3	Q92
5054	Z4	L3	Q93
5055	Z4	L3	Q94
5056	Z4	L3	Q95
5057	Z4	L3	Q96
5058	Z4	L3	Q97
5059	Z4	L3	Q98
5060	Z4	L3	Q99
5061	Z4	L3	Q100
5062	Z4	L3	Q101
5063	Z4	L3	Q102
5064	Z4	L3	Q103
5065	Z4	L4	Q40
5066	Z4	L4	Q41
5067	Z4	L4	Q42
5068	Z4	L4	Q43
5069	Z4	L4	Q44
5070	Z4	L4	Q45
5071	Z4	L4	Q46
5072	Z4	L4	Q47
5073	Z4	L4	Q48
5074	Z4	L4	Q49
5075	Z4	L4	Q50
5076	Z4	L4	Q51
5077	Z4	L4	Q52
5078	Z4	L4	Q53
5079	Z4	L4	Q54
5080	Z4	L4	Q55
5081	Z4	L4	Q56
5082	Z4	L4	Q57
5083	Z4	L4	Q58
5084	Z4	L4	Q59
5085	Z4	L4	Q60
5086	Z4	L4	Q61
5087	Z4	L4	Q62
5088	Z4	L4	Q63
5089	Z4	L4	Q64
5090	Z4	L4	Q65
5091	Z4	L4	Q66
5092	Z4	L4	Q67
5093	Z4	L4	Q68
5094	Z4	L4	Q69
5095	Z4	L4	Q70
5096	Z4	L4	Q71
5097	Z4	L4	Q72
5098	Z4	L4	Q73
5099	Z4	L4	Q74
5100	Z4	L4	Q75
5101	Z4	L4	Q76
5102	Z4	L4	Q77
5103	Z4	L4	Q78
5104	Z4	L4	Q79
5105	Z4	L4	Q80
5106	Z4	L4	Q81
5107	Z4	L4	Q82
5108	Z4	L4	Q83
5109	Z4	L4	Q84
5110	Z4	L4	Q85
5111	Z4	L4	Q86
5112	Z4	L4	Q87
5113	Z4	L4	Q88
5114	Z4	L4	Q89
5115	Z4	L4	Q90
5116	Z4	L4	Q91
5117	Z4	L4	Q92
5118	Z4	L4	Q93
5119	Z4	L4	Q94
5120	Z4	L4	Q95
5121	Z4	L4	Q96
5122	Z4	L4	Q97
5123	Z4	L4	Q98
5124	Z4	L4	Q99
5125	Z4	L4	Q100
5126	Z4	L4	Q101
5127	Z4	L4	Q102
5128	Z4	L4	Q103
5129	Z4	L5	Q40
5130	Z4	L5	Q41
5131	Z4	L5	Q42
5132	Z4	L5	Q43
5133	Z4	L5	Q44
5134	Z4	L5	Q45
5135	Z4	L5	Q46
5136	Z4	L5	Q47
5137	Z4	L5	Q48
5138	Z4	L5	Q49
5139	Z4	L5	Q50
5140	Z4	L5	Q51
5141	Z4	L5	Q52
5142	Z4	L5	Q53
5143	Z4	L5	Q54
5144	Z4	L5	Q55
5145	Z4	L5	Q56
5146	Z4	L5	Q57
5147	Z4	L5	Q58
5148	Z4	L5	Q59
5149	Z4	L5	Q60
5150	Z4	L5	Q61
5151	Z4	L5	Q62
5152	Z4	L5	Q63
5153	Z4	L5	Q64
5154	Z4	L5	Q65
5155	Z4	L5	Q66
5156	Z4	L5	Q67
5157	Z4	L5	Q68
5158	Z4	L5	Q69
5159	Z4	L5	Q70
5160	Z4	L5	Q71
5161	Z4	L5	Q72
5162	Z4	L5	Q73
5163	Z4	L5	Q74
5164	Z4	L5	Q75
5165	Z4	L5	Q76
5166	Z4	L5	Q77
5167	Z4	L5	Q78
5168	Z4	L5	Q79
5169	Z4	L5	Q80
5170	Z4	L5	Q81
5171	Z4	L5	Q82
5172	Z4	L5	Q83
5173	Z4	L5	Q84
5174	Z4	L5	Q85
5175	Z4	L5	Q86
5176	Z4	L5	Q87
5177	Z4	L5	Q88
5178	Z4	L5	Q89
5179	Z4	L5	Q90
5180	Z4	L5	Q91
5181	Z4	L5	Q92
5182	Z4	L5	Q93
5183	Z4	L5	Q94
5184	Z4	L5	Q95
5185	Z4	L5	Q96
5186	Z4	L5	Q97
5187	Z4	L5	Q98
5188	Z4	L5	Q99
5189	Z4	L5	Q100
5190	Z4	L5	Q101
5191	Z4	L5	Q102
5192	Z4	L5	Q103
5193	Z4	L6	Q40
5194	Z4	L6	Q41
5195	Z4	L6	Q42
5196	Z4	L6	Q43
5197	Z4	L6	Q44
5198	Z4	L6	Q45

[Table 1-32]

5199	Z4	L6	Q46
5200	Z4	L6	Q47
5201	Z4	L6	Q48
5202	Z4	L6	Q49
5203	Z4	L6	Q50
5204	Z4	L6	Q51
5205	Z4	L6	Q52
5206	Z4	L6	Q53
5207	Z4	L6	Q54
5208	Z4	L6	Q55
5209	Z4	L6	Q56
5210	Z4	L6	Q57
5211	Z4	L6	Q58
5212	Z4	L6	Q59
5213	Z4	L6	Q60
5214	Z4	L6	Q61
5215	Z4	L6	Q62
5216	Z4	L6	Q63
5217	Z4	L6	Q64
5218	Z4	L6	Q65
5219	Z4	L6	Q66
5220	Z4	L6	Q67
5221	Z4	L6	Q68
5222	Z4	L6	Q69
5223	Z4	L6	Q70
5224	Z4	L6	Q71
5225	Z4	L6	Q72
5226	Z4	L6	Q73
5227	Z4	L6	Q74
5228	Z4	L6	Q75
5229	Z4	L6	Q76
5230	Z4	L6	Q77
5231	Z4	L6	Q78
5232	Z4	L6	Q79
5233	Z4	L6	Q80
5234	Z4	L6	Q81
5235	Z4	L6	Q82
5236	Z4	L6	Q83
5237	Z4	L6	Q84
5238	Z4	L6	Q85
5239	Z4	L6	Q86
5240	Z4	L6	Q87
5241	Z4	L6	Q88
5242	Z4	L6	Q89
5243	Z4	L6	Q90
5244	Z4	L6	Q91
5245	Z4	L6	Q92
5246	Z4	L6	Q93
5247	Z4	L6	Q94
5248	Z4	L6	Q95
5249	Z4	L6	Q96
5250	Z4	L6	Q97
5251	Z4	L6	Q98
5252	Z4	L6	Q99
5253	Z4	L6	Q100
5254	Z4	L6	Q101
5255	Z4	L6	Q102
5256	Z4	L6	Q103
5257	Z4	L7	Q40
5258	Z4	L7	Q41
5259	Z4	L7	Q42
5260	Z4	L7	Q43
5261	Z4	L7	Q44
5262	Z4	L7	Q45
5263	Z4	L7	Q46
5264	Z4	L7	Q47
5265	Z4	L7	Q48
5266	Z4	L7	Q49
5267	Z4	L7	Q50
5268	Z4	L7	Q51
5269	Z4	L7	Q52
5270	Z4	L7	Q53
5271	Z4	L7	Q54
5272	Z4	L7	Q55
5273	Z4	L7	Q56
5274	Z4	L7	Q57
5275	Z4	L7	Q58
5276	Z4	L7	Q59
5277	Z4	L7	Q60
5278	Z4	L7	Q61
5279	Z4	L7	Q62
5280	Z4	L7	Q63
5281	Z4	L7	Q64
5282	Z4	L7	Q65
5283	Z4	L7	Q66
5284	Z4	L7	Q67
5285	Z4	L7	Q68
5286	Z4	L7	Q69
5287	Z4	L7	Q70
5288	Z4	L7	Q71
5289	Z4	L7	Q72
5290	Z4	L7	Q73
5291	Z4	L7	Q74
5292	Z4	L7	Q75
5293	Z4	L7	Q76
5294	Z4	L7	Q77
5295	Z4	L7	Q78
5296	Z4	L7	Q79
5297	Z4	L7	Q80
5298	Z4	L7	Q81
5299	Z4	L7	Q82
5300	Z4	L7	Q83
5301	Z4	L7	Q84
5302	Z4	L7	Q85
5303	Z4	L7	Q86
5304	Z4	L7	Q87
5305	Z4	L7	Q88
5306	Z4	L7	Q89
5307	Z4	L7	Q90
5308	Z4	L7	Q91
5309	Z4	L7	Q92
5310	Z4	L7	Q93
5311	Z4	L7	Q94
5312	Z4	L7	Q95
5313	Z4	L7	Q96
5314	Z4	L7	Q97
5315	Z4	L7	Q98
5316	Z4	L7	Q99
5317	Z4	L7	Q100
5318	Z4	L7	Q101
5319	Z4	L7	Q102
5320	Z4	L7	Q103
5321	Z4	L8	Q40
5322	Z4	L8	Q41
5323	Z4	L8	Q42
5324	Z4	L8	Q43
5325	Z4	L8	Q44
5326	Z4	L8	Q45
5327	Z4	L8	Q46
5328	Z4	L8	Q47
5329	Z4	L8	Q48
5330	Z4	L8	Q49
5331	Z4	L8	Q50
5332	Z4	L8	Q51
5333	Z4	L8	Q52
5334	Z4	L8	Q53
5335	Z4	L8	Q54
5336	Z4	L8	Q55
5337	Z4	L8	Q56
5338	Z4	L8	Q57
5339	Z4	L8	Q58
5340	Z4	L8	Q59
5341	Z4	L8	Q60
5342	Z4	L8	Q61
5343	Z4	L8	Q62
5344	Z4	L8	Q63
5345	Z4	L8	Q64
5346	Z4	L8	Q65
5347	Z4	L8	Q66
5348	Z4	L8	Q67
5349	Z4	L8	Q68
5350	Z4	L8	Q69
5351	Z4	L8	Q70
5352	Z4	L8	Q71
5353	Z4	L8	Q72
5354	Z4	L8	Q73
5355	Z4	L8	Q74
5356	Z4	L8	Q75
5357	Z4	L8	Q76
5358	Z4	L8	Q77
5359	Z4	L8	Q78
5360	Z4	L8	Q79
5361	Z4	L8	Q80
5362	Z4	L8	Q81
5363	Z4	L8	Q82
5364	Z4	L8	Q83
5365	Z4	L8	Q84
5366	Z4	L8	Q85
5367	Z4	L8	Q86
5368	Z4	L8	Q87
5369	Z4	L8	Q88
5370	Z4	L8	Q89
5371	Z4	L8	Q90
5372	Z4	L8	Q91
5373	Z4	L8	Q92
5374	Z4	L8	Q93
5375	Z4	L8	Q94
5376	Z4	L8	Q95
5377	Z4	L8	Q96
5378	Z4	L8	Q97
5379	Z4	L8	Q98
5380	Z4	L8	Q99
5381	Z4	L8	Q100
5382	Z4	L8	Q101
5383	Z4	L8	Q102
5384	Z4	L8	Q103
5385	Z4	L9	Q40
5386	Z4	L9	Q41
5387	Z4	L9	Q42
5388	Z4	L9	Q43
5389	Z4	L9	Q44
5390	Z4	L9	Q45
5391	Z4	L9	Q46
5392	Z4	L9	Q47
5393	Z4	L9	Q48
5394	Z4	L9	Q49
5395	Z4	L9	Q50
5396	Z4	L9	Q51
5397	Z4	L9	Q52
5398	Z4	L9	Q53
5399	Z4	L9	Q54

[Table 1-33]

5400	Z4	L9	Q55
5401	Z4	L9	Q56
5402	Z4	L9	Q57
5403	Z4	L9	Q58
5404	Z4	L9	Q59
5405	Z4	L9	Q60
5406	Z4	L9	Q61
5407	Z4	L9	Q62
5408	Z4	L9	Q63
5409	Z4	L9	Q64
5410	Z4	L9	Q65
5411	Z4	L9	Q66
5412	Z4	L9	Q67
5413	Z4	L9	Q68
5414	Z4	L9	Q69
5415	Z4	L9	Q70
5416	Z4	L9	Q71
5417	Z4	L9	Q72
5418	Z4	L9	Q73
5419	Z4	L9	Q74
5420	Z4	L9	Q75
5421	Z4	L9	Q76
5422	Z4	L9	Q77
5423	Z4	L9	Q78
5424	Z4	L9	Q79
5425	Z4	L9	Q80
5426	Z4	L9	Q81
5427	Z4	L9	Q82
5428	Z4	L9	Q83
5429	Z4	L9	Q84
5430	Z4	L9	Q85
5431	Z4	L9	Q86
5432	Z4	L9	Q87
5433	Z4	L9	Q88
5434	Z4	L9	Q89
5435	Z4	L9	Q90
5436	Z4	L9	Q91
5437	Z4	L9	Q92
5438	Z4	L9	Q93
5439	Z4	L9	Q94
5440	Z4	L9	Q95
5441	Z4	L9	Q96
5442	Z4	L9	Q97
5443	Z4	L9	Q98
5444	Z4	L9	Q99
5445	Z4	L9	Q100
5446	Z4	L9	Q101
5447	Z4	L9	Q102
5448	Z4	L9	Q103
5449	Z4	L10	Q40
5450	Z4	L10	Q41
5451	Z4	L10	Q42
5452	Z4	L10	Q43
5453	Z4	L10	Q44
5454	Z4	L10	Q45
5455	Z4	L10	Q46
5456	Z4	L10	Q47
5457	Z4	L10	Q48
5458	Z4	L10	Q49
5459	Z4	L10	Q50
5460	Z4	L10	Q51
5461	Z4	L10	Q52
5462	Z4	L10	Q53
5463	Z4	L10	Q54
5464	Z4	L10	Q55
5465	Z4	L10	Q56
5466	Z4	L10	Q57
5467	Z4	L10	Q58
5468	Z4	L10	Q59
5469	Z4	L10	Q60
5470	Z4	L10	Q61
5471	Z4	L10	Q62
5472	Z4	L10	Q63
5473	Z4	L10	Q64
5474	Z4	L10	Q65
5475	Z4	L10	Q66
5476	Z4	L10	Q67
5477	Z4	L10	Q68
5478	Z4	L10	Q69
5479	Z4	L10	Q70
5480	Z4	L10	Q71
5481	Z4	L10	Q72
5482	Z4	L10	Q73
5483	Z4	L10	Q74
5484	Z4	L10	Q75
5485	Z4	L10	Q76
5486	Z4	L10	Q77
5487	Z4	L10	Q78
5488	Z4	L10	Q79
5489	Z4	L10	Q80
5490	Z4	L10	Q81
5491	Z4	L10	Q82
5492	Z4	L10	Q83
5493	Z4	L10	Q84
5494	Z4	L10	Q85
5495	Z4	L10	Q86
5496	Z4	L10	Q87
5497	Z4	L10	Q88
5498	Z4	L10	Q89
5499	Z4	L10	Q90
5500	Z4	L10	Q91
5501	Z4	L10	Q92
5502	Z4	L10	Q93
5503	Z4	L10	Q94
5504	Z4	L10	Q95
5505	Z4	L10	Q96
5506	Z4	L10	Q97
5507	Z4	L10	Q98
5508	Z4	L10	Q99
5509	Z4	L10	Q100
5510	Z4	L10	Q101
5511	Z4	L10	Q102
5512	Z4	L10	Q103
5513	Z4	L11	Q40
5514	Z4	L11	Q41
5515	Z4	L11	Q42
5516	Z4	L11	Q43
5517	Z4	L11	Q44
5518	Z4	L11	Q45
5519	Z4	L11	Q46
5520	Z4	L11	Q47
5521	Z4	L11	Q48
5522	Z4	L11	Q49
5523	Z4	L11	Q50
5524	Z4	L11	Q51
5525	Z4	L11	Q52
5526	Z4	L11	Q53
5527	Z4	L11	Q54
5528	Z4	L11	Q55
5529	Z4	L11	Q56
5530	Z4	L11	Q57
5531	Z4	L11	Q58
5532	Z4	L11	Q59
5533	Z4	L11	Q60
5534	Z4	L11	Q61
5535	Z4	L11	Q62
5536	Z4	L11	Q63
5537	Z4	L11	Q64
5538	Z4	L11	Q65
5539	Z4	L11	Q66
5540	Z4	L11	Q67
5541	Z4	L11	Q68
5542	Z4	L11	Q69
5543	Z4	L11	Q70
5544	Z4	L11	Q71
5545	Z4	L11	Q72
5546	Z4	L11	Q73
5547	Z4	L11	Q74
5548	Z4	L11	Q75
5549	Z4	L11	Q76
5550	Z4	L11	Q77
5551	Z4	L11	Q78
5552	Z4	L11	Q79
5553	Z4	L11	Q80
5554	Z4	L11	Q81
5555	Z4	L11	Q82
5556	Z4	L11	Q83
5557	Z4	L11	Q84
5558	Z4	L11	Q85
5559	Z4	L11	Q86
5560	Z4	L11	Q87
5561	Z4	L11	Q88
5562	Z4	L11	Q89
5563	Z4	L11	Q90
5564	Z4	L11	Q91
5565	Z4	L11	Q92
5566	Z4	L11	Q93
5567	Z4	L11	Q94
5568	Z4	L11	Q95
5569	Z4	L11	Q96
5570	Z4	L11	Q97
5571	Z4	L11	Q98
5572	Z4	L11	Q99
5573	Z4	L11	Q100
5574	Z4	L11	Q101
5575	Z4	L11	Q102
5576	Z4	L11	Q103
5577	Z4	L12	Q40
5578	Z4	L12	Q41
5579	Z4	L12	Q42
5580	Z4	L12	Q43
5581	Z4	L12	Q44
5582	Z4	L12	Q45
5583	Z4	L12	Q46
5584	Z4	L12	Q47
5585	Z4	L12	Q48
5586	Z4	L12	Q49
5587	Z4	L12	Q50
5588	Z4	L12	Q51
5589	Z4	L12	Q52
5590	Z4	L12	Q53
5591	Z4	L12	Q54
5592	Z4	L12	Q55
5593	Z4	L12	Q56
5594	Z4	L12	Q57
5595	Z4	L12	Q58
5596	Z4	L12	Q59
5597	Z4	L12	Q60
5598	Z4	L12	Q61
5599	Z4	L12	Q62
5600	Z4	L12	Q63

[Table 1-34]

5601	Z4	L12	Q64
5602	Z4	L12	Q65
5603	Z4	L12	Q66
5604	Z4	L12	Q67
5605	Z4	L12	Q68
5606	Z4	L12	Q69
5607	Z4	L12	Q70
5608	Z4	L12	Q71
5609	Z4	L12	Q72
5610	Z4	L12	Q73
5611	Z4	L12	Q74
5612	Z4	L12	Q75
5613	Z4	L12	Q76
5614	Z4	L12	Q77
5615	Z4	L12	Q78
5616	Z4	L12	Q79
5617	Z4	L12	Q80
5618	Z4	L12	Q81
5619	Z4	L12	Q82
5620	Z4	L12	Q83
5621	Z4	L12	Q84
5622	Z4	L12	Q85
5623	Z4	L12	Q86
5624	Z4	L12	Q87
5625	Z4	L12	Q88
5626	Z4	L12	Q89
5627	Z4	L12	Q90
5628	Z4	L12	Q91
5629	Z4	L12	Q92
5630	Z4	L12	Q93
5631	Z4	L12	Q94
5632	Z4	L12	Q95
5633	Z4	L12	Q96
5634	Z4	L12	Q97
5635	Z4	L12	Q98
5636	Z4	L12	Q99
5637	Z4	L12	Q100
5638	Z4	L12	Q101
5639	Z4	L12	Q102
5640	Z4	L12	Q103
5641	Z4	L13	Q40
5642	Z4	L13	Q41
5643	Z4	L13	Q42
5644	Z4	L13	Q43
5645	Z4	L13	Q44
5646	Z4	L13	Q45
5647	Z4	L13	Q46
5648	Z4	L13	Q47
5649	Z4	L13	Q48
5650	Z4	L13	Q49
5651	Z4	L13	Q50
5652	Z4	L13	Q51
5653	Z4	L13	Q52
5654	Z4	L13	Q53
5655	Z4	L13	Q54
5656	Z4	L13	Q55
5657	Z4	L13	Q56
5658	Z4	L13	Q57
5659	Z4	L13	Q58
5660	Z4	L13	Q59
5661	Z4	L13	Q60
5662	Z4	L13	Q61
5663	Z4	L13	Q62
5664	Z4	L13	Q63
5665	Z4	L13	Q64
5666	Z4	L13	Q65
5667	Z4	L13	Q66
5668	Z4	L13	Q67
5669	Z4	L13	Q68
5670	Z4	L13	Q69
5671	Z4	L13	Q70
5672	Z4	L13	Q71
5673	Z4	L13	Q72
5674	Z4	L13	Q73
5675	Z4	L13	Q74
5676	Z4	L13	Q75
5677	Z4	L13	Q76
5678	Z4	L13	Q77
5679	Z4	L13	Q78
5680	Z4	L13	Q79
5681	Z4	L13	Q80
5682	Z4	L13	Q81
5683	Z4	L13	Q82
5684	Z4	L13	Q83
5685	Z4	L13	Q84
5686	Z4	L13	Q85
5687	Z4	L13	Q86
5688	Z4	L13	Q87
5689	Z4	L13	Q88
5690	Z4	L13	Q89
5691	Z4	L13	Q90
5692	Z4	L13	Q91
5693	Z4	L13	Q92
5694	Z4	L13	Q93
5695	Z4	L13	Q94
5696	Z4	L13	Q95
5697	Z4	L13	Q96
5698	Z4	L13	Q97
5699	Z4	L13	Q98
5700	Z4	L13	Q99
5701	Z4	L13	Q100
5702	Z4	L13	Q101
5703	Z4	L13	Q102
5704	Z4	L13	Q103
5705	Z4	L14	Q40
5706	Z4	L14	Q41
5707	Z4	L14	Q42
5708	Z4	L14	Q43
5709	Z4	L14	Q44
5710	Z4	L14	Q45
5711	Z4	L14	Q46
5712	Z4	L14	Q47
5713	Z4	L14	Q48
5714	Z4	L14	Q49
5715	Z4	L14	Q50
5716	Z4	L14	Q51
5717	Z4	L14	Q52
5718	Z4	L14	Q53
5719	Z4	L14	Q54
5720	Z4	L14	Q55
5721	Z4	L14	Q56
5722	Z4	L14	Q57
5723	Z4	L14	Q58
5724	Z4	L14	Q59
5725	Z4	L14	Q60
5726	Z4	L14	Q61
5727	Z4	L14	Q62
5728	Z4	L14	Q63
5729	Z4	L14	Q64
5730	Z4	L14	Q65
5731	Z4	L14	Q66
5732	Z4	L14	Q67
5733	Z4	L14	Q68
5734	Z4	L14	Q69
5735	Z4	L14	Q70
5736	Z4	L14	Q71
5737	Z4	L14	Q72
5738	Z4	L14	Q73
5739	Z4	L14	Q74
5740	Z4	L14	Q75
5741	Z4	L14	Q76
5742	Z4	L14	Q77
5743	Z4	L14	Q78
5744	Z4	L14	Q79
5745	Z4	L14	Q80
5746	Z4	L14	Q81
5747	Z4	L14	Q82
5748	Z4	L14	Q83
5749	Z4	L14	Q84
5750	Z4	L14	Q85
5751	Z4	L14	Q86
5752	Z4	L14	Q87
5753	Z4	L14	Q88
5754	Z4	L14	Q89
5755	Z4	L14	Q90
5756	Z4	L14	Q91
5757	Z4	L14	Q92
5758	Z4	L14	Q93
5759	Z4	L14	Q94
5760	Z4	L14	Q95
5761	Z4	L14	Q96
5762	Z4	L14	Q97
5763	Z4	L14	Q98
5764	Z4	L14	Q99
5765	Z4	L14	Q100
5766	Z4	L14	Q101
5767	Z4	L14	Q102
5768	Z4	L14	Q103
5769	Z1	L15	Q1
5770	Z1	L15	Q2
5771	Z1	L15	Q3
5772	Z1	L15	Q4
5773	Z1	L15	Q5
5774	Z1	L15	Q6
5775	Z1	L15	Q7
5776	Z1	L15	Q8
5777	Z1	L15	Q9
5778	Z1	L15	Q10
5779	Z1	L15	Q11
5780	Z1	L15	Q12
5781	Z1	L15	Q13
5782	Z1	L15	Q14
5783	Z1	L15	Q15
5784	Z1	L15	Q16
5785	Z1	L15	Q17
5786	Z1	L15	Q18
5787	Z1	L15	Q19
5788	Z1	L15	Q20
5789	Z1	L15	Q21
5790	Z1	L15	Q22
5791	Z1	L15	Q23
5792	Z1	L15	Q24
5793	Z1	L15	Q25
5794	Z1	L15	Q26
5795	Z1	L15	Q27
5796	Z1	L15	Q28
5797	Z1	L15	Q29
5798	Z1	L15	Q30
5799	Z1	L15	Q31
5800	Z1	L15	Q32
5801	Z1	L15	Q33

[Table 1-35]

5802	Z1	L15	Q34
5803	Z1	L15	Q35
5804	Z1	L15	Q36
5805	Z1	L15	Q37
5806	Z1	L15	Q38
5807	Z1	L15	Q39
5808	Z1	L15	Q40
5809	Z1	L15	Q41
5810	Z1	L15	Q42
5811	Z1	L15	Q43
5812	Z1	L15	Q44
5813	Z1	L15	Q45
5814	Z1	L15	Q46
5815	Z1	L15	Q47
5816	Z1	L15	Q48
5817	Z1	L15	Q49
5818	Z1	L15	Q50
5819	Z1	L15	Q51
5820	Z1	L15	Q52
5821	Z1	L15	Q53
5822	Z1	L15	Q54
5823	Z1	L15	Q55
5824	Z1	L15	Q56
5825	Z1	L15	Q57
5826	Z1	L15	Q58
5827	Z1	L15	Q59
5828	Z1	L15	Q60
5829	Z1	L15	Q61
5830	Z1	L15	Q62
5831	Z1	L15	Q63
5832	Z1	L15	Q64
5833	Z1	L15	Q65
5834	Z1	L15	Q66
5835	Z1	L15	Q67
5836	Z1	L15	Q68
5837	Z1	L15	Q69
5838	Z1	L15	Q70
5839	Z1	L15	Q71
5840	Z1	L15	Q72
5841	Z1	L15	Q73
5842	Z1	L15	Q74
5843	Z1	L15	Q75
5844	Z1	L15	Q76
5845	Z1	L15	Q77
5846	Z1	L15	Q78
5847	Z1	L15	Q79
5848	Z1	L15	Q80
5849	Z1	L15	Q81
5850	Z1	L15	Q82
5851	Z1	L15	Q83
5852	Z1	L15	Q84
5853	Z1	L15	Q85
5854	Z1	L15	Q86
5855	Z1	L15	Q87
5856	Z1	L15	Q88
5857	Z1	L15	Q89
5858	Z1	L15	Q90
5859	Z1	L15	Q91
5860	Z1	L15	Q92
5861	Z1	L15	Q93
5862	Z1	L15	Q94
5863	Z1	L15	Q95
5864	Z1	L15	Q96
5865	Z1	L15	Q97
5866	Z1	L15	Q98
5867	Z1	L15	Q99
5868	Z1	L15	Q100

5869	Z1	L15	Q101
5870	Z1	L15	Q102
5871	Z1	L15	Q103
5872	Z1	L16	Q1
5873	Z1	L16	Q2
5874	Z1	L16	Q3
5875	Z1	L16	Q4
5876	Z1	L16	Q5
5877	Z1	L16	Q6
5878	Z1	L16	Q7
5879	Z1	L16	Q8
5880	Z1	L16	Q9
5881	Z1	L16	Q10
5882	Z1	L16	Q11
5883	Z1	L16	Q12
5884	Z1	L16	Q13
5885	Z1	L16	Q14
5886	Z1	L16	Q15
5887	Z1	L16	Q16
5888	Z1	L16	Q17
5889	Z1	L16	Q18
5890	Z1	L16	Q19
5891	Z1	L16	Q20
5892	Z1	L16	Q21
5893	Z1	L16	Q22
5894	Z1	L16	Q23
5895	Z1	L16	Q24
5896	Z1	L16	Q25
5897	Z1	L16	Q26
5898	Z1	L16	Q27
5899	Z1	L16	Q28
5900	Z1	L16	Q29
5901	Z1	L16	Q30
5902	Z1	L16	Q31
5903	Z1	L16	Q32
5904	Z1	L16	Q33
5905	Z1	L16	Q34
5906	Z1	L16	Q35
5907	Z1	L16	Q36
5908	Z1	L16	Q37
5909	Z1	L16	Q38
5910	Z1	L16	Q39
5911	Z1	L16	Q40
5912	Z1	L16	Q41
5913	Z1	L16	Q42
5914	Z1	L16	Q43
5915	Z1	L16	Q44
5916	Z1	L16	Q45
5917	Z1	L16	Q46
5918	Z1	L16	Q47
5919	Z1	L16	Q48
5920	Z1	L16	Q49
5921	Z1	L16	Q50
5922	Z1	L16	Q51
5923	Z1	L16	Q52
5924	Z1	L16	Q53
5925	Z1	L16	Q54
5926	Z1	L16	Q55
5927	Z1	L16	Q56
5928	Z1	L16	Q57
5929	Z1	L16	Q58
5930	Z1	L16	Q59
5931	Z1	L16	Q60
5932	Z1	L16	Q61
5933	Z1	L16	Q62
5934	Z1	L16	Q63
5935	Z1	L16	Q64

5936	Z1	L16	Q65
5937	Z1	L16	Q66
5938	Z1	L16	Q67
5939	Z1	L16	Q68
5940	Z1	L16	Q69
5941	Z1	L16	Q70
5942	Z1	L16	Q71
5943	Z1	L16	Q72
5944	Z1	L16	Q73
5945	Z1	L16	Q74
5946	Z1	L16	Q75
5947	Z1	L16	Q76
5948	Z1	L16	Q77
5949	Z1	L16	Q78
5950	Z1	L16	Q79
5951	Z1	L16	Q80
5952	Z1	L16	Q81
5953	Z1	L16	Q82
5954	Z1	L16	Q83
5955	Z1	L16	Q84
5956	Z1	L16	Q85
5957	Z1	L16	Q86
5958	Z1	L16	Q87
5959	Z1	L16	Q88
5960	Z1	L16	Q89
5961	Z1	L16	Q90
5962	Z1	L16	Q91
5963	Z1	L16	Q92
5964	Z1	L16	Q93
5965	Z1	L16	Q94
5966	Z1	L16	Q95
5967	Z1	L16	Q96
5968	Z1	L16	Q97
5969	Z1	L16	Q98
5970	Z1	L16	Q99
5971	Z1	L16	Q100
5972	Z1	L16	Q101
5973	Z1	L16	Q102
5974	Z1	L16	Q103
5975	Z1	L17	Q1
5976	Z1	L17	Q2
5977	Z1	L17	Q3
5978	Z1	L17	Q4
5979	Z1	L17	Q5
5980	Z1	L17	Q6
5981	Z1	L17	Q7
5982	Z1	L17	Q8
5983	Z1	L17	Q9
5984	Z1	L17	Q10
5985	Z1	L17	Q11
5986	Z1	L17	Q12
5987	Z1	L17	Q13
5988	Z1	L17	Q14
5989	Z1	L17	Q15
5990	Z1	L17	Q16
5991	Z1	L17	Q17
5992	Z1	L17	Q18
5993	Z1	L17	Q19
5994	Z1	L17	Q20
5995	Z1	L17	Q21
5996	Z1	L17	Q22
5997	Z1	L17	Q23
5998	Z1	L17	Q24
5999	Z1	L17	Q25
6000	Z1	L17	Q26
6001	Z1	L17	Q27
6002	Z1	L17	Q28

[Table 1-36]

6003	Z1	L17	Q29
6004	Z1	L17	Q30
6005	Z1	L17	Q31
6006	Z1	L17	Q32
6007	Z1	L17	Q33
6008	Z1	L17	Q34
6009	Z1	L17	Q35
6010	Z1	L17	Q36
6011	Z1	L17	Q37
6012	Z1	L17	Q38
6013	Z1	L17	Q39
6014	Z1	L17	Q40
6015	Z1	L17	Q41
6016	Z1	L17	Q42
6017	Z1	L17	Q43
6018	Z1	L17	Q44
6019	Z1	L17	Q45
6020	Z1	L17	Q46
6021	Z1	L17	Q47
6022	Z1	L17	Q48
6023	Z1	L17	Q49
6024	Z1	L17	Q50
6025	Z1	L17	Q51
6026	Z1	L17	Q52
6027	Z1	L17	Q53
6028	Z1	L17	Q54
6029	Z1	L17	Q55
6030	Z1	L17	Q56
6031	Z1	L17	Q57
6032	Z1	L17	Q58
6033	Z1	L17	Q59
6034	Z1	L17	Q60
6035	Z1	L17	Q61
6036	Z1	L17	Q62
6037	Z1	L17	Q63
6038	Z1	L17	Q64
6039	Z1	L17	Q65
6040	Z1	L17	Q66
6041	Z1	L17	Q67
6042	Z1	L17	Q68
6043	Z1	L17	Q69
6044	Z1	L17	Q70
6045	Z1	L17	Q71
6046	Z1	L17	Q72
6047	Z1	L17	Q73
6048	Z1	L17	Q74
6049	Z1	L17	Q75
6050	Z1	L17	Q76
6051	Z1	L17	Q77
6052	Z1	L17	Q78
6053	Z1	L17	Q79
6054	Z1	L17	Q80
6055	Z1	L17	Q81
6056	Z1	L17	Q82
6057	Z1	L17	Q83
6058	Z1	L17	Q84
6059	Z1	L17	Q85
6060	Z1	L17	Q86
6061	Z1	L17	Q87
6062	Z1	L17	Q88
6063	Z1	L17	Q89
6064	Z1	L17	Q90
6065	Z1	L17	Q91
6066	Z1	L17	Q92
6067	Z1	L17	Q93
6068	Z1	L17	Q94
6069	Z1	L17	Q95
6070	Z1	L17	Q96
6071	Z1	L17	Q97
6072	Z1	L17	Q98
6073	Z1	L17	Q99
6074	Z1	L17	Q100
6075	Z1	L17	Q101
6076	Z1	L17	Q102
6077	Z1	L17	Q103
6078	Z1	L18	Q1
6079	Z1	L18	Q2
6080	Z1	L18	Q3
6081	Z1	L18	Q4
6082	Z1	L18	Q5
6083	Z1	L18	Q6
6084	Z1	L18	Q7
6085	Z1	L18	Q8
6086	Z1	L18	Q9
6087	Z1	L18	Q10
6088	Z1	L18	Q11
6089	Z1	L18	Q12
6090	Z1	L18	Q13
6091	Z1	L18	Q14
6092	Z1	L18	Q15
6093	Z1	L18	Q16
6094	Z1	L18	Q17
6095	Z1	L18	Q18
6096	Z1	L18	Q19
6097	Z1	L18	Q20
6098	Z1	L18	Q21
6099	Z1	L18	Q22
6100	Z1	L18	Q23
6101	Z1	L18	Q24
6102	Z1	L18	Q25
6103	Z1	L18	Q26
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6105	Z1	L18	Q28
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6107	Z1	L18	Q30
6108	Z1	L18	Q31
6109	Z1	L18	Q32
6110	Z1	L18	Q33
6111	Z1	L18	Q34
6112	Z1	L18	Q35
6113	Z1	L18	Q36
6114	Z1	L18	Q37
6115	Z1	L18	Q38
6116	Z1	L18	Q39
6117	Z1	L18	Q40
6118	Z1	L18	Q41
6119	Z1	L18	Q42
6120	Z1	L18	Q43
6121	Z1	L18	Q44
6122	Z1	L18	Q45
6123	Z1	L18	Q46
6124	Z1	L18	Q47
6125	Z1	L18	Q48
6126	Z1	L18	Q49
6127	Z1	L18	Q50
6128	Z1	L18	Q51
6129	Z1	L18	Q52
6130	Z1	L18	Q53
6131	Z1	L18	Q54
6132	Z1	L18	Q55
6133	Z1	L18	Q56
6134	Z1	L18	Q57
6135	Z1	L18	Q58
6136	Z1	L18	Q59
6137	Z1	L18	Q60
6138	Z1	L18	Q61
6139	Z1	L18	Q62
6140	Z1	L18	Q63
6141	Z1	L18	Q64
6142	Z1	L18	Q65
6143	Z1	L18	Q66
6144	Z1	L18	Q67
6145	Z1	L18	Q68
6146	Z1	L18	Q69
6147	Z1	L18	Q70
6148	Z1	L18	Q71
6149	Z1	L18	Q72
6150	Z1	L18	Q73
6151	Z1	L18	Q74
6152	Z1	L18	Q75
6153	Z1	L18	Q76
6154	Z1	L18	Q77
6155	Z1	L18	Q78
6156	Z1	L18	Q79
6157	Z1	L18	Q80
6158	Z1	L18	Q81
6159	Z1	L18	Q82
6160	Z1	L18	Q83
6161	Z1	L18	Q84
6162	Z1	L18	Q85
6163	Z1	L18	Q86
6164	Z1	L18	Q87
6165	Z1	L18	Q88
6166	Z1	L18	Q89
6167	Z1	L18	Q90
6168	Z1	L18	Q91
6169	Z1	L18	Q92
6170	Z1	L18	Q93
6171	Z1	L18	Q94
6172	Z1	L18	Q95
6173	Z1	L18	Q96
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6177	Z1	L18	Q100
6178	Z1	L18	Q101
6179	Z1	L18	Q102
6180	Z1	L18	Q103
6181	Z1	L19	Q1
6182	Z1	L19	Q2
6183	Z1	L19	Q3
6184	Z1	L19	Q4
6185	Z1	L19	Q5
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6187	Z1	L19	Q7
6188	Z1	L19	Q8
6189	Z1	L19	Q9
6190	Z1	L19	Q10
6191	Z1	L19	Q11
6192	Z1	L19	Q12
6193	Z1	L19	Q13
6194	Z1	L19	Q14
6195	Z1	L19	Q15
6196	Z1	L19	Q16
6197	Z1	L19	Q17
6198	Z1	L19	Q18
6199	Z1	L19	Q19
6200	Z1	L19	Q20
6201	Z1	L19	Q21
6202	Z1	L19	Q22
6203	Z1	L19	Q23

[Table 1-37]

6204	Z1	L19	Q24
6205	Z1	L19	Q25
6206	Z1	L19	Q26
6207	Z1	L19	Q27
6208	Z1	L19	Q28
6209	Z1	L19	Q29
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6213	Z1	L19	Q33
6214	Z1	L19	Q34
6215	Z1	L19	Q35
6216	Z1	L19	Q36
6217	Z1	L19	Q37
6218	Z1	L19	Q38
6219	Z1	L19	Q39
6220	Z1	L19	Q40
6221	Z1	L19	Q41
6222	Z1	L19	Q42
6223	Z1	L19	Q43
6224	Z1	L19	Q44
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6229	Z1	L19	Q49
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6231	Z1	L19	Q51
6232	Z1	L19	Q52
6233	Z1	L19	Q53
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6235	Z1	L19	Q55
6236	Z1	L19	Q56
6237	Z1	L19	Q57
6238	Z1	L19	Q58
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6249	Z1	L19	Q69
6250	Z1	L19	Q70
6251	Z1	L19	Q71
6252	Z1	L19	Q72
6253	Z1	L19	Q73
6254	Z1	L19	Q74
6255	Z1	L19	Q75
6256	Z1	L19	Q76
6257	Z1	L19	Q77
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6262	Z1	L19	Q82
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6273	Z1	L19	Q93
6274	Z1	L19	Q94
6275	Z1	L19	Q95
6276	Z1	L19	Q96
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6280	Z1	L19	Q100
6281	Z1	L19	Q101
6282	Z1	L19	Q102
6283	Z1	L19	Q103
6284	Z1	L20	Q1
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6294	Z1	L20	Q11
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6297	Z1	L20	Q14
6298	Z1	L20	Q15
6299	Z1	L20	Q16
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6301	Z1	L20	Q18
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6303	Z1	L20	Q20
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6305	Z1	L20	Q22
6306	Z1	L20	Q23
6307	Z1	L20	Q24
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6386	Z1	L20	Q103
6387	Z1	L21	Q1
6388	Z1	L21	Q2
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6390	Z1	L21	Q4
6391	Z1	L21	Q5
6392	Z1	L21	Q6
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6394	Z1	L21	Q8
6395	Z1	L21	Q9
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6399	Z1	L21	Q13
6400	Z1	L21	Q14
6401	Z1	L21	Q15
6402	Z1	L21	Q16
6403	Z1	L21	Q17
6404	Z1	L21	Q18

[Table 1-38]

6405	Z1	L21	Q19
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6471	Z1	L21	Q85

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6486	Z1	L21	Q100
6487	Z1	L21	Q101
6488	Z1	L21	Q102
6489	Z1	L21	Q103
6490	Z1	L22	Q1
6491	Z1	L22	Q2
6492	Z1	L22	Q3
6493	Z1	L22	Q4
6494	Z1	L22	Q5
6495	Z1	L22	Q6
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6505	Z1	L22	Q16
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6507	Z1	L22	Q18
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6522	Z1	L22	Q33
6523	Z1	L22	Q34
6524	Z1	L22	Q35
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6535	Z1	L22	Q46
6536	Z1	L22	Q47
6537	Z1	L22	Q48
6538	Z1	L22	Q49

6539	Z1	L22	Q50
6540	Z1	L22	Q51
6541	Z1	L22	Q52
6542	Z1	L22	Q53
6543	Z1	L22	Q54
6544	Z1	L22	Q55
6545	Z1	L22	Q56
6546	Z1	L22	Q57
6547	Z1	L22	Q58
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6558	Z1	L22	Q69
6559	Z1	L22	Q70
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6561	Z1	L22	Q72
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6589	Z1	L22	Q100
6590	Z1	L22	Q101
6591	Z1	L22	Q102
6592	Z1	L22	Q103
6593	Z1	L23	Q1
6594	Z1	L23	Q2
6595	Z1	L23	Q3
6596	Z1	L23	Q4
6597	Z1	L23	Q5
6598	Z1	L23	Q6
6599	Z1	L23	Q7
6600	Z1	L23	Q8
6601	Z1	L23	Q9
6602	Z1	L23	Q10
6603	Z1	L23	Q11
6604	Z1	L23	Q12
6605	Z1	L23	Q13

[Table 1-39]

6606	Z1	L23	Q14
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6608	Z1	L23	Q16
6609	Z1	L23	Q17
6610	Z1	L23	Q18
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6614	Z1	L23	Q22
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6616	Z1	L23	Q24
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6625	Z1	L23	Q33
6626	Z1	L23	Q34
6627	Z1	L23	Q35
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6633	Z1	L23	Q41
6634	Z1	L23	Q42
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6637	Z1	L23	Q45
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6641	Z1	L23	Q49
6642	Z1	L23	Q50
6643	Z1	L23	Q51
6644	Z1	L23	Q52
6645	Z1	L23	Q53
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6649	Z1	L23	Q57
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6669	Z1	L23	Q77
6670	Z1	L23	Q78
6671	Z1	L23	Q79
6672	Z1	L23	Q80

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6675	Z1	L23	Q83
6676	Z1	L23	Q84
6677	Z1	L23	Q85
6678	Z1	L23	Q86
6679	Z1	L23	Q87
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6681	Z1	L23	Q89
6682	Z1	L23	Q90
6683	Z1	L23	Q91
6684	Z1	L23	Q92
6685	Z1	L23	Q93
6686	Z1	L23	Q94
6687	Z1	L23	Q95
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6693	Z1	L23	Q101
6694	Z1	L23	Q102
6695	Z1	L23	Q103
6696	Z1	L24	Q1
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6742	Z1	L24	Q47
6743	Z1	L24	Q48
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6747	Z1	L24	Q52
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6750	Z1	L24	Q55
6751	Z1	L24	Q56
6752	Z1	L24	Q57
6753	Z1	L24	Q58
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6764	Z1	L24	Q69
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6784	Z1	L24	Q89
6785	Z1	L24	Q90
6786	Z1	L24	Q91
6787	Z1	L24	Q92
6788	Z1	L24	Q93
6789	Z1	L24	Q94
6790	Z1	L24	Q95
6791	Z1	L24	Q96
6792	Z1	L24	Q97
6793	Z1	L24	Q98
6794	Z1	L24	Q99
6795	Z1	L24	Q100
6796	Z1	L24	Q101
6797	Z1	L24	Q102
6798	Z1	L24	Q103
6799	Z1	L25	Q1
6800	Z1	L25	Q2
6801	Z1	L25	Q3
6802	Z1	L25	Q4
6803	Z1	L25	Q5
6804	Z1	L25	Q6
6805	Z1	L25	Q7
6806	Z1	L25	Q8

[Table 1-40]

6807	Z1	L25	Q9
6808	Z1	L25	Q10
6809	Z1	L25	Q11
6810	Z1	L25	Q12
6811	Z1	L25	Q13
6812	Z1	L25	Q14
6813	Z1	L25	Q15
6814	Z1	L25	Q16
6815	Z1	L25	Q17
6816	Z1	L25	Q18
6817	Z1	L25	Q19
6818	Z1	L25	Q20
6819	Z1	L25	Q21
6820	Z1	L25	Q22
6821	Z1	L25	Q23
6822	Z1	L25	Q24
6823	Z1	L25	Q25
6824	Z1	L25	Q26
6825	Z1	L25	Q27
6826	Z1	L25	Q28
6827	Z1	L25	Q29
6828	Z1	L25	Q30
6829	Z1	L25	Q31
6830	Z1	L25	Q32
6831	Z1	L25	Q33
6832	Z1	L25	Q34
6833	Z1	L25	Q35
6834	Z1	L25	Q36
6835	Z1	L25	Q37
6836	Z1	L25	Q38
6837	Z1	L25	Q39
6838	Z1	L25	Q40
6839	Z1	L25	Q41
6840	Z1	L25	Q42
6841	Z1	L25	Q43
6842	Z1	L25	Q44
6843	Z1	L25	Q45
6844	Z1	L25	Q46
6845	Z1	L25	Q47
6846	Z1	L25	Q48
6847	Z1	L25	Q49
6848	Z1	L25	Q50
6849	Z1	L25	Q51
6850	Z1	L25	Q52
6851	Z1	L25	Q53
6852	Z1	L25	Q54
6853	Z1	L25	Q55
6854	Z1	L25	Q56
6855	Z1	L25	Q57
6856	Z1	L25	Q58
6857	Z1	L25	Q59
6858	Z1	L25	Q60
6859	Z1	L25	Q61
6860	Z1	L25	Q62
6861	Z1	L25	Q63
6862	Z1	L25	Q64
6863	Z1	L25	Q65
6864	Z1	L25	Q66
6865	Z1	L25	Q67
6866	Z1	L25	Q68
6867	Z1	L25	Q69
6868	Z1	L25	Q70
6869	Z1	L25	Q71
6870	Z1	L25	Q72
6871	Z1	L25	Q73
6872	Z1	L25	Q74
6873	Z1	L25	Q75
6874	Z1	L25	Q76
6875	Z1	L25	Q77
6876	Z1	L25	Q78
6877	Z1	L25	Q79
6878	Z1	L25	Q80
6879	Z1	L25	Q81
6880	Z1	L25	Q82
6881	Z1	L25	Q83
6882	Z1	L25	Q84
6883	Z1	L25	Q85
6884	Z1	L25	Q86
6885	Z1	L25	Q87
6886	Z1	L25	Q88
6887	Z1	L25	Q89
6888	Z1	L25	Q90
6889	Z1	L25	Q91
6890	Z1	L25	Q92
6891	Z1	L25	Q93
6892	Z1	L25	Q94
6893	Z1	L25	Q95
6894	Z1	L25	Q96
6895	Z1	L25	Q97
6896	Z1	L25	Q98
6897	Z1	L25	Q99
6898	Z1	L25	Q100
6899	Z1	L25	Q101
6900	Z1	L25	Q102
6901	Z1	L25	Q103
6902	Z1	L26	Q1
6903	Z1	L26	Q2
6904	Z1	L26	Q3
6905	Z1	L26	Q4
6906	Z1	L26	Q5
6907	Z1	L26	Q6
6908	Z1	L26	Q7
6909	Z1	L26	Q8
6910	Z1	L26	Q9
6911	Z1	L26	Q10
6912	Z1	L26	Q11
6913	Z1	L26	Q12
6914	Z1	L26	Q13
6915	Z1	L26	Q14
6916	Z1	L26	Q15
6917	Z1	L26	Q16
6918	Z1	L26	Q17
6919	Z1	L26	Q18
6920	Z1	L26	Q19
6921	Z1	L26	Q20
6922	Z1	L26	Q21
6923	Z1	L26	Q22
6924	Z1	L26	Q23
6925	Z1	L26	Q24
6926	Z1	L26	Q25
6927	Z1	L26	Q26
6928	Z1	L26	Q27
6929	Z1	L26	Q28
6930	Z1	L26	Q29
6931	Z1	L26	Q30
6932	Z1	L26	Q31
6933	Z1	L26	Q32
6934	Z1	L26	Q33
6935	Z1	L26	Q34
6936	Z1	L26	Q35
6937	Z1	L26	Q36
6938	Z1	L26	Q37
6939	Z1	L26	Q38
6940	Z1	L26	Q39
6941	Z1	L26	Q40
6942	Z1	L26	Q41
6943	Z1	L26	Q42
6944	Z1	L26	Q43
6945	Z1	L26	Q44
6946	Z1	L26	Q45
6947	Z1	L26	Q46
6948	Z1	L26	Q47
6949	Z1	L26	Q48
6950	Z1	L26	Q49
6951	Z1	L26	Q50
6952	Z1	L26	Q51
6953	Z1	L26	Q52
6954	Z1	L26	Q53
6955	Z1	L26	Q54
6956	Z1	L26	Q55
6957	Z1	L26	Q56
6958	Z1	L26	Q57
6959	Z1	L26	Q58
6960	Z1	L26	Q59
6961	Z1	L26	Q60
6962	Z1	L26	Q61
6963	Z1	L26	Q62
6964	Z1	L26	Q63
6965	Z1	L26	Q64
6966	Z1	L26	Q65
6967	Z1	L26	Q66
6968	Z1	L26	Q67
6969	Z1	L26	Q68
6970	Z1	L26	Q69
6971	Z1	L26	Q70
6972	Z1	L26	Q71
6973	Z1	L26	Q72
6974	Z1	L26	Q73
6975	Z1	L26	Q74
6976	Z1	L26	Q75
6977	Z1	L26	Q76
6978	Z1	L26	Q77
6979	Z1	L26	Q78
6980	Z1	L26	Q79
6981	Z1	L26	Q80
6982	Z1	L26	Q81
6983	Z1	L26	Q82
6984	Z1	L26	Q83
6985	Z1	L26	Q84
6986	Z1	L26	Q85
6987	Z1	L26	Q86
6988	Z1	L26	Q87
6989	Z1	L26	Q88
6990	Z1	L26	Q89
6991	Z1	L26	Q90
6992	Z1	L26	Q91
6993	Z1	L26	Q92
6994	Z1	L26	Q93
6995	Z1	L26	Q94
6996	Z1	L26	Q95
6997	Z1	L26	Q96
6998	Z1	L26	Q97
6999	Z1	L26	Q98
7000	Z1	L26	Q99
7001	Z1	L26	Q100
7002	Z1	L26	Q101
7003	Z1	L26	Q102
7004	Z1	L26	Q103
7005	Z1	L27	Q1
7006	Z1	L27	Q2
7007	Z1	L27	Q3

[Table 1-41]

7008	Z1	L27	Q4
7009	Z1	L27	Q5
7010	Z1	L27	Q6
7011	Z1	L27	Q7
7012	Z1	L27	Q8
7013	Z1	L27	Q9
7014	Z1	L27	Q10
7015	Z1	L27	Q11
7016	Z1	L27	Q12
7017	Z1	L27	Q13
7018	Z1	L27	Q14
7019	Z1	L27	Q15
7020	Z1	L27	Q16
7021	Z1	L27	Q17
7022	Z1	L27	Q18
7023	Z1	L27	Q19
7024	Z1	L27	Q20
7025	Z1	L27	Q21
7026	Z1	L27	Q22
7027	Z1	L27	Q23
7028	Z1	L27	Q24
7029	Z1	L27	Q25
7030	Z1	L27	Q26
7031	Z1	L27	Q27
7032	Z1	L27	Q28
7033	Z1	L27	Q29
7034	Z1	L27	Q30
7035	Z1	L27	Q31
7036	Z1	L27	Q32
7037	Z1	L27	Q33
7038	Z1	L27	Q34
7039	Z1	L27	Q35
7040	Z1	L27	Q36
7041	Z1	L27	Q37
7042	Z1	L27	Q38
7043	Z1	L27	Q39
7044	Z1	L27	Q40
7045	Z1	L27	Q41
7046	Z1	L27	Q42
7047	Z1	L27	Q43
7048	Z1	L27	Q44
7049	Z1	L27	Q45
7050	Z1	L27	Q46
7051	Z1	L27	Q47
7052	Z1	L27	Q48
7053	Z1	L27	Q49
7054	Z1	L27	Q50
7055	Z1	L27	Q51
7056	Z1	L27	Q52
7057	Z1	L27	Q53
7058	Z1	L27	Q54
7059	Z1	L27	Q55
7060	Z1	L27	Q56
7061	Z1	L27	Q57
7062	Z1	L27	Q58
7063	Z1	L27	Q59
7064	Z1	L27	Q60
7065	Z1	L27	Q61
7066	Z1	L27	Q62
7067	Z1	L27	Q63
7068	Z1	L27	Q64
7069	Z1	L27	Q65
7070	Z1	L27	Q66
7071	Z1	L27	Q67
7072	Z1	L27	Q68
7073	Z1	L27	Q69
7074	Z1	L27	Q70
7075	Z1	L27	Q71
7076	Z1	L27	Q72
7077	Z1	L27	Q73
7078	Z1	L27	Q74
7079	Z1	L27	Q75
7080	Z1	L27	Q76
7081	Z1	L27	Q77
7082	Z1	L27	Q78
7083	Z1	L27	Q79
7084	Z1	L27	Q80
7085	Z1	L27	Q81
7086	Z1	L27	Q82
7087	Z1	L27	Q83
7088	Z1	L27	Q84
7089	Z1	L27	Q85
7090	Z1	L27	Q86
7091	Z1	L27	Q87
7092	Z1	L27	Q88
7093	Z1	L27	Q89
7094	Z1	L27	Q90
7095	Z1	L27	Q91
7096	Z1	L27	Q92
7097	Z1	L27	Q93
7098	Z1	L27	Q94
7099	Z1	L27	Q95
7100	Z1	L27	Q96
7101	Z1	L27	Q97
7102	Z1	L27	Q98
7103	Z1	L27	Q99
7104	Z1	L27	Q100
7105	Z1	L27	Q101
7106	Z1	L27	Q102
7107	Z1	L27	Q103
7108	Z1	L28	Q1
7109	Z1	L28	Q2
7110	Z1	L28	Q3
7111	Z1	L28	Q4
7112	Z1	L28	Q5
7113	Z1	L28	Q6
7114	Z1	L28	Q7
7115	Z1	L28	Q8
7116	Z1	L28	Q9
7117	Z1	L28	Q10
7118	Z1	L28	Q11
7119	Z1	L28	Q12
7120	Z1	L28	Q13
7121	Z1	L28	Q14
7122	Z1	L28	Q15
7123	Z1	L28	Q16
7124	Z1	L28	Q17
7125	Z1	L28	Q18
7126	Z1	L28	Q19
7127	Z1	L28	Q20
7128	Z1	L28	Q21
7129	Z1	L28	Q22
7130	Z1	L28	Q23
7131	Z1	L28	Q24
7132	Z1	L28	Q25
7133	Z1	L28	Q26
7134	Z1	L28	Q27
7135	Z1	L28	Q28
7136	Z1	L28	Q29
7137	Z1	L28	Q30
7138	Z1	L28	Q31
7139	Z1	L28	Q32
7140	Z1	L28	Q33
7141	Z1	L28	Q34
7142	Z1	L28	Q35
7143	Z1	L28	Q36
7144	Z1	L28	Q37
7145	Z1	L28	Q38
7146	Z1	L28	Q39
7147	Z1	L28	Q40
7148	Z1	L28	Q41
7149	Z1	L28	Q42
7150	Z1	L28	Q43
7151	Z1	L28	Q44
7152	Z1	L28	Q45
7153	Z1	L28	Q46
7154	Z1	L28	Q47
7155	Z1	L28	Q48
7156	Z1	L28	Q49
7157	Z1	L28	Q50
7158	Z1	L28	Q51
7159	Z1	L28	Q52
7160	Z1	L28	Q53
7161	Z1	L28	Q54
7162	Z1	L28	Q55
7163	Z1	L28	Q56
7164	Z1	L28	Q57
7165	Z1	L28	Q58
7166	Z1	L28	Q59
7167	Z1	L28	Q60
7168	Z1	L28	Q61
7169	Z1	L28	Q62
7170	Z1	L28	Q63
7171	Z1	L28	Q64
7172	Z1	L28	Q65
7173	Z1	L28	Q66
7174	Z1	L28	Q67
7175	Z1	L28	Q68
7176	Z1	L28	Q69
7177	Z1	L28	Q70
7178	Z1	L28	Q71
7179	Z1	L28	Q72
7180	Z1	L28	Q73
7181	Z1	L28	Q74
7182	Z1	L28	Q75
7183	Z1	L28	Q76
7184	Z1	L28	Q77
7185	Z1	L28	Q78
7186	Z1	L28	Q79
7187	Z1	L28	Q80
7188	Z1	L28	Q81
7189	Z1	L28	Q82
7190	Z1	L28	Q83
7191	Z1	L28	Q84
7192	Z1	L28	Q85
7193	Z1	L28	Q86
7194	Z1	L28	Q87
7195	Z1	L28	Q88
7196	Z1	L28	Q89
7197	Z1	L28	Q90
7198	Z1	L28	Q91
7199	Z1	L28	Q92
7200	Z1	L28	Q93
7201	Z1	L28	Q94
7202	Z1	L28	Q95
7203	Z1	L28	Q96
7204	Z1	L28	Q97
7205	Z1	L28	Q98
7206	Z1	L28	Q99
7207	Z1	L28	Q100
7208	Z1	L28	Q101

[Table 1-42]

7209	Z1	L28	Q102
7210	Z1	L28	Q103
7211	Z1	L29	Q1
7212	Z1	L29	Q2
7213	Z1	L29	Q3
7214	Z1	L29	Q4
7215	Z1	L29	Q5
7216	Z1	L29	Q6
7217	Z1	L29	Q7
7218	Z1	L29	Q8
7219	Z1	L29	Q9
7220	Z1	L29	Q10
7221	Z1	L29	Q11
7222	Z1	L29	Q12
7223	Z1	L29	Q13
7224	Z1	L29	Q14
7225	Z1	L29	Q15
7226	Z1	L29	Q16
7227	Z1	L29	Q17
7228	Z1	L29	Q18
7229	Z1	L29	Q19
7230	Z1	L29	Q20
7231	Z1	L29	Q21
7232	Z1	L29	Q22
7233	Z1	L29	Q23
7234	Z1	L29	Q24
7235	Z1	L29	Q25
7236	Z1	L29	Q26
7237	Z1	L29	Q27
7238	Z1	L29	Q28
7239	Z1	L29	Q29
7240	Z1	L29	Q30
7241	Z1	L29	Q31
7242	Z1	L29	Q32
7243	Z1	L29	Q33
7244	Z1	L29	Q34
7245	Z1	L29	Q35
7246	Z1	L29	Q36
7247	Z1	L29	Q37
7248	Z1	L29	Q38
7249	Z1	L29	Q39
7250	Z1	L29	Q40
7251	Z1	L29	Q41
7252	Z1	L29	Q42
7253	Z1	L29	Q43
7254	Z1	L29	Q44
7255	Z1	L29	Q45
7256	Z1	L29	Q46
7257	Z1	L29	Q47
7258	Z1	L29	Q48
7259	Z1	L29	Q49
7260	Z1	L29	Q50
7261	Z1	L29	Q51
7262	Z1	L29	Q52
7263	Z1	L29	Q53
7264	Z1	L29	Q54
7265	Z1	L29	Q55
7266	Z1	L29	Q56
7267	Z1	L29	Q57
7268	Z1	L29	Q58
7269	Z1	L29	Q59
7270	Z1	L29	Q60
7271	Z1	L29	Q61
7272	Z1	L29	Q62
7273	Z1	L29	Q63
7274	Z1	L29	Q64
7275	Z1	L29	Q65
7276	Z1	L29	Q66
7277	Z1	L29	Q67
7278	Z1	L29	Q68
7279	Z1	L29	Q69
7280	Z1	L29	Q70
7281	Z1	L29	Q71
7282	Z1	L29	Q72
7283	Z1	L29	Q73
7284	Z1	L29	Q74
7285	Z1	L29	Q75
7286	Z1	L29	Q76
7287	Z1	L29	Q77
7288	Z1	L29	Q78
7289	Z1	L29	Q79
7290	Z1	L29	Q80
7291	Z1	L29	Q81
7292	Z1	L29	Q82
7293	Z1	L29	Q83
7294	Z1	L29	Q84
7295	Z1	L29	Q85
7296	Z1	L29	Q86
7297	Z1	L29	Q87
7298	Z1	L29	Q88
7299	Z1	L29	Q89
7300	Z1	L29	Q90
7301	Z1	L29	Q91
7302	Z1	L29	Q92
7303	Z1	L29	Q93
7304	Z1	L29	Q94
7305	Z1	L29	Q95
7306	Z1	L29	Q96
7307	Z1	L29	Q97
7308	Z1	L29	Q98
7309	Z1	L29	Q99
7310	Z1	L29	Q100
7311	Z1	L29	Q101
7312	Z1	L29	Q102
7313	Z1	L29	Q103
7314	Z1	L30	Q1
7315	Z1	L30	Q2
7316	Z1	L30	Q3
7317	Z1	L30	Q4
7318	Z1	L30	Q5
7319	Z1	L30	Q6
7320	Z1	L30	Q7
7321	Z1	L30	Q8
7322	Z1	L30	Q9
7323	Z1	L30	Q10
7324	Z1	L30	Q11
7325	Z1	L30	Q12
7326	Z1	L30	Q13
7327	Z1	L30	Q14
7328	Z1	L30	Q15
7329	Z1	L30	Q16
7330	Z1	L30	Q17
7331	Z1	L30	Q18
7332	Z1	L30	Q19
7333	Z1	L30	Q20
7334	Z1	L30	Q21
7335	Z1	L30	Q22
7336	Z1	L30	Q23
7337	Z1	L30	Q24
7338	Z1	L30	Q25
7339	Z1	L30	Q26
7340	Z1	L30	Q27
7341	Z1	L30	Q28
7342	Z1	L30	Q29
7343	Z1	L30	Q30
7344	Z1	L30	Q31
7345	Z1	L30	Q32
7346	Z1	L30	Q33
7347	Z1	L30	Q34
7348	Z1	L30	Q35
7349	Z1	L30	Q36
7350	Z1	L30	Q37
7351	Z1	L30	Q38
7352	Z1	L30	Q39
7353	Z1	L30	Q40
7354	Z1	L30	Q41
7355	Z1	L30	Q42
7356	Z1	L30	Q43
7357	Z1	L30	Q44
7358	Z1	L30	Q45
7359	Z1	L30	Q46
7360	Z1	L30	Q47
7361	Z1	L30	Q48
7362	Z1	L30	Q49
7363	Z1	L30	Q50
7364	Z1	L30	Q51
7365	Z1	L30	Q52
7366	Z1	L30	Q53
7367	Z1	L30	Q54
7368	Z1	L30	Q55
7369	Z1	L30	Q56
7370	Z1	L30	Q57
7371	Z1	L30	Q58
7372	Z1	L30	Q59
7373	Z1	L30	Q60
7374	Z1	L30	Q61
7375	Z1	L30	Q62
7376	Z1	L30	Q63
7377	Z1	L30	Q64
7378	Z1	L30	Q65
7379	Z1	L30	Q66
7380	Z1	L30	Q67
7381	Z1	L30	Q68
7382	Z1	L30	Q69
7383	Z1	L30	Q70
7384	Z1	L30	Q71
7385	Z1	L30	Q72
7386	Z1	L30	Q73
7387	Z1	L30	Q74
7388	Z1	L30	Q75
7389	Z1	L30	Q76
7390	Z1	L30	Q77
7391	Z1	L30	Q78
7392	Z1	L30	Q79
7393	Z1	L30	Q80
7394	Z1	L30	Q81
7395	Z1	L30	Q82
7396	Z1	L30	Q83
7397	Z1	L30	Q84
7398	Z1	L30	Q85
7399	Z1	L30	Q86
7400	Z1	L30	Q87
7401	Z1	L30	Q88
7402	Z1	L30	Q89
7403	Z1	L30	Q90
7404	Z1	L30	Q91
7405	Z1	L30	Q92
7406	Z1	L30	Q93
7407	Z1	L30	Q94
7408	Z1	L30	Q95
7409	Z1	L30	Q96

[Table 1-43]

7410	Z1	L30	Q97
7411	Z1	L30	Q98
7412	Z1	L30	Q99
7413	Z1	L30	Q100
7414	Z1	L30	Q101
7415	Z1	L30	Q102
7416	Z1	L30	Q103
7417	Z1	L31	Q1
7418	Z1	L31	Q2
7419	Z1	L31	Q3
7420	Z1	L31	Q4
7421	Z1	L31	Q5
7422	Z1	L31	Q6
7423	Z1	L31	Q7
7424	Z1	L31	Q8
7425	Z1	L31	Q9
7426	Z1	L31	Q10
7427	Z1	L31	Q11
7428	Z1	L31	Q12
7429	Z1	L31	Q13
7430	Z1	L31	Q14
7431	Z1	L31	Q15
7432	Z1	L31	Q16
7433	Z1	L31	Q17
7434	Z1	L31	Q18
7435	Z1	L31	Q19
7436	Z1	L31	Q20
7437	Z1	L31	Q21
7438	Z1	L31	Q22
7439	Z1	L31	Q23
7440	Z1	L31	Q24
7441	Z1	L31	Q25
7442	Z1	L31	Q26
7443	Z1	L31	Q27
7444	Z1	L31	Q28
7445	Z1	L31	Q29
7446	Z1	L31	Q30
7447	Z1	L31	Q31
7448	Z1	L31	Q32
7449	Z1	L31	Q33
7450	Z1	L31	Q34
7451	Z1	L31	Q35
7452	Z1	L31	Q36
7453	Z1	L31	Q37
7454	Z1	L31	Q38
7455	Z1	L31	Q39
7456	Z1	L31	Q40
7457	Z1	L31	Q41
7458	Z1	L31	Q42
7459	Z1	L31	Q43
7460	Z1	L31	Q44
7461	Z1	L31	Q45
7462	Z1	L31	Q46
7463	Z1	L31	Q47
7464	Z1	L31	Q48
7465	Z1	L31	Q49
7466	Z1	L31	Q50
7467	Z1	L31	Q51
7468	Z1	L31	Q52
7469	Z1	L31	Q53
7470	Z1	L31	Q54
7471	Z1	L31	Q55
7472	Z1	L31	Q56
7473	Z1	L31	Q57
7474	Z1	L31	Q58
7475	Z1	L31	Q59
7476	Z1	L31	Q60
7477	Z1	L31	Q61
7478	Z1	L31	Q62
7479	Z1	L31	Q63
7480	Z1	L31	Q64
7481	Z1	L31	Q65
7482	Z1	L31	Q66
7483	Z1	L31	Q67
7484	Z1	L31	Q68
7485	Z1	L31	Q69
7486	Z1	L31	Q70
7487	Z1	L31	Q71
7488	Z1	L31	Q72
7489	Z1	L31	Q73
7490	Z1	L31	Q74
7491	Z1	L31	Q75
7492	Z1	L31	Q76
7493	Z1	L31	Q77
7494	Z1	L31	Q78
7495	Z1	L31	Q79
7496	Z1	L31	Q80
7497	Z1	L31	Q81
7498	Z1	L31	Q82
7499	Z1	L31	Q83
7500	Z1	L31	Q84
7501	Z1	L31	Q85
7502	Z1	L31	Q86
7503	Z1	L31	Q87
7504	Z1	L31	Q88
7505	Z1	L31	Q89
7506	Z1	L31	Q90
7507	Z1	L31	Q91
7508	Z1	L31	Q92
7509	Z1	L31	Q93
7510	Z1	L31	Q94
7511	Z1	L31	Q95
7512	Z1	L31	Q96
7513	Z1	L31	Q97
7514	Z1	L31	Q98
7515	Z1	L31	Q99
7516	Z1	L31	Q100
7517	Z1	L31	Q101
7518	Z1	L31	Q102
7519	Z1	L31	Q103
7520	Z1	L32	Q1
7521	Z1	L32	Q2
7522	Z1	L32	Q3
7523	Z1	L32	Q4
7524	Z1	L32	Q5
7525	Z1	L32	Q6
7526	Z1	L32	Q7
7527	Z1	L32	Q8
7528	Z1	L32	Q9
7529	Z1	L32	Q10
7530	Z1	L32	Q11
7531	Z1	L32	Q12
7532	Z1	L32	Q13
7533	Z1	L32	Q14
7534	Z1	L32	Q15
7535	Z1	L32	Q16
7536	Z1	L32	Q17
7537	Z1	L32	Q18
7538	Z1	L32	Q19
7539	Z1	L32	Q20
7540	Z1	L32	Q21
7541	Z1	L32	Q22
7542	Z1	L32	Q23
7543	Z1	L32	Q24
7544	Z1	L32	Q25
7545	Z1	L32	Q26
7546	Z1	L32	Q27
7547	Z1	L32	Q28
7548	Z1	L32	Q29
7549	Z1	L32	Q30
7550	Z1	L32	Q31
7551	Z1	L32	Q32
7552	Z1	L32	Q33
7553	Z1	L32	Q34
7554	Z1	L32	Q35
7555	Z1	L32	Q36
7556	Z1	L32	Q37
7557	Z1	L32	Q38
7558	Z1	L32	Q39
7559	Z1	L32	Q40
7560	Z1	L32	Q41
7561	Z1	L32	Q42
7562	Z1	L32	Q43
7563	Z1	L32	Q44
7564	Z1	L32	Q45
7565	Z1	L32	Q46
7566	Z1	L32	Q47
7567	Z1	L32	Q48
7568	Z1	L32	Q49
7569	Z1	L32	Q50
7570	Z1	L32	Q51
7571	Z1	L32	Q52
7572	Z1	L32	Q53
7573	Z1	L32	Q54
7574	Z1	L32	Q55
7575	Z1	L32	Q56
7576	Z1	L32	Q57
7577	Z1	L32	Q58
7578	Z1	L32	Q59
7579	Z1	L32	Q60
7580	Z1	L32	Q61
7581	Z1	L32	Q62
7582	Z1	L32	Q63
7583	Z1	L32	Q64
7584	Z1	L32	Q65
7585	Z1	L32	Q66
7586	Z1	L32	Q67
7587	Z1	L32	Q68
7588	Z1	L32	Q69
7589	Z1	L32	Q70
7590	Z1	L32	Q71
7591	Z1	L32	Q72
7592	Z1	L32	Q73
7593	Z1	L32	Q74
7594	Z1	L32	Q75
7595	Z1	L32	Q76
7596	Z1	L32	Q77
7597	Z1	L32	Q78
7598	Z1	L32	Q79
7599	Z1	L32	Q80
7600	Z1	L32	Q81
7601	Z1	L32	Q82
7602	Z1	L32	Q83
7603	Z1	L32	Q84
7604	Z1	L32	Q85
7605	Z1	L32	Q86
7606	Z1	L32	Q87
7607	Z1	L32	Q88
7608	Z1	L32	Q89
7609	Z1	L32	Q90
7610	Z1	L32	Q91

[Table 1-44]

7611	Z1	L32	Q92
7612	Z1	L32	Q93
7613	Z1	L32	Q94
7614	Z1	L32	Q95
7615	Z1	L32	Q96
7616	Z1	L32	Q97
7617	Z1	L32	Q98
7618	Z1	L32	Q99
7619	Z1	L32	Q100
7620	Z1	L32	Q101
7621	Z1	L32	Q102
7622	Z1	L32	Q103
7623	Z1	L33	Q1
7624	Z1	L33	Q2
7625	Z1	L33	Q3
7626	Z1	L33	Q4
7627	Z1	L33	Q5
7628	Z1	L33	Q6
7629	Z1	L33	Q7
7630	Z1	L33	Q8
7631	Z1	L33	Q9
7632	Z1	L33	Q10
7633	Z1	L33	Q11
7634	Z1	L33	Q12
7635	Z1	L33	Q13
7636	Z1	L33	Q14
7637	Z1	L33	Q15
7638	Z1	L33	Q16
7639	Z1	L33	Q17
7640	Z1	L33	Q18
7641	Z1	L33	Q19
7642	Z1	L33	Q20
7643	Z1	L33	Q21
7644	Z1	L33	Q22
7645	Z1	L33	Q23
7646	Z1	L33	Q24
7647	Z1	L33	Q25
7648	Z1	L33	Q26
7649	Z1	L33	Q27
7650	Z1	L33	Q28
7651	Z1	L33	Q29
7652	Z1	L33	Q30
7653	Z1	L33	Q31
7654	Z1	L33	Q32
7655	Z1	L33	Q33
7656	Z1	L33	Q34
7657	Z1	L33	Q35
7658	Z1	L33	Q36
7659	Z1	L33	Q37
7660	Z1	L33	Q38
7661	Z1	L33	Q39
7662	Z1	L33	Q40
7663	Z1	L33	Q41
7664	Z1	L33	Q42
7665	Z1	L33	Q43
7666	Z1	L33	Q44
7667	Z1	L33	Q45
7668	Z1	L33	Q46
7669	Z1	L33	Q47
7670	Z1	L33	Q48
7671	Z1	L33	Q49
7672	Z1	L33	Q50
7673	Z1	L33	Q51
7674	Z1	L33	Q52
7675	Z1	L33	Q53
7676	Z1	L33	Q54
7677	Z1	L33	Q55
7678	Z1	L33	Q56
7679	Z1	L33	Q57
7680	Z1	L33	Q58
7681	Z1	L33	Q59
7682	Z1	L33	Q60
7683	Z1	L33	Q61
7684	Z1	L33	Q62
7685	Z1	L33	Q63
7686	Z1	L33	Q64
7687	Z1	L33	Q65
7688	Z1	L33	Q66
7689	Z1	L33	Q67
7690	Z1	L33	Q68
7691	Z1	L33	Q69
7692	Z1	L33	Q70
7693	Z1	L33	Q71
7694	Z1	L33	Q72
7695	Z1	L33	Q73
7696	Z1	L33	Q74
7697	Z1	L33	Q75
7698	Z1	L33	Q76
7699	Z1	L33	Q77
7700	Z1	L33	Q78
7701	Z1	L33	Q79
7702	Z1	L33	Q80
7703	Z1	L33	Q81
7704	Z1	L33	Q82
7705	Z1	L33	Q83
7706	Z1	L33	Q84
7707	Z1	L33	Q85
7708	Z1	L33	Q86
7709	Z1	L33	Q87
7710	Z1	L33	Q88
7711	Z1	L33	Q89
7712	Z1	L33	Q90
7713	Z1	L33	Q91
7714	Z1	L33	Q92
7715	Z1	L33	Q93
7716	Z1	L33	Q94
7717	Z1	L33	Q95
7718	Z1	L33	Q96
7719	Z1	L33	Q97
7720	Z1	L33	Q98
7721	Z1	L33	Q99
7722	Z1	L33	Q100
7723	Z1	L33	Q101
7724	Z1	L33	Q102
7725	Z1	L33	Q103
7726	Z1	L34	Q1
7727	Z1	L34	Q2
7728	Z1	L34	Q3
7729	Z1	L34	Q4
7730	Z1	L34	Q5
7731	Z1	L34	Q6
7732	Z1	L34	Q7
7733	Z1	L34	Q8
7734	Z1	L34	Q9
7735	Z1	L34	Q10
7736	Z1	L34	Q11
7737	Z1	L34	Q12
7738	Z1	L34	Q13
7739	Z1	L34	Q14
7740	Z1	L34	Q15
7741	Z1	L34	Q16
7742	Z1	L34	Q17
7743	Z1	L34	Q18
7744	Z1	L34	Q19
7745	Z1	L34	Q20
7746	Z1	L34	Q21
7747	Z1	L34	Q22
7748	Z1	L34	Q23
7749	Z1	L34	Q24
7750	Z1	L34	Q25
7751	Z1	L34	Q26
7752	Z1	L34	Q27
7753	Z1	L34	Q28
7754	Z1	L34	Q29
7755	Z1	L34	Q30
7756	Z1	L34	Q31
7757	Z1	L34	Q32
7758	Z1	L34	Q33
7759	Z1	L34	Q34
7760	Z1	L34	Q35
7761	Z1	L34	Q36
7762	Z1	L34	Q37
7763	Z1	L34	Q38
7764	Z1	L34	Q39
7765	Z1	L34	Q40
7766	Z1	L34	Q41
7767	Z1	L34	Q42
7768	Z1	L34	Q43
7769	Z1	L34	Q44
7770	Z1	L34	Q45
7771	Z1	L34	Q46
7772	Z1	L34	Q47
7773	Z1	L34	Q48
7774	Z1	L34	Q49
7775	Z1	L34	Q50
7776	Z1	L34	Q51
7777	Z1	L34	Q52
7778	Z1	L34	Q53
7779	Z1	L34	Q54
7780	Z1	L34	Q55
7781	Z1	L34	Q56
7782	Z1	L34	Q57
7783	Z1	L34	Q58
7784	Z1	L34	Q59
7785	Z1	L34	Q60
7786	Z1	L34	Q61
7787	Z1	L34	Q62
7788	Z1	L34	Q63
7789	Z1	L34	Q64
7790	Z1	L34	Q65
7791	Z1	L34	Q66
7792	Z1	L34	Q67
7793	Z1	L34	Q68
7794	Z1	L34	Q69
7795	Z1	L34	Q70
7796	Z1	L34	Q71
7797	Z1	L34	Q72
7798	Z1	L34	Q73
7799	Z1	L34	Q74
7800	Z1	L34	Q75
7801	Z1	L34	Q76
7802	Z1	L34	Q77
7803	Z1	L34	Q78
7804	Z1	L34	Q79
7805	Z1	L34	Q80
7806	Z1	L34	Q81
7807	Z1	L34	Q82
7808	Z1	L34	Q83
7809	Z1	L34	Q84
7810	Z1	L34	Q85
7811	Z1	L34	Q86

[Table 1-45]

7812	Z1	L34	Q87
7813	Z1	L34	Q88
7814	Z1	L34	Q89
7815	Z1	L34	Q90
7816	Z1	L34	Q91
7817	Z1	L34	Q92
7818	Z1	L34	Q93
7819	Z1	L34	Q94
7820	Z1	L34	Q95
7821	Z1	L34	Q96
7822	Z1	L34	Q97
7823	Z1	L34	Q98
7824	Z1	L34	Q99
7825	Z1	L34	Q100
7826	Z1	L34	Q101
7827	Z1	L34	Q102
7828	Z1	L34	Q103
7829	Z1	L35	Q1
7830	Z1	L35	Q2
7831	Z1	L35	Q3
7832	Z1	L35	Q4
7833	Z1	L35	Q5
7834	Z1	L35	Q6
7835	Z1	L35	Q7
7836	Z1	L35	Q8
7837	Z1	L35	Q9
7838	Z1	L35	Q10
7839	Z1	L35	Q11
7840	Z1	L35	Q12
7841	Z1	L35	Q13
7842	Z1	L35	Q14
7843	Z1	L35	Q15
7844	Z1	L35	Q16
7845	Z1	L35	Q17
7846	Z1	L35	Q18
7847	Z1	L35	Q19
7848	Z1	L35	Q20
7849	Z1	L35	Q21
7850	Z1	L35	Q22
7851	Z1	L35	Q23
7852	Z1	L35	Q24
7853	Z1	L35	Q25
7854	Z1	L35	Q26
7855	Z1	L35	Q27
7856	Z1	L35	Q28
7857	Z1	L35	Q29
7858	Z1	L35	Q30
7859	Z1	L35	Q31
7860	Z1	L35	Q32
7861	Z1	L35	Q33
7862	Z1	L35	Q34
7863	Z1	L35	Q35
7864	Z1	L35	Q36
7865	Z1	L35	Q37
7866	Z1	L35	Q38
7867	Z1	L35	Q39
7868	Z1	L35	Q40
7869	Z1	L35	Q41
7870	Z1	L35	Q42
7871	Z1	L35	Q43
7872	Z1	L35	Q44
7873	Z1	L35	Q45
7874	Z1	L35	Q46
7875	Z1	L35	Q47
7876	Z1	L35	Q48
7877	Z1	L35	Q49
7878	Z1	L35	Q50
7879	Z1	L35	Q51
7880	Z1	L35	Q52
7881	Z1	L35	Q53
7882	Z1	L35	Q54
7883	Z1	L35	Q55
7884	Z1	L35	Q56
7885	Z1	L35	Q57
7886	Z1	L35	Q58
7887	Z1	L35	Q59
7888	Z1	L35	Q60
7889	Z1	L35	Q61
7890	Z1	L35	Q62
7891	Z1	L35	Q63
7892	Z1	L35	Q64
7893	Z1	L35	Q65
7894	Z1	L35	Q66
7895	Z1	L35	Q67
7896	Z1	L35	Q68
7897	Z1	L35	Q69
7898	Z1	L35	Q70
7899	Z1	L35	Q71
7900	Z1	L35	Q72
7901	Z1	L35	Q73
7902	Z1	L35	Q74
7903	Z1	L35	Q75
7904	Z1	L35	Q76
7905	Z1	L35	Q77
7906	Z1	L35	Q78
7907	Z1	L35	Q79
7908	Z1	L35	Q80
7909	Z1	L35	Q81
7910	Z1	L35	Q82
7911	Z1	L35	Q83
7912	Z1	L35	Q84
7913	Z1	L35	Q85
7914	Z1	L35	Q86
7915	Z1	L35	Q87
7916	Z1	L35	Q88
7917	Z1	L35	Q89
7918	Z1	L35	Q90
7919	Z1	L35	Q91
7920	Z1	L35	Q92
7921	Z1	L35	Q93
7922	Z1	L35	Q94
7923	Z1	L35	Q95
7924	Z1	L35	Q96
7925	Z1	L35	Q97
7926	Z1	L35	Q98
7927	Z1	L35	Q99
7928	Z1	L35	Q100
7929	Z1	L35	Q101
7930	Z1	L35	Q102
7931	Z1	L35	Q103
7932	Z1	L36	Q1
7933	Z1	L36	Q2
7934	Z1	L36	Q3
7935	Z1	L36	Q4
7936	Z1	L36	Q5
7937	Z1	L36	Q6
7938	Z1	L36	Q7
7939	Z1	L36	Q8
7940	Z1	L36	Q9
7941	Z1	L36	Q10
7942	Z1	L36	Q11
7943	Z1	L36	Q12
7944	Z1	L36	Q13
7945	Z1	L36	Q14
7946	Z1	L36	Q15
7947	Z1	L36	Q16
7948	Z1	L36	Q17
7949	Z1	L36	Q18
7950	Z1	L36	Q19
7951	Z1	L36	Q20
7952	Z1	L36	Q21
7953	Z1	L36	Q22
7954	Z1	L36	Q23
7955	Z1	L36	Q24
7956	Z1	L36	Q25
7957	Z1	L36	Q26
7958	Z1	L36	Q27
7959	Z1	L36	Q28
7960	Z1	L36	Q29
7961	Z1	L36	Q30
7962	Z1	L36	Q31
7963	Z1	L36	Q32
7964	Z1	L36	Q33
7965	Z1	L36	Q34
7966	Z1	L36	Q35
7967	Z1	L36	Q36
7968	Z1	L36	Q37
7969	Z1	L36	Q38
7970	Z1	L36	Q39
7971	Z1	L36	Q40
7972	Z1	L36	Q41
7973	Z1	L36	Q42
7974	Z1	L36	Q43
7975	Z1	L36	Q44
7976	Z1	L36	Q45
7977	Z1	L36	Q46
7978	Z1	L36	Q47
7979	Z1	L36	Q48
7980	Z1	L36	Q49
7981	Z1	L36	Q50
7982	Z1	L36	Q51
7983	Z1	L36	Q52
7984	Z1	L36	Q53
7985	Z1	L36	Q54
7986	Z1	L36	Q55
7987	Z1	L36	Q56
7988	Z1	L36	Q57
7989	Z1	L36	Q58
7990	Z1	L36	Q59
7991	Z1	L36	Q60
7992	Z1	L36	Q61
7993	Z1	L36	Q62
7994	Z1	L36	Q63
7995	Z1	L36	Q64
7996	Z1	L36	Q65
7997	Z1	L36	Q66
7998	Z1	L36	Q67
7999	Z1	L36	Q68
8000	Z1	L36	Q69
8001	Z1	L36	Q70
8002	Z1	L36	Q71
8003	Z1	L36	Q72
8004	Z1	L36	Q73
8005	Z1	L36	Q74
8006	Z1	L36	Q75
8007	Z1	L36	Q76
8008	Z1	L36	Q77
8009	Z1	L36	Q78
8010	Z1	L36	Q79
8011	Z1	L36	Q80
8012	Z1	L36	Q81

[Table 1-46]

8013	Z1	L36	Q82
8014	Z1	L36	Q83
8015	Z1	L36	Q84
8016	Z1	L36	Q85
8017	Z1	L36	Q86
8018	Z1	L36	Q87
8019	Z1	L36	Q88
8020	Z1	L36	Q89
8021	Z1	L36	Q90
8022	Z1	L36	Q91
8023	Z1	L36	Q92
8024	Z1	L36	Q93
8025	Z1	L36	Q94
8026	Z1	L36	Q95
8027	Z1	L36	Q96
8028	Z1	L36	Q97
8029	Z1	L36	Q98
8030	Z1	L36	Q99
8031	Z1	L36	Q100
8032	Z1	L36	Q101
8033	Z1	L36	Q102
8034	Z1	L36	Q103
8035	Z2	L15	Q1
8036	Z2	L15	Q2
8037	Z2	L15	Q3
8038	Z2	L15	Q4
8039	Z2	L15	Q5
8040	Z2	L15	Q6
8041	Z2	L15	Q7
8042	Z2	L15	Q8
8043	Z2	L15	Q9
8044	Z2	L15	Q10
8045	Z2	L15	Q11
8046	Z2	L15	Q12
8047	Z2	L15	Q13
8048	Z2	L15	Q14
8049	Z2	L15	Q15
8050	Z2	L15	Q16
8051	Z2	L15	Q17
8052	Z2	L15	Q18
8053	Z2	L15	Q19
8054	Z2	L15	Q20
8055	Z2	L15	Q21
8056	Z2	L15	Q22
8057	Z2	L15	Q23
8058	Z2	L15	Q24
8059	Z2	L15	Q25
8060	Z2	L15	Q26
8061	Z2	L15	Q27
8062	Z2	L15	Q28
8063	Z2	L15	Q29
8064	Z2	L15	Q30
8065	Z2	L15	Q31
8066	Z2	L15	Q32
8067	Z2	L15	Q33
8068	Z2	L15	Q34
8069	Z2	L15	Q35
8070	Z2	L15	Q36
8071	Z2	L15	Q37
8072	Z2	L15	Q38
8073	Z2	L15	Q39
8074	Z2	L15	Q40
8075	Z2	L15	Q41
8076	Z2	L15	Q42
8077	Z2	L15	Q43
8078	Z2	L15	Q44
8079	Z2	L15	Q45
8080	Z2	L15	Q46
8081	Z2	L15	Q47
8082	Z2	L15	Q48
8083	Z2	L15	Q49
8084	Z2	L15	Q50
8085	Z2	L15	Q51
8086	Z2	L15	Q52
8087	Z2	L15	Q53
8088	Z2	L15	Q54
8089	Z2	L15	Q55
8090	Z2	L15	Q56
8091	Z2	L15	Q57
8092	Z2	L15	Q58
8093	Z2	L15	Q59
8094	Z2	L15	Q60
8095	Z2	L15	Q61
8096	Z2	L15	Q62
8097	Z2	L15	Q63
8098	Z2	L15	Q64
8099	Z2	L15	Q65
8100	Z2	L15	Q66
8101	Z2	L15	Q67
8102	Z2	L15	Q68
8103	Z2	L15	Q69
8104	Z2	L15	Q70
8105	Z2	L15	Q71
8106	Z2	L15	Q72
8107	Z2	L15	Q73
8108	Z2	L15	Q74
8109	Z2	L15	Q75
8110	Z2	L15	Q76
8111	Z2	L15	Q77
8112	Z2	L15	Q78
8113	Z2	L15	Q79
8114	Z2	L15	Q80
8115	Z2	L15	Q81
8116	Z2	L15	Q82
8117	Z2	L15	Q83
8118	Z2	L15	Q84
8119	Z2	L15	Q85
8120	Z2	L15	Q86
8121	Z2	L15	Q87
8122	Z2	L15	Q88
8123	Z2	L15	Q89
8124	Z2	L15	Q90
8125	Z2	L15	Q91
8126	Z2	L15	Q92
8127	Z2	L15	Q93
8128	Z2	L15	Q94
8129	Z2	L15	Q95
8130	Z2	L15	Q96
8131	Z2	L15	Q97
8132	Z2	L15	Q98
8133	Z2	L15	Q99
8134	Z2	L15	Q100
8135	Z2	L15	Q101
8136	Z2	L15	Q102
8137	Z2	L15	Q103
8138	Z2	L16	Q1
8139	Z2	L16	Q2
8140	Z2	L16	Q3
8141	Z2	L16	Q4
8142	Z2	L16	Q5
8143	Z2	L16	Q6
8144	Z2	L16	Q7
8145	Z2	L16	Q8
8146	Z2	L16	Q9
8147	Z2	L16	Q10
8148	Z2	L16	Q11
8149	Z2	L16	Q12
8150	Z2	L16	Q13
8151	Z2	L16	Q14
8152	Z2	L16	Q15
8153	Z2	L16	Q16
8154	Z2	L16	Q17
8155	Z2	L16	Q18
8156	Z2	L16	Q19
8157	Z2	L16	Q20
8158	Z2	L16	Q21
8159	Z2	L16	Q22
8160	Z2	L16	Q23
8161	Z2	L16	Q24
8162	Z2	L16	Q25
8163	Z2	L16	Q26
8164	Z2	L16	Q27
8165	Z2	L16	Q28
8166	Z2	L16	Q29
8167	Z2	L16	Q30
8168	Z2	L16	Q31
8169	Z2	L16	Q32
8170	Z2	L16	Q33
8171	Z2	L16	Q34
8172	Z2	L16	Q35
8173	Z2	L16	Q36
8174	Z2	L16	Q37
8175	Z2	L16	Q38
8176	Z2	L16	Q39
8177	Z2	L16	Q40
8178	Z2	L16	Q41
8179	Z2	L16	Q42
8180	Z2	L16	Q43
8181	Z2	L16	Q44
8182	Z2	L16	Q45
8183	Z2	L16	Q46
8184	Z2	L16	Q47
8185	Z2	L16	Q48
8186	Z2	L16	Q49
8187	Z2	L16	Q50
8188	Z2	L16	Q51
8189	Z2	L16	Q52
8190	Z2	L16	Q53
8191	Z2	L16	Q54
8192	Z2	L16	Q55
8193	Z2	L16	Q56
8194	Z2	L16	Q57
8195	Z2	L16	Q58
8196	Z2	L16	Q59
8197	Z2	L16	Q60
8198	Z2	L16	Q61
8199	Z2	L16	Q62
8200	Z2	L16	Q63
8201	Z2	L16	Q64
8202	Z2	L16	Q65
8203	Z2	L16	Q66
8204	Z2	L16	Q67
8205	Z2	L16	Q68
8206	Z2	L16	Q69
8207	Z2	L16	Q70
8208	Z2	L16	Q71
8209	Z2	L16	Q72
8210	Z2	L16	Q73
8211	Z2	L16	Q74
8212	Z2	L16	Q75
8213	Z2	L16	Q76

[Table 1-47]

8214	Z2	L16	Q77
8215	Z2	L16	Q78
8216	Z2	L16	Q79
8217	Z2	L16	Q80
8218	Z2	L16	Q81
8219	Z2	L16	Q82
8220	Z2	L16	Q83
8221	Z2	L16	Q84
8222	Z2	L16	Q85
8223	Z2	L16	Q86
8224	Z2	L16	Q87
8225	Z2	L16	Q88
8226	Z2	L16	Q89
8227	Z2	L16	Q90
8228	Z2	L16	Q91
8229	Z2	L16	Q92
8230	Z2	L16	Q93
8231	Z2	L16	Q94
8232	Z2	L16	Q95
8233	Z2	L16	Q96
8234	Z2	L16	Q97
8235	Z2	L16	Q98
8236	Z2	L16	Q99
8237	Z2	L16	Q100
8238	Z2	L16	Q101
8239	Z2	L16	Q102
8240	Z2	L16	Q103
8241	Z2	L17	Q1
8242	Z2	L17	Q2
8243	Z2	L17	Q3
8244	Z2	L17	Q4
8245	Z2	L17	Q5
8246	Z2	L17	Q6
8247	Z2	L17	Q7
8248	Z2	L17	Q8
8249	Z2	L17	Q9
8250	Z2	L17	Q10
8251	Z2	L17	Q11
8252	Z2	L17	Q12
8253	Z2	L17	Q13
8254	Z2	L17	Q14
8255	Z2	L17	Q15
8256	Z2	L17	Q16
8257	Z2	L17	Q17
8258	Z2	L17	Q18
8259	Z2	L17	Q19
8260	Z2	L17	Q20
8261	Z2	L17	Q21
8262	Z2	L17	Q22
8263	Z2	L17	Q23
8264	Z2	L17	Q24
8265	Z2	L17	Q25
8266	Z2	L17	Q26
8267	Z2	L17	Q27
8268	Z2	L17	Q28
8269	Z2	L17	Q29
8270	Z2	L17	Q30
8271	Z2	L17	Q31
8272	Z2	L17	Q32
8273	Z2	L17	Q33
8274	Z2	L17	Q34
8275	Z2	L17	Q35
8276	Z2	L17	Q36
8277	Z2	L17	Q37
8278	Z2	L17	Q38
8279	Z2	L17	Q39
8280	Z2	L17	Q40
8281	Z2	L17	Q41
8282	Z2	L17	Q42
8283	Z2	L17	Q43
8284	Z2	L17	Q44
8285	Z2	L17	Q45
8286	Z2	L17	Q46
8287	Z2	L17	Q47
8288	Z2	L17	Q48
8289	Z2	L17	Q49
8290	Z2	L17	Q50
8291	Z2	L17	Q51
8292	Z2	L17	Q52
8293	Z2	L17	Q53
8294	Z2	L17	Q54
8295	Z2	L17	Q55
8296	Z2	L17	Q56
8297	Z2	L17	Q57
8298	Z2	L17	Q58
8299	Z2	L17	Q59
8300	Z2	L17	Q60
8301	Z2	L17	Q61
8302	Z2	L17	Q62
8303	Z2	L17	Q63
8304	Z2	L17	Q64
8305	Z2	L17	Q65
8306	Z2	L17	Q66
8307	Z2	L17	Q67
8308	Z2	L17	Q68
8309	Z2	L17	Q69
8310	Z2	L17	Q70
8311	Z2	L17	Q71
8312	Z2	L17	Q72
8313	Z2	L17	Q73
8314	Z2	L17	Q74
8315	Z2	L17	Q75
8316	Z2	L17	Q76
8317	Z2	L17	Q77
8318	Z2	L17	Q78
8319	Z2	L17	Q79
8320	Z2	L17	Q80
8321	Z2	L17	Q81
8322	Z2	L17	Q82
8323	Z2	L17	Q83
8324	Z2	L17	Q84
8325	Z2	L17	Q85
8326	Z2	L17	Q86
8327	Z2	L17	Q87
8328	Z2	L17	Q88
8329	Z2	L17	Q89
8330	Z2	L17	Q90
8331	Z2	L17	Q91
8332	Z2	L17	Q92
8333	Z2	L17	Q93
8334	Z2	L17	Q94
8335	Z2	L17	Q95
8336	Z2	L17	Q96
8337	Z2	L17	Q97
8338	Z2	L17	Q98
8339	Z2	L17	Q99
8340	Z2	L17	Q100
8341	Z2	L17	Q101
8342	Z2	L17	Q102
8343	Z2	L17	Q103
8344	Z2	L18	Q1
8345	Z2	L18	Q2
8346	Z2	L18	Q3
8347	Z2	L18	Q4
8348	Z2	L18	Q5
8349	Z2	L18	Q6
8350	Z2	L18	Q7
8351	Z2	L18	Q8
8352	Z2	L18	Q9
8353	Z2	L18	Q10
8354	Z2	L18	Q11
8355	Z2	L18	Q12
8356	Z2	L18	Q13
8357	Z2	L18	Q14
8358	Z2	L18	Q15
8359	Z2	L18	Q16
8360	Z2	L18	Q17
8361	Z2	L18	Q18
8362	Z2	L18	Q19
8363	Z2	L18	Q20
8364	Z2	L18	Q21
8365	Z2	L18	Q22
8366	Z2	L18	Q23
8367	Z2	L18	Q24
8368	Z2	L18	Q25
8369	Z2	L18	Q26
8370	Z2	L18	Q27
8371	Z2	L18	Q28
8372	Z2	L18	Q29
8373	Z2	L18	Q30
8374	Z2	L18	Q31
8375	Z2	L18	Q32
8376	Z2	L18	Q33
8377	Z2	L18	Q34
8378	Z2	L18	Q35
8379	Z2	L18	Q36
8380	Z2	L18	Q37
8381	Z2	L18	Q38
8382	Z2	L18	Q39
8383	Z2	L18	Q40
8384	Z2	L18	Q41
8385	Z2	L18	Q42
8386	Z2	L18	Q43
8387	Z2	L18	Q44
8388	Z2	L18	Q45
8389	Z2	L18	Q46
8390	Z2	L18	Q47
8391	Z2	L18	Q48
8392	Z2	L18	Q49
8393	Z2	L18	Q50
8394	Z2	L18	Q51
8395	Z2	L18	Q52
8396	Z2	L18	Q53
8397	Z2	L18	Q54
8398	Z2	L18	Q55
8399	Z2	L18	Q56
8400	Z2	L18	Q57
8401	Z2	L18	Q58
8402	Z2	L18	Q59
8403	Z2	L18	Q60
8404	Z2	L18	Q61
8405	Z2	L18	Q62
8406	Z2	L18	Q63
8407	Z2	L18	Q64
8408	Z2	L18	Q65
8409	Z2	L18	Q66
8410	Z2	L18	Q67
8411	Z2	L18	Q68
8412	Z2	L18	Q69
8413	Z2	L18	Q70
8414	Z2	L18	Q71

[Table 1-48]

8415	Z2	L18	Q72
8416	Z2	L18	Q73
8417	Z2	L18	Q74
8418	Z2	L18	Q75
8419	Z2	L18	Q76
8420	Z2	L18	Q77
8421	Z2	L18	Q78
8422	Z2	L18	Q79
8423	Z2	L18	Q80
8424	Z2	L18	Q81
8425	Z2	L18	Q82
8426	Z2	L18	Q83
8427	Z2	L18	Q84
8428	Z2	L18	Q85
8429	Z2	L18	Q86
8430	Z2	L18	Q87
8431	Z2	L18	Q88
8432	Z2	L18	Q89
8433	Z2	L18	Q90
8434	Z2	L18	Q91
8435	Z2	L18	Q92
8436	Z2	L18	Q93
8437	Z2	L18	Q94
8438	Z2	L18	Q95
8439	Z2	L18	Q96
8440	Z2	L18	Q97
8441	Z2	L18	Q98
8442	Z2	L18	Q99
8443	Z2	L18	Q100
8444	Z2	L18	Q101
8445	Z2	L18	Q102
8446	Z2	L18	Q103
8447	Z2	L19	Q1
8448	Z2	L19	Q2
8449	Z2	L19	Q3
8450	Z2	L19	Q4
8451	Z2	L19	Q5
8452	Z2	L19	Q6
8453	Z2	L19	Q7
8454	Z2	L19	Q8
8455	Z2	L19	Q9
8456	Z2	L19	Q10
8457	Z2	L19	Q11
8458	Z2	L19	Q12
8459	Z2	L19	Q13
8460	Z2	L19	Q14
8461	Z2	L19	Q15
8462	Z2	L19	Q16
8463	Z2	L19	Q17
8464	Z2	L19	Q18
8465	Z2	L19	Q19
8466	Z2	L19	Q20
8467	Z2	L19	Q21
8468	Z2	L19	Q22
8469	Z2	L19	Q23
8470	Z2	L19	Q24
8471	Z2	L19	Q25
8472	Z2	L19	Q26
8473	Z2	L19	Q27
8474	Z2	L19	Q28
8475	Z2	L19	Q29
8476	Z2	L19	Q30
8477	Z2	L19	Q31
8478	Z2	L19	Q32
8479	Z2	L19	Q33
8480	Z2	L19	Q34
8481	Z2	L19	Q35
8482	Z2	L19	Q36
8483	Z2	L19	Q37
8484	Z2	L19	Q38
8485	Z2	L19	Q39
8486	Z2	L19	Q40
8487	Z2	L19	Q41
8488	Z2	L19	Q42
8489	Z2	L19	Q43
8490	Z2	L19	Q44
8491	Z2	L19	Q45
8492	Z2	L19	Q46
8493	Z2	L19	Q47
8494	Z2	L19	Q48
8495	Z2	L19	Q49
8496	Z2	L19	Q50
8497	Z2	L19	Q51
8498	Z2	L19	Q52
8499	Z2	L19	Q53
8500	Z2	L19	Q54
8501	Z2	L19	Q55
8502	Z2	L19	Q56
8503	Z2	L19	Q57
8504	Z2	L19	Q58
8505	Z2	L19	Q59
8506	Z2	L19	Q60
8507	Z2	L19	Q61
8508	Z2	L19	Q62
8509	Z2	L19	Q63
8510	Z2	L19	Q64
8511	Z2	L19	Q65
8512	Z2	L19	Q66
8513	Z2	L19	Q67
8514	Z2	L19	Q68
8515	Z2	L19	Q69
8516	Z2	L19	Q70
8517	Z2	L19	Q71
8518	Z2	L19	Q72
8519	Z2	L19	Q73
8520	Z2	L19	Q74
8521	Z2	L19	Q75
8522	Z2	L19	Q76
8523	Z2	L19	Q77
8524	Z2	L19	Q78
8525	Z2	L19	Q79
8526	Z2	L19	Q80
8527	Z2	L19	Q81
8528	Z2	L19	Q82
8529	Z2	L19	Q83
8530	Z2	L19	Q84
8531	Z2	L19	Q85
8532	Z2	L19	Q86
8533	Z2	L19	Q87
8534	Z2	L19	Q88
8535	Z2	L19	Q89
8536	Z2	L19	Q90
8537	Z2	L19	Q91
8538	Z2	L19	Q92
8539	Z2	L19	Q93
8540	Z2	L19	Q94
8541	Z2	L19	Q95
8542	Z2	L19	Q96
8543	Z2	L19	Q97
8544	Z2	L19	Q98
8545	Z2	L19	Q99
8546	Z2	L19	Q100
8547	Z2	L19	Q101
8548	Z2	L19	Q102
8549	Z2	L19	Q103
8550	Z2	L20	Q1
8551	Z2	L20	Q2
8552	Z2	L20	Q3
8553	Z2	L20	Q4
8554	Z2	L20	Q5
8555	Z2	L20	Q6
8556	Z2	L20	Q7
8557	Z2	L20	Q8
8558	Z2	L20	Q9
8559	Z2	L20	Q10
8560	Z2	L20	Q11
8561	Z2	L20	Q12
8562	Z2	L20	Q13
8563	Z2	L20	Q14
8564	Z2	L20	Q15
8565	Z2	L20	Q16
8566	Z2	L20	Q17
8567	Z2	L20	Q18
8568	Z2	L20	Q19
8569	Z2	L20	Q20
8570	Z2	L20	Q21
8571	Z2	L20	Q22
8572	Z2	L20	Q23
8573	Z2	L20	Q24
8574	Z2	L20	Q25
8575	Z2	L20	Q26
8576	Z2	L20	Q27
8577	Z2	L20	Q28
8578	Z2	L20	Q29
8579	Z2	L20	Q30
8580	Z2	L20	Q31
8581	Z2	L20	Q32
8582	Z2	L20	Q33
8583	Z2	L20	Q34
8584	Z2	L20	Q35
8585	Z2	L20	Q36
8586	Z2	L20	Q37
8587	Z2	L20	Q38
8588	Z2	L20	Q39
8589	Z2	L20	Q40
8590	Z2	L20	Q41
8591	Z2	L20	Q42
8592	Z2	L20	Q43
8593	Z2	L20	Q44
8594	Z2	L20	Q45
8595	Z2	L20	Q46
8596	Z2	L20	Q47
8597	Z2	L20	Q48
8598	Z2	L20	Q49
8599	Z2	L20	Q50
8600	Z2	L20	Q51
8601	Z2	L20	Q52
8602	Z2	L20	Q53
8603	Z2	L20	Q54
8604	Z2	L20	Q55
8605	Z2	L20	Q56
8606	Z2	L20	Q57
8607	Z2	L20	Q58
8608	Z2	L20	Q59
8609	Z2	L20	Q60
8610	Z2	L20	Q61
8611	Z2	L20	Q62
8612	Z2	L20	Q63
8613	Z2	L20	Q64
8614	Z2	L20	Q65
8615	Z2	L20	Q66

[Table 1-49]

8616	Z2	L20	Q67
8617	Z2	L20	Q68
8618	Z2	L20	Q69
8619	Z2	L20	Q70
8620	Z2	L20	Q71
8621	Z2	L20	Q72
8622	Z2	L20	Q73
8623	Z2	L20	Q74
8624	Z2	L20	Q75
8625	Z2	L20	Q76
8626	Z2	L20	Q77
8627	Z2	L20	Q78
8628	Z2	L20	Q79
8629	Z2	L20	Q80
8630	Z2	L20	Q81
8631	Z2	L20	Q82
8632	Z2	L20	Q83
8633	Z2	L20	Q84
8634	Z2	L20	Q85
8635	Z2	L20	Q86
8636	Z2	L20	Q87
8637	Z2	L20	Q88
8638	Z2	L20	Q89
8639	Z2	L20	Q90
8640	Z2	L20	Q91
8641	Z2	L20	Q92
8642	Z2	L20	Q93
8643	Z2	L20	Q94
8644	Z2	L20	Q95
8645	Z2	L20	Q96
8646	Z2	L20	Q97
8647	Z2	L20	Q98
8648	Z2	L20	Q99
8649	Z2	L20	Q100
8650	Z2	L20	Q101
8651	Z2	L20	Q102
8652	Z2	L20	Q103
8653	Z2	L21	Q1
8654	Z2	L21	Q2
8655	Z2	L21	Q3
8656	Z2	L21	Q4
8657	Z2	L21	Q5
8658	Z2	L21	Q6
8659	Z2	L21	Q7
8660	Z2	L21	Q8
8661	Z2	L21	Q9
8662	Z2	L21	Q10
8663	Z2	L21	Q11
8664	Z2	L21	Q12
8665	Z2	L21	Q13
8666	Z2	L21	Q14
8667	Z2	L21	Q15
8668	Z2	L21	Q16
8669	Z2	L21	Q17
8670	Z2	L21	Q18
8671	Z2	L21	Q19
8672	Z2	L21	Q20
8673	Z2	L21	Q21
8674	Z2	L21	Q22
8675	Z2	L21	Q23
8676	Z2	L21	Q24
8677	Z2	L21	Q25
8678	Z2	L21	Q26
8679	Z2	L21	Q27
8680	Z2	L21	Q28
8681	Z2	L21	Q29
8682	Z2	L21	Q30
8683	Z2	L21	Q31
8684	Z2	L21	Q32
8685	Z2	L21	Q33
8686	Z2	L21	Q34
8687	Z2	L21	Q35
8688	Z2	L21	Q36
8689	Z2	L21	Q37
8690	Z2	L21	Q38
8691	Z2	L21	Q39
8692	Z2	L21	Q40
8693	Z2	L21	Q41
8694	Z2	L21	Q42
8695	Z2	L21	Q43
8696	Z2	L21	Q44
8697	Z2	L21	Q45
8698	Z2	L21	Q46
8699	Z2	L21	Q47
8700	Z2	L21	Q48
8701	Z2	L21	Q49
8702	Z2	L21	Q50
8703	Z2	L21	Q51
8704	Z2	L21	Q52
8705	Z2	L21	Q53
8706	Z2	L21	Q54
8707	Z2	L21	Q55
8708	Z2	L21	Q56
8709	Z2	L21	Q57
8710	Z2	L21	Q58
8711	Z2	L21	Q59
8712	Z2	L21	Q60
8713	Z2	L21	Q61
8714	Z2	L21	Q62
8715	Z2	L21	Q63
8716	Z2	L21	Q64
8717	Z2	L21	Q65
8718	Z2	L21	Q66
8719	Z2	L21	Q67
8720	Z2	L21	Q68
8721	Z2	L21	Q69
8722	Z2	L21	Q70
8723	Z2	L21	Q71
8724	Z2	L21	Q72
8725	Z2	L21	Q73
8726	Z2	L21	Q74
8727	Z2	L21	Q75
8728	Z2	L21	Q76
8729	Z2	L21	Q77
8730	Z2	L21	Q78
8731	Z2	L21	Q79
8732	Z2	L21	Q80
8733	Z2	L21	Q81
8734	Z2	L21	Q82
8735	Z2	L21	Q83
8736	Z2	L21	Q84
8737	Z2	L21	Q85
8738	Z2	L21	Q86
8739	Z2	L21	Q87
8740	Z2	L21	Q88
8741	Z2	L21	Q89
8742	Z2	L21	Q90
8743	Z2	L21	Q91
8744	Z2	L21	Q92
8745	Z2	L21	Q93
8746	Z2	L21	Q94
8747	Z2	L21	Q95
8748	Z2	L21	Q96
8749	Z2	L21	Q97
8750	Z2	L21	Q98
8751	Z2	L21	Q99
8752	Z2	L21	Q100
8753	Z2	L21	Q101
8754	Z2	L21	Q102
8755	Z2	L21	Q103
8756	Z2	L22	Q1
8757	Z2	L22	Q2
8758	Z2	L22	Q3
8759	Z2	L22	Q4
8760	Z2	L22	Q5
8761	Z2	L22	Q6
8762	Z2	L22	Q7
8763	Z2	L22	Q8
8764	Z2	L22	Q9
8765	Z2	L22	Q10
8766	Z2	L22	Q11
8767	Z2	L22	Q12
8768	Z2	L22	Q13
8769	Z2	L22	Q14
8770	Z2	L22	Q15
8771	Z2	L22	Q16
8772	Z2	L22	Q17
8773	Z2	L22	Q18
8774	Z2	L22	Q19
8775	Z2	L22	Q20
8776	Z2	L22	Q21
8777	Z2	L22	Q22
8778	Z2	L22	Q23
8779	Z2	L22	Q24
8780	Z2	L22	Q25
8781	Z2	L22	Q26
8782	Z2	L22	Q27
8783	Z2	L22	Q28
8784	Z2	L22	Q29
8785	Z2	L22	Q30
8786	Z2	L22	Q31
8787	Z2	L22	Q32
8788	Z2	L22	Q33
8789	Z2	L22	Q34
8790	Z2	L22	Q35
8791	Z2	L22	Q36
8792	Z2	L22	Q37
8793	Z2	L22	Q38
8794	Z2	L22	Q39
8795	Z2	L22	Q40
8796	Z2	L22	Q41
8797	Z2	L22	Q42
8798	Z2	L22	Q43
8799	Z2	L22	Q44
8800	Z2	L22	Q45
8801	Z2	L22	Q46
8802	Z2	L22	Q47
8803	Z2	L22	Q48
8804	Z2	L22	Q49
8805	Z2	L22	Q50
8806	Z2	L22	Q51
8807	Z2	L22	Q52
8808	Z2	L22	Q53
8809	Z2	L22	Q54
8810	Z2	L22	Q55
8811	Z2	L22	Q56
8812	Z2	L22	Q57
8813	Z2	L22	Q58
8814	Z2	L22	Q59
8815	Z2	L22	Q60
8816	Z2	L22	Q61

[Table 1-50]

8817	Z2	L22	Q62
8818	Z2	L22	Q63
8819	Z2	L22	Q64
8820	Z2	L22	Q65
8821	Z2	L22	Q66
8822	Z2	L22	Q67
8823	Z2	L22	Q68
8824	Z2	L22	Q69
8825	Z2	L22	Q70
8826	Z2	L22	Q71
8827	Z2	L22	Q72
8828	Z2	L22	Q73
8829	Z2	L22	Q74
8830	Z2	L22	Q75
8831	Z2	L22	Q76
8832	Z2	L22	Q77
8833	Z2	L22	Q78
8834	Z2	L22	Q79
8835	Z2	L22	Q80
8836	Z2	L22	Q81
8837	Z2	L22	Q82
8838	Z2	L22	Q83
8839	Z2	L22	Q84
8840	Z2	L22	Q85
8841	Z2	L22	Q86
8842	Z2	L22	Q87
8843	Z2	L22	Q88
8844	Z2	L22	Q89
8845	Z2	L22	Q90
8846	Z2	L22	Q91
8847	Z2	L22	Q92
8848	Z2	L22	Q93
8849	Z2	L22	Q94
8850	Z2	L22	Q95
8851	Z2	L22	Q96
8852	Z2	L22	Q97
8853	Z2	L22	Q98
8854	Z2	L22	Q99
8855	Z2	L22	Q100
8856	Z2	L22	Q101
8857	Z2	L22	Q102
8858	Z2	L22	Q103
8859	Z2	L23	Q1
8860	Z2	L23	Q2
8861	Z2	L23	Q3
8862	Z2	L23	Q4
8863	Z2	L23	Q5
8864	Z2	L23	Q6
8865	Z2	L23	Q7
8866	Z2	L23	Q8
8867	Z2	L23	Q9
8868	Z2	L23	Q10
8869	Z2	L23	Q11
8870	Z2	L23	Q12
8871	Z2	L23	Q13
8872	Z2	L23	Q14
8873	Z2	L23	Q15
8874	Z2	L23	Q16
8875	Z2	L23	Q17
8876	Z2	L23	Q18
8877	Z2	L23	Q19
8878	Z2	L23	Q20
8879	Z2	L23	Q21
8880	Z2	L23	Q22
8881	Z2	L23	Q23
8882	Z2	L23	Q24
8883	Z2	L23	Q25
8884	Z2	L23	Q26
8885	Z2	L23	Q27
8886	Z2	L23	Q28
8887	Z2	L23	Q29
8888	Z2	L23	Q30
8889	Z2	L23	Q31
8890	Z2	L23	Q32
8891	Z2	L23	Q33
8892	Z2	L23	Q34
8893	Z2	L23	Q35
8894	Z2	L23	Q36
8895	Z2	L23	Q37
8896	Z2	L23	Q38
8897	Z2	L23	Q39
8898	Z2	L23	Q40
8899	Z2	L23	Q41
8900	Z2	L23	Q42
8901	Z2	L23	Q43
8902	Z2	L23	Q44
8903	Z2	L23	Q45
8904	Z2	L23	Q46
8905	Z2	L23	Q47
8906	Z2	L23	Q48
8907	Z2	L23	Q49
8908	Z2	L23	Q50
8909	Z2	L23	Q51
8910	Z2	L23	Q52
8911	Z2	L23	Q53
8912	Z2	L23	Q54
8913	Z2	L23	Q55
8914	Z2	L23	Q56
8915	Z2	L23	Q57
8916	Z2	L23	Q58
8917	Z2	L23	Q59
8918	Z2	L23	Q60
8919	Z2	L23	Q61
8920	Z2	L23	Q62
8921	Z2	L23	Q63
8922	Z2	L23	Q64
8923	Z2	L23	Q65
8924	Z2	L23	Q66
8925	Z2	L23	Q67
8926	Z2	L23	Q68
8927	Z2	L23	Q69
8928	Z2	L23	Q70
8929	Z2	L23	Q71
8930	Z2	L23	Q72
8931	Z2	L23	Q73
8932	Z2	L23	Q74
8933	Z2	L23	Q75
8934	Z2	L23	Q76
8935	Z2	L23	Q77
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8938	Z2	L23	Q80
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8940	Z2	L23	Q82
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8943	Z2	L23	Q85
8944	Z2	L23	Q86
8945	Z2	L23	Q87
8946	Z2	L23	Q88
8947	Z2	L23	Q89
8948	Z2	L23	Q90
8949	Z2	L23	Q91
8950	Z2	L23	Q92
8951	Z2	L23	Q93
8952	Z2	L23	Q94
8953	Z2	L23	Q95
8954	Z2	L23	Q96
8955	Z2	L23	Q97
8956	Z2	L23	Q98
8957	Z2	L23	Q99
8958	Z2	L23	Q100
8959	Z2	L23	Q101
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8961	Z2	L23	Q103
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8963	Z2	L24	Q2
8964	Z2	L24	Q3
8965	Z2	L24	Q4
8966	Z2	L24	Q5
8967	Z2	L24	Q6
8968	Z2	L24	Q7
8969	Z2	L24	Q8
8970	Z2	L24	Q9
8971	Z2	L24	Q10
8972	Z2	L24	Q11
8973	Z2	L24	Q12
8974	Z2	L24	Q13
8975	Z2	L24	Q14
8976	Z2	L24	Q15
8977	Z2	L24	Q16
8978	Z2	L24	Q17
8979	Z2	L24	Q18
8980	Z2	L24	Q19
8981	Z2	L24	Q20
8982	Z2	L24	Q21
8983	Z2	L24	Q22
8984	Z2	L24	Q23
8985	Z2	L24	Q24
8986	Z2	L24	Q25
8987	Z2	L24	Q26
8988	Z2	L24	Q27
8989	Z2	L24	Q28
8990	Z2	L24	Q29
8991	Z2	L24	Q30
8992	Z2	L24	Q31
8993	Z2	L24	Q32
8994	Z2	L24	Q33
8995	Z2	L24	Q34
8996	Z2	L24	Q35
8997	Z2	L24	Q36
8998	Z2	L24	Q37
8999	Z2	L24	Q38
9000	Z2	L24	Q39
9001	Z2	L24	Q40
9002	Z2	L24	Q41
9003	Z2	L24	Q42
9004	Z2	L24	Q43
9005	Z2	L24	Q44
9006	Z2	L24	Q45
9007	Z2	L24	Q46
9008	Z2	L24	Q47
9009	Z2	L24	Q48
9010	Z2	L24	Q49
9011	Z2	L24	Q50
9012	Z2	L24	Q51
9013	Z2	L24	Q52
9014	Z2	L24	Q53
9015	Z2	L24	Q54
9016	Z2	L24	Q55
9017	Z2	L24	Q56

[Table 1-51]

9018	Z2	L24	Q57
9019	Z2	L24	Q58
9020	Z2	L24	Q59
9021	Z2	L24	Q60
9022	Z2	L24	Q61
9023	Z2	L24	Q62
9024	Z2	L24	Q63
9025	Z2	L24	Q64
9026	Z2	L24	Q65
9027	Z2	L24	Q66
9028	Z2	L24	Q67
9029	Z2	L24	Q68
9030	Z2	L24	Q69
9031	Z2	L24	Q70
9032	Z2	L24	Q71
9033	Z2	L24	Q72
9034	Z2	L24	Q73
9035	Z2	L24	Q74
9036	Z2	L24	Q75
9037	Z2	L24	Q76
9038	Z2	L24	Q77
9039	Z2	L24	Q78
9040	Z2	L24	Q79
9041	Z2	L24	Q80
9042	Z2	L24	Q81
9043	Z2	L24	Q82
9044	Z2	L24	Q83
9045	Z2	L24	Q84
9046	Z2	L24	Q85
9047	Z2	L24	Q86
9048	Z2	L24	Q87
9049	Z2	L24	Q88
9050	Z2	L24	Q89
9051	Z2	L24	Q90
9052	Z2	L24	Q91
9053	Z2	L24	Q92
9054	Z2	L24	Q93
9055	Z2	L24	Q94
9056	Z2	L24	Q95
9057	Z2	L24	Q96
9058	Z2	L24	Q97
9059	Z2	L24	Q98
9060	Z2	L24	Q99
9061	Z2	L24	Q100
9062	Z2	L24	Q101
9063	Z2	L24	Q102
9064	Z2	L24	Q103
9065	Z2	L25	Q1
9066	Z2	L25	Q2
9067	Z2	L25	Q3
9068	Z2	L25	Q4
9069	Z2	L25	Q5
9070	Z2	L25	Q6
9071	Z2	L25	Q7
9072	Z2	L25	Q8
9073	Z2	L25	Q9
9074	Z2	L25	Q10
9075	Z2	L25	Q11
9076	Z2	L25	Q12
9077	Z2	L25	Q13
9078	Z2	L25	Q14
9079	Z2	L25	Q15
9080	Z2	L25	Q16
9081	Z2	L25	Q17
9082	Z2	L25	Q18
9083	Z2	L25	Q19
9084	Z2	L25	Q20
9085	Z2	L25	Q21
9086	Z2	L25	Q22
9087	Z2	L25	Q23
9088	Z2	L25	Q24
9089	Z2	L25	Q25
9090	Z2	L25	Q26
9091	Z2	L25	Q27
9092	Z2	L25	Q28
9093	Z2	L25	Q29
9094	Z2	L25	Q30
9095	Z2	L25	Q31
9096	Z2	L25	Q32
9097	Z2	L25	Q33
9098	Z2	L25	Q34
9099	Z2	L25	Q35
9100	Z2	L25	Q36
9101	Z2	L25	Q37
9102	Z2	L25	Q38
9103	Z2	L25	Q39
9104	Z2	L25	Q40
9105	Z2	L25	Q41
9106	Z2	L25	Q42
9107	Z2	L25	Q43
9108	Z2	L25	Q44
9109	Z2	L25	Q45
9110	Z2	L25	Q46
9111	Z2	L25	Q47
9112	Z2	L25	Q48
9113	Z2	L25	Q49
9114	Z2	L25	Q50
9115	Z2	L25	Q51
9116	Z2	L25	Q52
9117	Z2	L25	Q53
9118	Z2	L25	Q54
9119	Z2	L25	Q55
9120	Z2	L25	Q56
9121	Z2	L25	Q57
9122	Z2	L25	Q58
9123	Z2	L25	Q59
9124	Z2	L25	Q60
9125	Z2	L25	Q61
9126	Z2	L25	Q62
9127	Z2	L25	Q63
9128	Z2	L25	Q64
9129	Z2	L25	Q65
9130	Z2	L25	Q66
9131	Z2	L25	Q67
9132	Z2	L25	Q68
9133	Z2	L25	Q69
9134	Z2	L25	Q70
9135	Z2	L25	Q71
9136	Z2	L25	Q72
9137	Z2	L25	Q73
9138	Z2	L25	Q74
9139	Z2	L25	Q75
9140	Z2	L25	Q76
9141	Z2	L25	Q77
9142	Z2	L25	Q78
9143	Z2	L25	Q79
9144	Z2	L25	Q80
9145	Z2	L25	Q81
9146	Z2	L25	Q82
9147	Z2	L25	Q83
9148	Z2	L25	Q84
9149	Z2	L25	Q85
9150	Z2	L25	Q86
9151	Z2	L25	Q87
9152	Z2	L25	Q88
9153	Z2	L25	Q89
9154	Z2	L25	Q90
9155	Z2	L25	Q91
9156	Z2	L25	Q92
9157	Z2	L25	Q93
9158	Z2	L25	Q94
9159	Z2	L25	Q95
9160	Z2	L25	Q96
9161	Z2	L25	Q97
9162	Z2	L25	Q98
9163	Z2	L25	Q99
9164	Z2	L25	Q100
9165	Z2	L25	Q101
9166	Z2	L25	Q102
9167	Z2	L25	Q103
9168	Z2	L26	Q1
9169	Z2	L26	Q2
9170	Z2	L26	Q3
9171	Z2	L26	Q4
9172	Z2	L26	Q5
9173	Z2	L26	Q6
9174	Z2	L26	Q7
9175	Z2	L26	Q8
9176	Z2	L26	Q9
9177	Z2	L26	Q10
9178	Z2	L26	Q11
9179	Z2	L26	Q12
9180	Z2	L26	Q13
9181	Z2	L26	Q14
9182	Z2	L26	Q15
9183	Z2	L26	Q16
9184	Z2	L26	Q17
9185	Z2	L26	Q18
9186	Z2	L26	Q19
9187	Z2	L26	Q20
9188	Z2	L26	Q21
9189	Z2	L26	Q22
9190	Z2	L26	Q23
9191	Z2	L26	Q24
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9193	Z2	L26	Q26
9194	Z2	L26	Q27
9195	Z2	L26	Q28
9196	Z2	L26	Q29
9197	Z2	L26	Q30
9198	Z2	L26	Q31
9199	Z2	L26	Q32
9200	Z2	L26	Q33
9201	Z2	L26	Q34
9202	Z2	L26	Q35
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9206	Z2	L26	Q39
9207	Z2	L26	Q40
9208	Z2	L26	Q41
9209	Z2	L26	Q42
9210	Z2	L26	Q43
9211	Z2	L26	Q44
9212	Z2	L26	Q45
9213	Z2	L26	Q46
9214	Z2	L26	Q47
9215	Z2	L26	Q48
9216	Z2	L26	Q49
9217	Z2	L26	Q50
9218	Z2	L26	Q51

[Table 1-52]

9219	Z2	L26	Q52
9220	Z2	L26	Q53
9221	Z2	L26	Q54
9222	Z2	L26	Q55
9223	Z2	L26	Q56
9224	Z2	L26	Q57
9225	Z2	L26	Q58
9226	Z2	L26	Q59
9227	Z2	L26	Q60
9228	Z2	L26	Q61
9229	Z2	L26	Q62
9230	Z2	L26	Q63
9231	Z2	L26	Q64
9232	Z2	L26	Q65
9233	Z2	L26	Q66
9234	Z2	L26	Q67
9235	Z2	L26	Q68
9236	Z2	L26	Q69
9237	Z2	L26	Q70
9238	Z2	L26	Q71
9239	Z2	L26	Q72
9240	Z2	L26	Q73
9241	Z2	L26	Q74
9242	Z2	L26	Q75
9243	Z2	L26	Q76
9244	Z2	L26	Q77
9245	Z2	L26	Q78
9246	Z2	L26	Q79
9247	Z2	L26	Q80
9248	Z2	L26	Q81
9249	Z2	L26	Q82
9250	Z2	L26	Q83
9251	Z2	L26	Q84
9252	Z2	L26	Q85
9253	Z2	L26	Q86
9254	Z2	L26	Q87
9255	Z2	L26	Q88
9256	Z2	L26	Q89
9257	Z2	L26	Q90
9258	Z2	L26	Q91
9259	Z2	L26	Q92
9260	Z2	L26	Q93
9261	Z2	L26	Q94
9262	Z2	L26	Q95
9263	Z2	L26	Q96
9264	Z2	L26	Q97
9265	Z2	L26	Q98
9266	Z2	L26	Q99
9267	Z2	L26	Q100
9268	Z2	L26	Q101
9269	Z2	L26	Q102
9270	Z2	L26	Q103
9271	Z2	L27	Q1
9272	Z2	L27	Q2
9273	Z2	L27	Q3
9274	Z2	L27	Q4
9275	Z2	L27	Q5
9276	Z2	L27	Q6
9277	Z2	L27	Q7
9278	Z2	L27	Q8
9279	Z2	L27	Q9
9280	Z2	L27	Q10
9281	Z2	L27	Q11
9282	Z2	L27	Q12
9283	Z2	L27	Q13
9284	Z2	L27	Q14
9285	Z2	L27	Q15
9286	Z2	L27	Q16
9287	Z2	L27	Q17
9288	Z2	L27	Q18
9289	Z2	L27	Q19
9290	Z2	L27	Q20
9291	Z2	L27	Q21
9292	Z2	L27	Q22
9293	Z2	L27	Q23
9294	Z2	L27	Q24
9295	Z2	L27	Q25
9296	Z2	L27	Q26
9297	Z2	L27	Q27
9298	Z2	L27	Q28
9299	Z2	L27	Q29
9300	Z2	L27	Q30
9301	Z2	L27	Q31
9302	Z2	L27	Q32
9303	Z2	L27	Q33
9304	Z2	L27	Q34
9305	Z2	L27	Q35
9306	Z2	L27	Q36
9307	Z2	L27	Q37
9308	Z2	L27	Q38
9309	Z2	L27	Q39
9310	Z2	L27	Q40
9311	Z2	L27	Q41
9312	Z2	L27	Q42
9313	Z2	L27	Q43
9314	Z2	L27	Q44
9315	Z2	L27	Q45
9316	Z2	L27	Q46
9317	Z2	L27	Q47
9318	Z2	L27	Q48
9319	Z2	L27	Q49
9320	Z2	L27	Q50
9321	Z2	L27	Q51
9322	Z2	L27	Q52
9323	Z2	L27	Q53
9324	Z2	L27	Q54
9325	Z2	L27	Q55
9326	Z2	L27	Q56
9327	Z2	L27	Q57
9328	Z2	L27	Q58
9329	Z2	L27	Q59
9330	Z2	L27	Q60
9331	Z2	L27	Q61
9332	Z2	L27	Q62
9333	Z2	L27	Q63
9334	Z2	L27	Q64
9335	Z2	L27	Q65
9336	Z2	L27	Q66
9337	Z2	L27	Q67
9338	Z2	L27	Q68
9339	Z2	L27	Q69
9340	Z2	L27	Q70
9341	Z2	L27	Q71
9342	Z2	L27	Q72
9343	Z2	L27	Q73
9344	Z2	L27	Q74
9345	Z2	L27	Q75
9346	Z2	L27	Q76
9347	Z2	L27	Q77
9348	Z2	L27	Q78
9349	Z2	L27	Q79
9350	Z2	L27	Q80
9351	Z2	L27	Q81
9352	Z2	L27	Q82
9353	Z2	L27	Q83
9354	Z2	L27	Q84
9355	Z2	L27	Q85
9356	Z2	L27	Q86
9357	Z2	L27	Q87
9358	Z2	L27	Q88
9359	Z2	L27	Q89
9360	Z2	L27	Q90
9361	Z2	L27	Q91
9362	Z2	L27	Q92
9363	Z2	L27	Q93
9364	Z2	L27	Q94
9365	Z2	L27	Q95
9366	Z2	L27	Q96
9367	Z2	L27	Q97
9368	Z2	L27	Q98
9369	Z2	L27	Q99
9370	Z2	L27	Q100
9371	Z2	L27	Q101
9372	Z2	L27	Q102
9373	Z2	L27	Q103
9374	Z2	L28	Q1
9375	Z2	L28	Q2
9376	Z2	L28	Q3
9377	Z2	L28	Q4
9378	Z2	L28	Q5
9379	Z2	L28	Q6
9380	Z2	L28	Q7
9381	Z2	L28	Q8
9382	Z2	L28	Q9
9383	Z2	L28	Q10
9384	Z2	L28	Q11
9385	Z2	L28	Q12
9386	Z2	L28	Q13
9387	Z2	L28	Q14
9388	Z2	L28	Q15
9389	Z2	L28	Q16
9390	Z2	L28	Q17
9391	Z2	L28	Q18
9392	Z2	L28	Q19
9393	Z2	L28	Q20
9394	Z2	L28	Q21
9395	Z2	L28	Q22
9396	Z2	L28	Q23
9397	Z2	L28	Q24
9398	Z2	L28	Q25
9399	Z2	L28	Q26
9400	Z2	L28	Q27
9401	Z2	L28	Q28
9402	Z2	L28	Q29
9403	Z2	L28	Q30
9404	Z2	L28	Q31
9405	Z2	L28	Q32
9406	Z2	L28	Q33
9407	Z2	L28	Q34
9408	Z2	L28	Q35
9409	Z2	L28	Q36
9410	Z2	L28	Q37
9411	Z2	L28	Q38
9412	Z2	L28	Q39
9413	Z2	L28	Q40
9414	Z2	L28	Q41
9415	Z2	L28	Q42
9416	Z2	L28	Q43
9417	Z2	L28	Q44
9418	Z2	L28	Q45
9419	Z2	L28	Q46

[Table 1-53]

9420	Z2	L28	Q47
9421	Z2	L28	Q48
9422	Z2	L28	Q49
9423	Z2	L28	Q50
9424	Z2	L28	Q51
9425	Z2	L28	Q52
9426	Z2	L28	Q53
9427	Z2	L28	Q54
9428	Z2	L28	Q55
9429	Z2	L28	Q56
9430	Z2	L28	Q57
9431	Z2	L28	Q58
9432	Z2	L28	Q59
9433	Z2	L28	Q60
9434	Z2	L28	Q61
9435	Z2	L28	Q62
9436	Z2	L28	Q63
9437	Z2	L28	Q64
9438	Z2	L28	Q65
9439	Z2	L28	Q66
9440	Z2	L28	Q67
9441	Z2	L28	Q68
9442	Z2	L28	Q69
9443	Z2	L28	Q70
9444	Z2	L28	Q71
9445	Z2	L28	Q72
9446	Z2	L28	Q73
9447	Z2	L28	Q74
9448	Z2	L28	Q75
9449	Z2	L28	Q76
9450	Z2	L28	Q77
9451	Z2	L28	Q78
9452	Z2	L28	Q79
9453	Z2	L28	Q80
9454	Z2	L28	Q81
9455	Z2	L28	Q82
9456	Z2	L28	Q83
9457	Z2	L28	Q84
9458	Z2	L28	Q85
9459	Z2	L28	Q86
9460	Z2	L28	Q87
9461	Z2	L28	Q88
9462	Z2	L28	Q89
9463	Z2	L28	Q90
9464	Z2	L28	Q91
9465	Z2	L28	Q92
9466	Z2	L28	Q93
9467	Z2	L28	Q94
9468	Z2	L28	Q95
9469	Z2	L28	Q96
9470	Z2	L28	Q97
9471	Z2	L28	Q98
9472	Z2	L28	Q99
9473	Z2	L28	Q100
9474	Z2	L28	Q101
9475	Z2	L28	Q102
9476	Z2	L28	Q103
9477	Z2	L29	Q1
9478	Z2	L29	Q2
9479	Z2	L29	Q3
9480	Z2	L29	Q4
9481	Z2	L29	Q5
9482	Z2	L29	Q6
9483	Z2	L29	Q7
9484	Z2	L29	Q8
9485	Z2	L29	Q9
9486	Z2	L29	Q10
9487	Z2	L29	Q11
9488	Z2	L29	Q12
9489	Z2	L29	Q13
9490	Z2	L29	Q14
9491	Z2	L29	Q15
9492	Z2	L29	Q16
9493	Z2	L29	Q17
9494	Z2	L29	Q18
9495	Z2	L29	Q19
9496	Z2	L29	Q20
9497	Z2	L29	Q21
9498	Z2	L29	Q22
9499	Z2	L29	Q23
9500	Z2	L29	Q24
9501	Z2	L29	Q25
9502	Z2	L29	Q26
9503	Z2	L29	Q27
9504	Z2	L29	Q28
9505	Z2	L29	Q29
9506	Z2	L29	Q30
9507	Z2	L29	Q31
9508	Z2	L29	Q32
9509	Z2	L29	Q33
9510	Z2	L29	Q34
9511	Z2	L29	Q35
9512	Z2	L29	Q36
9513	Z2	L29	Q37
9514	Z2	L29	Q38
9515	Z2	L29	Q39
9516	Z2	L29	Q40
9517	Z2	L29	Q41
9518	Z2	L29	Q42
9519	Z2	L29	Q43
9520	Z2	L29	Q44
9521	Z2	L29	Q45
9522	Z2	L29	Q46
9523	Z2	L29	Q47
9524	Z2	L29	Q48
9525	Z2	L29	Q49
9526	Z2	L29	Q50
9527	Z2	L29	Q51
9528	Z2	L29	Q52
9529	Z2	L29	Q53
9530	Z2	L29	Q54
9531	Z2	L29	Q55
9532	Z2	L29	Q56
9533	Z2	L29	Q57
9534	Z2	L29	Q58
9535	Z2	L29	Q59
9536	Z2	L29	Q60
9537	Z2	L29	Q61
9538	Z2	L29	Q62
9539	Z2	L29	Q63
9540	Z2	L29	Q64
9541	Z2	L29	Q65
9542	Z2	L29	Q66
9543	Z2	L29	Q67
9544	Z2	L29	Q68
9545	Z2	L29	Q69
9546	Z2	L29	Q70
9547	Z2	L29	Q71
9548	Z2	L29	Q72
9549	Z2	L29	Q73
9550	Z2	L29	Q74
9551	Z2	L29	Q75
9552	Z2	L29	Q76
9553	Z2	L29	Q77
9554	Z2	L29	Q78
9555	Z2	L29	Q79
9556	Z2	L29	Q80
9557	Z2	L29	Q81
9558	Z2	L29	Q82
9559	Z2	L29	Q83
9560	Z2	L29	Q84
9561	Z2	L29	Q85
9562	Z2	L29	Q86
9563	Z2	L29	Q87
9564	Z2	L29	Q88
9565	Z2	L29	Q89
9566	Z2	L29	Q90
9567	Z2	L29	Q91
9568	Z2	L29	Q92
9569	Z2	L29	Q93
9570	Z2	L29	Q94
9571	Z2	L29	Q95
9572	Z2	L29	Q96
9573	Z2	L29	Q97
9574	Z2	L29	Q98
9575	Z2	L29	Q99
9576	Z2	L29	Q100
9577	Z2	L29	Q101
9578	Z2	L29	Q102
9579	Z2	L29	Q103
9580	Z2	L30	Q1
9581	Z2	L30	Q2
9582	Z2	L30	Q3
9583	Z2	L30	Q4
9584	Z2	L30	Q5
9585	Z2	L30	Q6
9586	Z2	L30	Q7
9587	Z2	L30	Q8
9588	Z2	L30	Q9
9589	Z2	L30	Q10
9590	Z2	L30	Q11
9591	Z2	L30	Q12
9592	Z2	L30	Q13
9593	Z2	L30	Q14
9594	Z2	L30	Q15
9595	Z2	L30	Q16
9596	Z2	L30	Q17
9597	Z2	L30	Q18
9598	Z2	L30	Q19
9599	Z2	L30	Q20
9600	Z2	L30	Q21
9601	Z2	L30	Q22
9602	Z2	L30	Q23
9603	Z2	L30	Q24
9604	Z2	L30	Q25
9605	Z2	L30	Q26
9606	Z2	L30	Q27
9607	Z2	L30	Q28
9608	Z2	L30	Q29
9609	Z2	L30	Q30
9610	Z2	L30	Q31
9611	Z2	L30	Q32
9612	Z2	L30	Q33
9613	Z2	L30	Q34
9614	Z2	L30	Q35
9615	Z2	L30	Q36
9616	Z2	L30	Q37
9617	Z2	L30	Q38
9618	Z2	L30	Q39
9619	Z2	L30	Q40
9620	Z2	L30	Q41

[Table 1-54]

9621	Z2	L30	Q42
9622	Z2	L30	Q43
9623	Z2	L30	Q44
9624	Z2	L30	Q45
9625	Z2	L30	Q46
9626	Z2	L30	Q47
9627	Z2	L30	Q48
9628	Z2	L30	Q49
9629	Z2	L30	Q50
9630	Z2	L30	Q51
9631	Z2	L30	Q52
9632	Z2	L30	Q53
9633	Z2	L30	Q54
9634	Z2	L30	Q55
9635	Z2	L30	Q56
9636	Z2	L30	Q57
9637	Z2	L30	Q58
9638	Z2	L30	Q59
9639	Z2	L30	Q60
9640	Z2	L30	Q61
9641	Z2	L30	Q62
9642	Z2	L30	Q63
9643	Z2	L30	Q64
9644	Z2	L30	Q65
9645	Z2	L30	Q66
9646	Z2	L30	Q67
9647	Z2	L30	Q68
9648	Z2	L30	Q69
9649	Z2	L30	Q70
9650	Z2	L30	Q71
9651	Z2	L30	Q72
9652	Z2	L30	Q73
9653	Z2	L30	Q74
9654	Z2	L30	Q75
9655	Z2	L30	Q76
9656	Z2	L30	Q77
9657	Z2	L30	Q78
9658	Z2	L30	Q79
9659	Z2	L30	Q80
9660	Z2	L30	Q81
9661	Z2	L30	Q82
9662	Z2	L30	Q83
9663	Z2	L30	Q84
9664	Z2	L30	Q85
9665	Z2	L30	Q86
9666	Z2	L30	Q87
9667	Z2	L30	Q88
9668	Z2	L30	Q89
9669	Z2	L30	Q90
9670	Z2	L30	Q91
9671	Z2	L30	Q92
9672	Z2	L30	Q93
9673	Z2	L30	Q94
9674	Z2	L30	Q95
9675	Z2	L30	Q96
9676	Z2	L30	Q97
9677	Z2	L30	Q98
9678	Z2	L30	Q99
9679	Z2	L30	Q100
9680	Z2	L30	Q101
9681	Z2	L30	Q102
9682	Z2	L30	Q103
9683	Z2	L31	Q1
9684	Z2	L31	Q2
9685	Z2	L31	Q3
9686	Z2	L31	Q4
9687	Z2	L31	Q5
9688	Z2	L31	Q6
9689	Z2	L31	Q7
9690	Z2	L31	Q8
9691	Z2	L31	Q9
9692	Z2	L31	Q10
9693	Z2	L31	Q11
9694	Z2	L31	Q12
9695	Z2	L31	Q13
9696	Z2	L31	Q14
9697	Z2	L31	Q15
9698	Z2	L31	Q16
9699	Z2	L31	Q17
9700	Z2	L31	Q18
9701	Z2	L31	Q19
9702	Z2	L31	Q20
9703	Z2	L31	Q21
9704	Z2	L31	Q22
9705	Z2	L31	Q23
9706	Z2	L31	Q24
9707	Z2	L31	Q25
9708	Z2	L31	Q26
9709	Z2	L31	Q27
9710	Z2	L31	Q28
9711	Z2	L31	Q29
9712	Z2	L31	Q30
9713	Z2	L31	Q31
9714	Z2	L31	Q32
9715	Z2	L31	Q33
9716	Z2	L31	Q34
9717	Z2	L31	Q35
9718	Z2	L31	Q36
9719	Z2	L31	Q37
9720	Z2	L31	Q38
9721	Z2	L31	Q39
9722	Z2	L31	Q40
9723	Z2	L31	Q41
9724	Z2	L31	Q42
9725	Z2	L31	Q43
9726	Z2	L31	Q44
9727	Z2	L31	Q45
9728	Z2	L31	Q46
9729	Z2	L31	Q47
9730	Z2	L31	Q48
9731	Z2	L31	Q49
9732	Z2	L31	Q50
9733	Z2	L31	Q51
9734	Z2	L31	Q52
9735	Z2	L31	Q53
9736	Z2	L31	Q54
9737	Z2	L31	Q55
9738	Z2	L31	Q56
9739	Z2	L31	Q57
9740	Z2	L31	Q58
9741	Z2	L31	Q59
9742	Z2	L31	Q60
9743	Z2	L31	Q61
9744	Z2	L31	Q62
9745	Z2	L31	Q63
9746	Z2	L31	Q64
9747	Z2	L31	Q65
9748	Z2	L31	Q66
9749	Z2	L31	Q67
9750	Z2	L31	Q68
9751	Z2	L31	Q69
9752	Z2	L31	Q70
9753	Z2	L31	Q71
9754	Z2	L31	Q72
9755	Z2	L31	Q73
9756	Z2	L31	Q74
9757	Z2	L31	Q75
9758	Z2	L31	Q76
9759	Z2	L31	Q77
9760	Z2	L31	Q78
9761	Z2	L31	Q79
9762	Z2	L31	Q80
9763	Z2	L31	Q81
9764	Z2	L31	Q82
9765	Z2	L31	Q83
9766	Z2	L31	Q84
9767	Z2	L31	Q85
9768	Z2	L31	Q86
9769	Z2	L31	Q87
9770	Z2	L31	Q88
9771	Z2	L31	Q89
9772	Z2	L31	Q90
9773	Z2	L31	Q91
9774	Z2	L31	Q92
9775	Z2	L31	Q93
9776	Z2	L31	Q94
9777	Z2	L31	Q95
9778	Z2	L31	Q96
9779	Z2	L31	Q97
9780	Z2	L31	Q98
9781	Z2	L31	Q99
9782	Z2	L31	Q100
9783	Z2	L31	Q101
9784	Z2	L31	Q102
9785	Z2	L31	Q103
9786	Z2	L32	Q1
9787	Z2	L32	Q2
9788	Z2	L32	Q3
9789	Z2	L32	Q4
9790	Z2	L32	Q5
9791	Z2	L32	Q6
9792	Z2	L32	Q7
9793	Z2	L32	Q8
9794	Z2	L32	Q9
9795	Z2	L32	Q10
9796	Z2	L32	Q11
9797	Z2	L32	Q12
9798	Z2	L32	Q13
9799	Z2	L32	Q14
9800	Z2	L32	Q15
9801	Z2	L32	Q16
9802	Z2	L32	Q17
9803	Z2	L32	Q18
9804	Z2	L32	Q19
9805	Z2	L32	Q20
9806	Z2	L32	Q21
9807	Z2	L32	Q22
9808	Z2	L32	Q23
9809	Z2	L32	Q24
9810	Z2	L32	Q25
9811	Z2	L32	Q26
9812	Z2	L32	Q27
9813	Z2	L32	Q28
9814	Z2	L32	Q29
9815	Z2	L32	Q30
9816	Z2	L32	Q31
9817	Z2	L32	Q32
9818	Z2	L32	Q33
9819	Z2	L32	Q34
9820	Z2	L32	Q35
9821	Z2	L32	Q36

[Table 1-55]

9822	Z2	L32	Q37
9823	Z2	L32	Q38
9824	Z2	L32	Q39
9825	Z2	L32	Q40
9826	Z2	L32	Q41
9827	Z2	L32	Q42
9828	Z2	L32	Q43
9829	Z2	L32	Q44
9830	Z2	L32	Q45
9831	Z2	L32	Q46
9832	Z2	L32	Q47
9833	Z2	L32	Q48
9834	Z2	L32	Q49
9835	Z2	L32	Q50
9836	Z2	L32	Q51
9837	Z2	L32	Q52
9838	Z2	L32	Q53
9839	Z2	L32	Q54
9840	Z2	L32	Q55
9841	Z2	L32	Q56
9842	Z2	L32	Q57
9843	Z2	L32	Q58
9844	Z2	L32	Q59
9845	Z2	L32	Q60
9846	Z2	L32	Q61
9847	Z2	L32	Q62
9848	Z2	L32	Q63
9849	Z2	L32	Q64
9850	Z2	L32	Q65
9851	Z2	L32	Q66
9852	Z2	L32	Q67
9853	Z2	L32	Q68
9854	Z2	L32	Q69
9855	Z2	L32	Q70
9856	Z2	L32	Q71
9857	Z2	L32	Q72
9858	Z2	L32	Q73
9859	Z2	L32	Q74
9860	Z2	L32	Q75
9861	Z2	L32	Q76
9862	Z2	L32	Q77
9863	Z2	L32	Q78
9864	Z2	L32	Q79
9865	Z2	L32	Q80
9866	Z2	L32	Q81
9867	Z2	L32	Q82
9868	Z2	L32	Q83
9869	Z2	L32	Q84
9870	Z2	L32	Q85
9871	Z2	L32	Q86
9872	Z2	L32	Q87
9873	Z2	L32	Q88
9874	Z2	L32	Q89
9875	Z2	L32	Q90
9876	Z2	L32	Q91
9877	Z2	L32	Q92
9878	Z2	L32	Q93
9879	Z2	L32	Q94
9880	Z2	L32	Q95
9881	Z2	L32	Q96
9882	Z2	L32	Q97
9883	Z2	L32	Q98
9884	Z2	L32	Q99
9885	Z2	L32	Q100
9886	Z2	L32	Q101
9887	Z2	L32	Q102
9888	Z2	L32	Q103
9889	Z2	L33	Q1
9890	Z2	L33	Q2
9891	Z2	L33	Q3
9892	Z2	L33	Q4
9893	Z2	L33	Q5
9894	Z2	L33	Q6
9895	Z2	L33	Q7
9896	Z2	L33	Q8
9897	Z2	L33	Q9
9898	Z2	L33	Q10
9899	Z2	L33	Q11
9900	Z2	L33	Q12
9901	Z2	L33	Q13
9902	Z2	L33	Q14
9903	Z2	L33	Q15
9904	Z2	L33	Q16
9905	Z2	L33	Q17
9906	Z2	L33	Q18
9907	Z2	L33	Q19
9908	Z2	L33	Q20
9909	Z2	L33	Q21
9910	Z2	L33	Q22
9911	Z2	L33	Q23
9912	Z2	L33	Q24
9913	Z2	L33	Q25
9914	Z2	L33	Q26
9915	Z2	L33	Q27
9916	Z2	L33	Q28
9917	Z2	L33	Q29
9918	Z2	L33	Q30
9919	Z2	L33	Q31
9920	Z2	L33	Q32
9921	Z2	L33	Q33
9922	Z2	L33	Q34
9923	Z2	L33	Q35
9924	Z2	L33	Q36
9925	Z2	L33	Q37
9926	Z2	L33	Q38
9927	Z2	L33	Q39
9928	Z2	L33	Q40
9929	Z2	L33	Q41
9930	Z2	L33	Q42
9931	Z2	L33	Q43
9932	Z2	L33	Q44
9933	Z2	L33	Q45
9934	Z2	L33	Q46
9935	Z2	L33	Q47
9936	Z2	L33	Q48
9937	Z2	L33	Q49
9938	Z2	L33	Q50
9939	Z2	L33	Q51
9940	Z2	L33	Q52
9941	Z2	L33	Q53
9942	Z2	L33	Q54
9943	Z2	L33	Q55
9944	Z2	L33	Q56
9945	Z2	L33	Q57
9946	Z2	L33	Q58
9947	Z2	L33	Q59
9948	Z2	L33	Q60
9949	Z2	L33	Q61
9950	Z2	L33	Q62
9951	Z2	L33	Q63
9952	Z2	L33	Q64
9953	Z2	L33	Q65
9954	Z2	L33	Q66
9955	Z2	L33	Q67
9956	Z2	L33	Q68
9957	Z2	L33	Q69
9958	Z2	L33	Q70
9959	Z2	L33	Q71
9960	Z2	L33	Q72
9961	Z2	L33	Q73
9962	Z2	L33	Q74
9963	Z2	L33	Q75
9964	Z2	L33	Q76
9965	Z2	L33	Q77
9966	Z2	L33	Q78
9967	Z2	L33	Q79
9968	Z2	L33	Q80
9969	Z2	L33	Q81
9970	Z2	L33	Q82
9971	Z2	L33	Q83
9972	Z2	L33	Q84
9973	Z2	L33	Q85
9974	Z2	L33	Q86
9975	Z2	L33	Q87
9976	Z2	L33	Q88
9977	Z2	L33	Q89
9978	Z2	L33	Q90
9979	Z2	L33	Q91
9980	Z2	L33	Q92
9981	Z2	L33	Q93
9982	Z2	L33	Q94
9983	Z2	L33	Q95
9984	Z2	L33	Q96
9985	Z2	L33	Q97
9986	Z2	L33	Q98
9987	Z2	L33	Q99
9988	Z2	L33	Q100
9989	Z2	L33	Q101
9990	Z2	L33	Q102
9991	Z2	L33	Q103
9992	Z2	L34	Q1
9993	Z2	L34	Q2
9994	Z2	L34	Q3
9995	Z2	L34	Q4
9996	Z2	L34	Q5
9997	Z2	L34	Q6
9998	Z2	L34	Q7
9999	Z2	L34	Q8
10000	Z2	L34	Q9
10001	Z2	L34	Q10
10002	Z2	L34	Q11
10003	Z2	L34	Q12
10004	Z2	L34	Q13
10005	Z2	L34	Q14
10006	Z2	L34	Q15
10007	Z2	L34	Q16
10008	Z2	L34	Q17
10009	Z2	L34	Q18
10010	Z2	L34	Q19
10011	Z2	L34	Q20
10012	Z2	L34	Q21
10013	Z2	L34	Q22
10014	Z2	L34	Q23
10015	Z2	L34	Q24
10016	Z2	L34	Q25
10017	Z2	L34	Q26
10018	Z2	L34	Q27
10019	Z2	L34	Q28
10020	Z2	L34	Q29
10021	Z2	L34	Q30
10022	Z2	L34	Q31

[Table 1-56]

10023	Z2	L34	Q32
10024	Z2	L34	Q33
10025	Z2	L34	Q34
10026	Z2	L34	Q35
10027	Z2	L34	Q36
10028	Z2	L34	Q37
10029	Z2	L34	Q38
10030	Z2	L34	Q39
10031	Z2	L34	Q40
10032	Z2	L34	Q41
10033	Z2	L34	Q42
10034	Z2	L34	Q43
10035	Z2	L34	Q44
10036	Z2	L34	Q45
10037	Z2	L34	Q46
10038	Z2	L34	Q47
10039	Z2	L34	Q48
10040	Z2	L34	Q49
10041	Z2	L34	Q50
10042	Z2	L34	Q51
10043	Z2	L34	Q52
10044	Z2	L34	Q53
10045	Z2	L34	Q54
10046	Z2	L34	Q55
10047	Z2	L34	Q56
10048	Z2	L34	Q57
10049	Z2	L34	Q58
10050	Z2	L34	Q59
10051	Z2	L34	Q60
10052	Z2	L34	Q61
10053	Z2	L34	Q62
10054	Z2	L34	Q63
10055	Z2	L34	Q64
10056	Z2	L34	Q65
10057	Z2	L34	Q66
10058	Z2	L34	Q67
10059	Z2	L34	Q68
10060	Z2	L34	Q69
10061	Z2	L34	Q70
10062	Z2	L34	Q71
10063	Z2	L34	Q72
10064	Z2	L34	Q73
10065	Z2	L34	Q74
10066	Z2	L34	Q75
10067	Z2	L34	Q76
10068	Z2	L34	Q77
10069	Z2	L34	Q78
10070	Z2	L34	Q79
10071	Z2	L34	Q80
10072	Z2	L34	Q81
10073	Z2	L34	Q82
10074	Z2	L34	Q83
10075	Z2	L34	Q84
10076	Z2	L34	Q85
10077	Z2	L34	Q86
10078	Z2	L34	Q87
10079	Z2	L34	Q88
10080	Z2	L34	Q89
10081	Z2	L34	Q90
10082	Z2	L34	Q91
10083	Z2	L34	Q92
10084	Z2	L34	Q93
10085	Z2	L34	Q94
10086	Z2	L34	Q95
10087	Z2	L34	Q96
10088	Z2	L34	Q97
10089	Z2	L34	Q98
10090	Z2	L34	Q99
10091	Z2	L34	Q100
10092	Z2	L34	Q101
10093	Z2	L34	Q102
10094	Z2	L34	Q103
10095	Z2	L35	Q1
10096	Z2	L35	Q2
10097	Z2	L35	Q3
10098	Z2	L35	Q4
10099	Z2	L35	Q5
10100	Z2	L35	Q6
10101	Z2	L35	Q7
10102	Z2	L35	Q8
10103	Z2	L35	Q9
10104	Z2	L35	Q10
10105	Z2	L35	Q11
10106	Z2	L35	Q12
10107	Z2	L35	Q13
10108	Z2	L35	Q14
10109	Z2	L35	Q15
10110	Z2	L35	Q16
10111	Z2	L35	Q17
10112	Z2	L35	Q18
10113	Z2	L35	Q19
10114	Z2	L35	Q20
10115	Z2	L35	Q21
10116	Z2	L35	Q22
10117	Z2	L35	Q23
10118	Z2	L35	Q24
10119	Z2	L35	Q25
10120	Z2	L35	Q26
10121	Z2	L35	Q27
10122	Z2	L35	Q28
10123	Z2	L35	Q29
10124	Z2	L35	Q30
10125	Z2	L35	Q31
10126	Z2	L35	Q32
10127	Z2	L35	Q33
10128	Z2	L35	Q34
10129	Z2	L35	Q35
10130	Z2	L35	Q36
10131	Z2	L35	Q37
10132	Z2	L35	Q38
10133	Z2	L35	Q39
10134	Z2	L35	Q40
10135	Z2	L35	Q41
10136	Z2	L35	Q42
10137	Z2	L35	Q43
10138	Z2	L35	Q44
10139	Z2	L35	Q45
10140	Z2	L35	Q46
10141	Z2	L35	Q47
10142	Z2	L35	Q48
10143	Z2	L35	Q49
10144	Z2	L35	Q50
10145	Z2	L35	Q51
10146	Z2	L35	Q52
10147	Z2	L35	Q53
10148	Z2	L35	Q54
10149	Z2	L35	Q55
10150	Z2	L35	Q56
10151	Z2	L35	Q57
10152	Z2	L35	Q58
10153	Z2	L35	Q59
10154	Z2	L35	Q60
10155	Z2	L35	Q61
10156	Z2	L35	Q62
10157	Z2	L35	Q63
10158	Z2	L35	Q64
10159	Z2	L35	Q65
10160	Z2	L35	Q66
10161	Z2	L35	Q67
10162	Z2	L35	Q68
10163	Z2	L35	Q69
10164	Z2	L35	Q70
10165	Z2	L35	Q71
10166	Z2	L35	Q72
10167	Z2	L35	Q73
10168	Z2	L35	Q74
10169	Z2	L35	Q75
10170	Z2	L35	Q76
10171	Z2	L35	Q77
10172	Z2	L35	Q78
10173	Z2	L35	Q79
10174	Z2	L35	Q80
10175	Z2	L35	Q81
10176	Z2	L35	Q82
10177	Z2	L35	Q83
10178	Z2	L35	Q84
10179	Z2	L35	Q85
10180	Z2	L35	Q86
10181	Z2	L35	Q87
10182	Z2	L35	Q88
10183	Z2	L35	Q89
10184	Z2	L35	Q90
10185	Z2	L35	Q91
10186	Z2	L35	Q92
10187	Z2	L35	Q93
10188	Z2	L35	Q94
10189	Z2	L35	Q95
10190	Z2	L35	Q96
10191	Z2	L35	Q97
10192	Z2	L35	Q98
10193	Z2	L35	Q99
10194	Z2	L35	Q100
10195	Z2	L35	Q101
10196	Z2	L35	Q102
10197	Z2	L35	Q103
10198	Z2	L36	Q1
10199	Z2	L36	Q2
10200	Z2	L36	Q3
10201	Z2	L36	Q4
10202	Z2	L36	Q5
10203	Z2	L36	Q6
10204	Z2	L36	Q7
10205	Z2	L36	Q8
10206	Z2	L36	Q9
10207	Z2	L36	Q10
10208	Z2	L36	Q11
10209	Z2	L36	Q12
10210	Z2	L36	Q13
10211	Z2	L36	Q14
10212	Z2	L36	Q15
10213	Z2	L36	Q16
10214	Z2	L36	Q17
10215	Z2	L36	Q18
10216	Z2	L36	Q19
10217	Z2	L36	Q20
10218	Z2	L36	Q21
10219	Z2	L36	Q22
10220	Z2	L36	Q23
10221	Z2	L36	Q24
10222	Z2	L36	Q25
10223	Z2	L36	Q26

[Table 1-57]

10224	Z2	L36	Q27
10225	Z2	L36	Q28
10226	Z2	L36	Q29
10227	Z2	L36	Q30
10228	Z2	L36	Q31
10229	Z2	L36	Q32
10230	Z2	L36	Q33
10231	Z2	L36	Q34
10232	Z2	L36	Q35
10233	Z2	L36	Q36
10234	Z2	L36	Q37
10235	Z2	L36	Q38
10236	Z2	L36	Q39
10237	Z2	L36	Q40
10238	Z2	L36	Q41
10239	Z2	L36	Q42
10240	Z2	L36	Q43
10241	Z2	L36	Q44
10242	Z2	L36	Q45
10243	Z2	L36	Q46
10244	Z2	L36	Q47
10245	Z2	L36	Q48
10246	Z2	L36	Q49
10247	Z2	L36	Q50
10248	Z2	L36	Q51
10249	Z2	L36	Q52
10250	Z2	L36	Q53
10251	Z2	L36	Q54
10252	Z2	L36	Q55
10253	Z2	L36	Q56
10254	Z2	L36	Q57
10255	Z2	L36	Q58
10256	Z2	L36	Q59
10257	Z2	L36	Q60
10258	Z2	L36	Q61
10259	Z2	L36	Q62
10260	Z2	L36	Q63
10261	Z2	L36	Q64
10262	Z2	L36	Q65
10263	Z2	L36	Q66
10264	Z2	L36	Q67
10265	Z2	L36	Q68
10266	Z2	L36	Q69
10267	Z2	L36	Q70
10268	Z2	L36	Q71
10269	Z2	L36	Q72
10270	Z2	L36	Q73
10271	Z2	L36	Q74
10272	Z2	L36	Q75
10273	Z2	L36	Q76
10274	Z2	L36	Q77
10275	Z2	L36	Q78
10276	Z2	L36	Q79
10277	Z2	L36	Q80
10278	Z2	L36	Q81
10279	Z2	L36	Q82
10280	Z2	L36	Q83
10281	Z2	L36	Q84
10282	Z2	L36	Q85
10283	Z2	L36	Q86
10284	Z2	L36	Q87
10285	Z2	L36	Q88
10286	Z2	L36	Q89
10287	Z2	L36	Q90
10288	Z2	L36	Q91
10289	Z2	L36	Q92
10290	Z2	L36	Q93
10291	Z2	L36	Q94
10292	Z2	L36	Q95
10293	Z2	L36	Q96
10294	Z2	L36	Q97
10295	Z2	L36	Q98
10296	Z2	L36	Q99
10297	Z2	L36	Q100
10298	Z2	L36	Q101
10299	Z2	L36	Q102
10300	Z2	L36	Q103
10301	Z3	L15	Q1
10302	Z3	L15	Q2
10303	Z3	L15	Q3
10304	Z3	L15	Q4
10305	Z3	L15	Q5
10306	Z3	L15	Q6
10307	Z3	L15	Q7
10308	Z3	L15	Q8
10309	Z3	L15	Q9
10310	Z3	L15	Q10
10311	Z3	L15	Q11
10312	Z3	L15	Q12
10313	Z3	L15	Q13
10314	Z3	L15	Q14
10315	Z3	L15	Q15
10316	Z3	L15	Q16
10317	Z3	L15	Q17
10318	Z3	L15	Q18
10319	Z3	L15	Q19
10320	Z3	L15	Q20
10321	Z3	L15	Q21
10322	Z3	L15	Q22
10323	Z3	L15	Q23
10324	Z3	L15	Q24
10325	Z3	L15	Q25
10326	Z3	L15	Q26
10327	Z3	L15	Q27
10328	Z3	L15	Q28
10329	Z3	L15	Q29
10330	Z3	L15	Q30
10331	Z3	L15	Q31
10332	Z3	L15	Q32
10333	Z3	L15	Q33
10334	Z3	L15	Q34
10335	Z3	L15	Q35
10336	Z3	L15	Q36
10337	Z3	L15	Q37
10338	Z3	L15	Q38
10339	Z3	L15	Q39
10340	Z3	L15	Q40
10341	Z3	L15	Q41
10342	Z3	L15	Q42
10343	Z3	L15	Q43
10344	Z3	L15	Q44
10345	Z3	L15	Q45
10346	Z3	L15	Q46
10347	Z3	L15	Q47
10348	Z3	L15	Q48
10349	Z3	L15	Q49
10350	Z3	L15	Q50
10351	Z3	L15	Q51
10352	Z3	L15	Q52
10353	Z3	L15	Q53
10354	Z3	L15	Q54
10355	Z3	L15	Q55
10356	Z3	L15	Q56
10357	Z3	L15	Q57
10358	Z3	L15	Q58
10359	Z3	L15	Q59
10360	Z3	L15	Q60
10361	Z3	L15	Q61
10362	Z3	L15	Q62
10363	Z3	L15	Q63
10364	Z3	L15	Q64
10365	Z3	L15	Q65
10366	Z3	L15	Q66
10367	Z3	L15	Q67
10368	Z3	L15	Q68
10369	Z3	L15	Q69
10370	Z3	L15	Q70
10371	Z3	L15	Q71
10372	Z3	L15	Q72
10373	Z3	L15	Q73
10374	Z3	L15	Q74
10375	Z3	L15	Q75
10376	Z3	L15	Q76
10377	Z3	L15	Q77
10378	Z3	L15	Q78
10379	Z3	L15	Q79
10380	Z3	L15	Q80
10381	Z3	L15	Q81
10382	Z3	L15	Q82
10383	Z3	L15	Q83
10384	Z3	L15	Q84
10385	Z3	L15	Q85
10386	Z3	L15	Q86
10387	Z3	L15	Q87
10388	Z3	L15	Q88
10389	Z3	L15	Q89
10390	Z3	L15	Q90
10391	Z3	L15	Q91
10392	Z3	L15	Q92
10393	Z3	L15	Q93
10394	Z3	L15	Q94
10395	Z3	L15	Q95
10396	Z3	L15	Q96
10397	Z3	L15	Q97
10398	Z3	L15	Q98
10399	Z3	L15	Q99
10400	Z3	L15	Q100
10401	Z3	L15	Q101
10402	Z3	L15	Q102
10403	Z3	L15	Q103
10404	Z3	L16	Q1
10405	Z3	L16	Q2
10406	Z3	L16	Q3
10407	Z3	L16	Q4
10408	Z3	L16	Q5
10409	Z3	L16	Q6
10410	Z3	L16	Q7
10411	Z3	L16	Q8
10412	Z3	L16	Q9
10413	Z3	L16	Q10
10414	Z3	L16	Q11
10415	Z3	L16	Q12
10416	Z3	L16	Q13
10417	Z3	L16	Q14
10418	Z3	L16	Q15
10419	Z3	L16	Q16
10420	Z3	L16	Q17
10421	Z3	L16	Q18
10422	Z3	L16	Q19
10423	Z3	L16	Q20
10424	Z3	L16	Q21

[Table 1-58]

10425	Z3	L16	Q22
10426	Z3	L16	Q23
10427	Z3	L16	Q24
10428	Z3	L16	Q25
10429	Z3	L16	Q26
10430	Z3	L16	Q27
10431	Z3	L16	Q28
10432	Z3	L16	Q29
10433	Z3	L16	Q30
10434	Z3	L16	Q31
10435	Z3	L16	Q32
10436	Z3	L16	Q33
10437	Z3	L16	Q34
10438	Z3	L16	Q35
10439	Z3	L16	Q36
10440	Z3	L16	Q37
10441	Z3	L16	Q38
10442	Z3	L16	Q39
10443	Z3	L16	Q40
10444	Z3	L16	Q41
10445	Z3	L16	Q42
10446	Z3	L16	Q43
10447	Z3	L16	Q44
10448	Z3	L16	Q45
10449	Z3	L16	Q46
10450	Z3	L16	Q47
10451	Z3	L16	Q48
10452	Z3	L16	Q49
10453	Z3	L16	Q50
10454	Z3	L16	Q51
10455	Z3	L16	Q52
10456	Z3	L16	Q53
10457	Z3	L16	Q54
10458	Z3	L16	Q55
10459	Z3	L16	Q56
10460	Z3	L16	Q57
10461	Z3	L16	Q58
10462	Z3	L16	Q59
10463	Z3	L16	Q60
10464	Z3	L16	Q61
10465	Z3	L16	Q62
10466	Z3	L16	Q63
10467	Z3	L16	Q64
10468	Z3	L16	Q65
10469	Z3	L16	Q66
10470	Z3	L16	Q67
10471	Z3	L16	Q68
10472	Z3	L16	Q69
10473	Z3	L16	Q70
10474	Z3	L16	Q71
10475	Z3	L16	Q72
10476	Z3	L16	Q73
10477	Z3	L16	Q74
10478	Z3	L16	Q75
10479	Z3	L16	Q76
10480	Z3	L16	Q77
10481	Z3	L16	Q78
10482	Z3	L16	Q79
10483	Z3	L16	Q80
10484	Z3	L16	Q81
10485	Z3	L16	Q82
10486	Z3	L16	Q83
10487	Z3	L16	Q84
10488	Z3	L16	Q85
10489	Z3	L16	Q86
10490	Z3	L16	Q87
10491	Z3	L16	Q88
10492	Z3	L16	Q89
10493	Z3	L16	Q90
10494	Z3	L16	Q91
10495	Z3	L16	Q92
10496	Z3	L16	Q93
10497	Z3	L16	Q94
10498	Z3	L16	Q95
10499	Z3	L16	Q96
10500	Z3	L16	Q97
10501	Z3	L16	Q98
10502	Z3	L16	Q99
10503	Z3	L16	Q100
10504	Z3	L16	Q101
10505	Z3	L16	Q102
10506	Z3	L16	Q103
10507	Z3	L17	Q1
10508	Z3	L17	Q2
10509	Z3	L17	Q3
10510	Z3	L17	Q4
10511	Z3	L17	Q5
10512	Z3	L17	Q6
10513	Z3	L17	Q7
10514	Z3	L17	Q8
10515	Z3	L17	Q9
10516	Z3	L17	Q10
10517	Z3	L17	Q11
10518	Z3	L17	Q12
10519	Z3	L17	Q13
10520	Z3	L17	Q14
10521	Z3	L17	Q15
10522	Z3	L17	Q16
10523	Z3	L17	Q17
10524	Z3	L17	Q18
10525	Z3	L17	Q19
10526	Z3	L17	Q20
10527	Z3	L17	Q21
10528	Z3	L17	Q22
10529	Z3	L17	Q23
10530	Z3	L17	Q24
10531	Z3	L17	Q25
10532	Z3	L17	Q26
10533	Z3	L17	Q27
10534	Z3	L17	Q28
10535	Z3	L17	Q29
10536	Z3	L17	Q30
10537	Z3	L17	Q31
10538	Z3	L17	Q32
10539	Z3	L17	Q33
10540	Z3	L17	Q34
10541	Z3	L17	Q35
10542	Z3	L17	Q36
10543	Z3	L17	Q37
10544	Z3	L17	Q38
10545	Z3	L17	Q39
10546	Z3	L17	Q40
10547	Z3	L17	Q41
10548	Z3	L17	Q42
10549	Z3	L17	Q43
10550	Z3	L17	Q44
10551	Z3	L17	Q45
10552	Z3	L17	Q46
10553	Z3	L17	Q47
10554	Z3	L17	Q48
10555	Z3	L17	Q49
10556	Z3	L17	Q50
10557	Z3	L17	Q51
10558	Z3	L17	Q52
10559	Z3	L17	Q53
10560	Z3	L17	Q54
10561	Z3	L17	Q55
10562	Z3	L17	Q56
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10574	Z3	L17	Q68
10575	Z3	L17	Q69
10576	Z3	L17	Q70
10577	Z3	L17	Q71
10578	Z3	L17	Q72
10579	Z3	L17	Q73
10580	Z3	L17	Q74
10581	Z3	L17	Q75
10582	Z3	L17	Q76
10583	Z3	L17	Q77
10584	Z3	L17	Q78
10585	Z3	L17	Q79
10586	Z3	L17	Q80
10587	Z3	L17	Q81
10588	Z3	L17	Q82
10589	Z3	L17	Q83
10590	Z3	L17	Q84
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10592	Z3	L17	Q86
10593	Z3	L17	Q87
10594	Z3	L17	Q88
10595	Z3	L17	Q89
10596	Z3	L17	Q90
10597	Z3	L17	Q91
10598	Z3	L17	Q92
10599	Z3	L17	Q93
10600	Z3	L17	Q94
10601	Z3	L17	Q95
10602	Z3	L17	Q96
10603	Z3	L17	Q97
10604	Z3	L17	Q98
10605	Z3	L17	Q99
10606	Z3	L17	Q100
10607	Z3	L17	Q101
10608	Z3	L17	Q102
10609	Z3	L17	Q103
10610	Z3	L18	Q1
10611	Z3	L18	Q2
10612	Z3	L18	Q3
10613	Z3	L18	Q4
10614	Z3	L18	Q5
10615	Z3	L18	Q6
10616	Z3	L18	Q7
10617	Z3	L18	Q8
10618	Z3	L18	Q9
10619	Z3	L18	Q10
10620	Z3	L18	Q11
10621	Z3	L18	Q12
10622	Z3	L18	Q13
10623	Z3	L18	Q14
10624	Z3	L18	Q15
10625	Z3	L18	Q16

[Table 1-59]

10626	Z3	L18	Q17
10627	Z3	L18	Q18
10628	Z3	L18	Q19
10629	Z3	L18	Q20
10630	Z3	L18	Q21
10631	Z3	L18	Q22
10632	Z3	L18	Q23
10633	Z3	L18	Q24
10634	Z3	L18	Q25
10635	Z3	L18	Q26
10636	Z3	L18	Q27
10637	Z3	L18	Q28
10638	Z3	L18	Q29
10639	Z3	L18	Q30
10640	Z3	L18	Q31
10641	Z3	L18	Q32
10642	Z3	L18	Q33
10643	Z3	L18	Q34
10644	Z3	L18	Q35
10645	Z3	L18	Q36
10646	Z3	L18	Q37
10647	Z3	L18	Q38
10648	Z3	L18	Q39
10649	Z3	L18	Q40
10650	Z3	L18	Q41
10651	Z3	L18	Q42
10652	Z3	L18	Q43
10653	Z3	L18	Q44
10654	Z3	L18	Q45
10655	Z3	L18	Q46
10656	Z3	L18	Q47
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10658	Z3	L18	Q49
10659	Z3	L18	Q50
10660	Z3	L18	Q51
10661	Z3	L18	Q52
10662	Z3	L18	Q53
10663	Z3	L18	Q54
10664	Z3	L18	Q55
10665	Z3	L18	Q56
10666	Z3	L18	Q57
10667	Z3	L18	Q58
10668	Z3	L18	Q59
10669	Z3	L18	Q60
10670	Z3	L18	Q61
10671	Z3	L18	Q62
10672	Z3	L18	Q63
10673	Z3	L18	Q64
10674	Z3	L18	Q65
10675	Z3	L18	Q66
10676	Z3	L18	Q67
10677	Z3	L18	Q68
10678	Z3	L18	Q69
10679	Z3	L18	Q70
10680	Z3	L18	Q71
10681	Z3	L18	Q72
10682	Z3	L18	Q73
10683	Z3	L18	Q74
10684	Z3	L18	Q75
10685	Z3	L18	Q76
10686	Z3	L18	Q77
10687	Z3	L18	Q78
10688	Z3	L18	Q79
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10691	Z3	L18	Q82
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10694	Z3	L18	Q85
10695	Z3	L18	Q86
10696	Z3	L18	Q87
10697	Z3	L18	Q88
10698	Z3	L18	Q89
10699	Z3	L18	Q90
10700	Z3	L18	Q91
10701	Z3	L18	Q92
10702	Z3	L18	Q93
10703	Z3	L18	Q94
10704	Z3	L18	Q95
10705	Z3	L18	Q96
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10717	Z3	L19	Q5
10718	Z3	L19	Q6
10719	Z3	L19	Q7
10720	Z3	L19	Q8
10721	Z3	L19	Q9
10722	Z3	L19	Q10
10723	Z3	L19	Q11
10724	Z3	L19	Q12
10725	Z3	L19	Q13
10726	Z3	L19	Q14
10727	Z3	L19	Q15
10728	Z3	L19	Q16
10729	Z3	L19	Q17
10730	Z3	L19	Q18
10731	Z3	L19	Q19
10732	Z3	L19	Q20
10733	Z3	L19	Q21
10734	Z3	L19	Q22
10735	Z3	L19	Q23
10736	Z3	L19	Q24
10737	Z3	L19	Q25
10738	Z3	L19	Q26
10739	Z3	L19	Q27
10740	Z3	L19	Q28
10741	Z3	L19	Q29
10742	Z3	L19	Q30
10743	Z3	L19	Q31
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10757	Z3	L19	Q45
10758	Z3	L19	Q46
10759	Z3	L19	Q47
10760	Z3	L19	Q48
10761	Z3	L19	Q49
10762	Z3	L19	Q50
10763	Z3	L19	Q51
10764	Z3	L19	Q52
10765	Z3	L19	Q53
10766	Z3	L19	Q54
10767	Z3	L19	Q55
10768	Z3	L19	Q56
10769	Z3	L19	Q57
10770	Z3	L19	Q58
10771	Z3	L19	Q59
10772	Z3	L19	Q60
10773	Z3	L19	Q61
10774	Z3	L19	Q62
10775	Z3	L19	Q63
10776	Z3	L19	Q64
10777	Z3	L19	Q65
10778	Z3	L19	Q66
10779	Z3	L19	Q67
10780	Z3	L19	Q68
10781	Z3	L19	Q69
10782	Z3	L19	Q70
10783	Z3	L19	Q71
10784	Z3	L19	Q72
10785	Z3	L19	Q73
10786	Z3	L19	Q74
10787	Z3	L19	Q75
10788	Z3	L19	Q76
10789	Z3	L19	Q77
10790	Z3	L19	Q78
10791	Z3	L19	Q79
10792	Z3	L19	Q80
10793	Z3	L19	Q81
10794	Z3	L19	Q82
10795	Z3	L19	Q83
10796	Z3	L19	Q84
10797	Z3	L19	Q85
10798	Z3	L19	Q86
10799	Z3	L19	Q87
10800	Z3	L19	Q88
10801	Z3	L19	Q89
10802	Z3	L19	Q90
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10806	Z3	L19	Q94
10807	Z3	L19	Q95
10808	Z3	L19	Q96
10809	Z3	L19	Q97
10810	Z3	L19	Q98
10811	Z3	L19	Q99
10812	Z3	L19	Q100
10813	Z3	L19	Q101
10814	Z3	L19	Q102
10815	Z3	L19	Q103
10816	Z3	L20	Q1
10817	Z3	L20	Q2
10818	Z3	L20	Q3
10819	Z3	L20	Q4
10820	Z3	L20	Q5
10821	Z3	L20	Q6
10822	Z3	L20	Q7
10823	Z3	L20	Q8
10824	Z3	L20	Q9
10825	Z3	L20	Q10
10826	Z3	L20	Q11

[Table 1-60]

10827	Z3	L20	Q12
10828	Z3	L20	Q13
10829	Z3	L20	Q14
10830	Z3	L20	Q15
10831	Z3	L20	Q16
10832	Z3	L20	Q17
10833	Z3	L20	Q18
10834	Z3	L20	Q19
10835	Z3	L20	Q20
10836	Z3	L20	Q21
10837	Z3	L20	Q22
10838	Z3	L20	Q23
10839	Z3	L20	Q24
10840	Z3	L20	Q25
10841	Z3	L20	Q26
10842	Z3	L20	Q27
10843	Z3	L20	Q28
10844	Z3	L20	Q29
10845	Z3	L20	Q30
10846	Z3	L20	Q31
10847	Z3	L20	Q32
10848	Z3	L20	Q33
10849	Z3	L20	Q34
10850	Z3	L20	Q35
10851	Z3	L20	Q36
10852	Z3	L20	Q37
10853	Z3	L20	Q38
10854	Z3	L20	Q39
10855	Z3	L20	Q40
10856	Z3	L20	Q41
10857	Z3	L20	Q42
10858	Z3	L20	Q43
10859	Z3	L20	Q44
10860	Z3	L20	Q45
10861	Z3	L20	Q46
10862	Z3	L20	Q47
10863	Z3	L20	Q48
10864	Z3	L20	Q49
10865	Z3	L20	Q50
10866	Z3	L20	Q51
10867	Z3	L20	Q52
10868	Z3	L20	Q53
10869	Z3	L20	Q54
10870	Z3	L20	Q55
10871	Z3	L20	Q56
10872	Z3	L20	Q57
10873	Z3	L20	Q58
10874	Z3	L20	Q59
10875	Z3	L20	Q60
10876	Z3	L20	Q61
10877	Z3	L20	Q62
10878	Z3	L20	Q63
10879	Z3	L20	Q64
10880	Z3	L20	Q65
10881	Z3	L20	Q66
10882	Z3	L20	Q67
10883	Z3	L20	Q68
10884	Z3	L20	Q69
10885	Z3	L20	Q70
10886	Z3	L20	Q71
10887	Z3	L20	Q72
10888	Z3	L20	Q73
10889	Z3	L20	Q74
10890	Z3	L20	Q75
10891	Z3	L20	Q76
10892	Z3	L20	Q77
10893	Z3	L20	Q78
10894	Z3	L20	Q79
10895	Z3	L20	Q80
10896	Z3	L20	Q81
10897	Z3	L20	Q82
10898	Z3	L20	Q83
10899	Z3	L20	Q84
10900	Z3	L20	Q85
10901	Z3	L20	Q86
10902	Z3	L20	Q87
10903	Z3	L20	Q88
10904	Z3	L20	Q89
10905	Z3	L20	Q90
10906	Z3	L20	Q91
10907	Z3	L20	Q92
10908	Z3	L20	Q93
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10913	Z3	L20	Q98
10914	Z3	L20	Q99
10915	Z3	L20	Q100
10916	Z3	L20	Q101
10917	Z3	L20	Q102
10918	Z3	L20	Q103
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10920	Z3	L21	Q2
10921	Z3	L21	Q3
10922	Z3	L21	Q4
10923	Z3	L21	Q5
10924	Z3	L21	Q6
10925	Z3	L21	Q7
10926	Z3	L21	Q8
10927	Z3	L21	Q9
10928	Z3	L21	Q10
10929	Z3	L21	Q11
10930	Z3	L21	Q12
10931	Z3	L21	Q13
10932	Z3	L21	Q14
10933	Z3	L21	Q15
10934	Z3	L21	Q16
10935	Z3	L21	Q17
10936	Z3	L21	Q18
10937	Z3	L21	Q19
10938	Z3	L21	Q20
10939	Z3	L21	Q21
10940	Z3	L21	Q22
10941	Z3	L21	Q23
10942	Z3	L21	Q24
10943	Z3	L21	Q25
10944	Z3	L21	Q26
10945	Z3	L21	Q27
10946	Z3	L21	Q28
10947	Z3	L21	Q29
10948	Z3	L21	Q30
10949	Z3	L21	Q31
10950	Z3	L21	Q32
10951	Z3	L21	Q33
10952	Z3	L21	Q34
10953	Z3	L21	Q35
10954	Z3	L21	Q36
10955	Z3	L21	Q37
10956	Z3	L21	Q38
10957	Z3	L21	Q39
10958	Z3	L21	Q40
10959	Z3	L21	Q41
10960	Z3	L21	Q42
10961	Z3	L21	Q43
10962	Z3	L21	Q44
10963	Z3	L21	Q45
10964	Z3	L21	Q46
10965	Z3	L21	Q47
10966	Z3	L21	Q48
10967	Z3	L21	Q49
10968	Z3	L21	Q50
10969	Z3	L21	Q51
10970	Z3	L21	Q52
10971	Z3	L21	Q53
10972	Z3	L21	Q54
10973	Z3	L21	Q55
10974	Z3	L21	Q56
10975	Z3	L21	Q57
10976	Z3	L21	Q58
10977	Z3	L21	Q59
10978	Z3	L21	Q60
10979	Z3	L21	Q61
10980	Z3	L21	Q62
10981	Z3	L21	Q63
10982	Z3	L21	Q64
10983	Z3	L21	Q65
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10985	Z3	L21	Q67
10986	Z3	L21	Q68
10987	Z3	L21	Q69
10988	Z3	L21	Q70
10989	Z3	L21	Q71
10990	Z3	L21	Q72
10991	Z3	L21	Q73
10992	Z3	L21	Q74
10993	Z3	L21	Q75
10994	Z3	L21	Q76
10995	Z3	L21	Q77
10996	Z3	L21	Q78
10997	Z3	L21	Q79
10998	Z3	L21	Q80
10999	Z3	L21	Q81
11000	Z3	L21	Q82
11001	Z3	L21	Q83
11002	Z3	L21	Q84
11003	Z3	L21	Q85
11004	Z3	L21	Q86
11005	Z3	L21	Q87
11006	Z3	L21	Q88
11007	Z3	L21	Q89
11008	Z3	L21	Q90
11009	Z3	L21	Q91
11010	Z3	L21	Q92
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11016	Z3	L21	Q98
11017	Z3	L21	Q99
11018	Z3	L21	Q100
11019	Z3	L21	Q101
11020	Z3	L21	Q102
11021	Z3	L21	Q103
11022	Z3	L22	Q1
11023	Z3	L22	Q2
11024	Z3	L22	Q3
11025	Z3	L22	Q4
11026	Z3	L22	Q5
11027	Z3	L22	Q6

[Table 1-61]

11028	Z3	L22	Q7
11029	Z3	L22	Q8
11030	Z3	L22	Q9
11031	Z3	L22	Q10
11032	Z3	L22	Q11
11033	Z3	L22	Q12
11034	Z3	L22	Q13
11035	Z3	L22	Q14
11036	Z3	L22	Q15
11037	Z3	L22	Q16
11038	Z3	L22	Q17
11039	Z3	L22	Q18
11040	Z3	L22	Q19
11041	Z3	L22	Q20
11042	Z3	L22	Q21
11043	Z3	L22	Q22
11044	Z3	L22	Q23
11045	Z3	L22	Q24
11046	Z3	L22	Q25
11047	Z3	L22	Q26
11048	Z3	L22	Q27
11049	Z3	L22	Q28
11050	Z3	L22	Q29
11051	Z3	L22	Q30
11052	Z3	L22	Q31
11053	Z3	L22	Q32
11054	Z3	L22	Q33
11055	Z3	L22	Q34
11056	Z3	L22	Q35
11057	Z3	L22	Q36
11058	Z3	L22	Q37
11059	Z3	L22	Q38
11060	Z3	L22	Q39
11061	Z3	L22	Q40
11062	Z3	L22	Q41
11063	Z3	L22	Q42
11064	Z3	L22	Q43
11065	Z3	L22	Q44
11066	Z3	L22	Q45
11067	Z3	L22	Q46
11068	Z3	L22	Q47
11069	Z3	L22	Q48
11070	Z3	L22	Q49
11071	Z3	L22	Q50
11072	Z3	L22	Q51
11073	Z3	L22	Q52
11074	Z3	L22	Q53
11075	Z3	L22	Q54
11076	Z3	L22	Q55
11077	Z3	L22	Q56
11078	Z3	L22	Q57
11079	Z3	L22	Q58
11080	Z3	L22	Q59
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11082	Z3	L22	Q61
11083	Z3	L22	Q62
11084	Z3	L22	Q63
11085	Z3	L22	Q64
11086	Z3	L22	Q65
11087	Z3	L22	Q66
11088	Z3	L22	Q67
11089	Z3	L22	Q68
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11091	Z3	L22	Q70
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11094	Z3	L22	Q73
11095	Z3	L22	Q74
11096	Z3	L22	Q75
11097	Z3	L22	Q76
11098	Z3	L22	Q77
11099	Z3	L22	Q78
11100	Z3	L22	Q79
11101	Z3	L22	Q80
11102	Z3	L22	Q81
11103	Z3	L22	Q82
11104	Z3	L22	Q83
11105	Z3	L22	Q84
11106	Z3	L22	Q85
11107	Z3	L22	Q86
11108	Z3	L22	Q87
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11111	Z3	L22	Q90
11112	Z3	L22	Q91
11113	Z3	L22	Q92
11114	Z3	L22	Q93
11115	Z3	L22	Q94
11116	Z3	L22	Q95
11117	Z3	L22	Q96
11118	Z3	L22	Q97
11119	Z3	L22	Q98
11120	Z3	L22	Q99
11121	Z3	L22	Q100
11122	Z3	L22	Q101
11123	Z3	L22	Q102
11124	Z3	L22	Q103
11125	Z3	L23	Q1
11126	Z3	L23	Q2
11127	Z3	L23	Q3
11128	Z3	L23	Q4
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11130	Z3	L23	Q6
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11145	Z3	L23	Q21
11146	Z3	L23	Q22
11147	Z3	L23	Q23
11148	Z3	L23	Q24
11149	Z3	L23	Q25
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11151	Z3	L23	Q27
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11155	Z3	L23	Q31
11156	Z3	L23	Q32
11157	Z3	L23	Q33
11158	Z3	L23	Q34
11159	Z3	L23	Q35
11160	Z3	L23	Q36
11161	Z3	L23	Q37
11162	Z3	L23	Q38
11163	Z3	L23	Q39
11164	Z3	L23	Q40
11165	Z3	L23	Q41
11166	Z3	L23	Q42
11167	Z3	L23	Q43
11168	Z3	L23	Q44
11169	Z3	L23	Q45
11170	Z3	L23	Q46
11171	Z3	L23	Q47
11172	Z3	L23	Q48
11173	Z3	L23	Q49
11174	Z3	L23	Q50
11175	Z3	L23	Q51
11176	Z3	L23	Q52
11177	Z3	L23	Q53
11178	Z3	L23	Q54
11179	Z3	L23	Q55
11180	Z3	L23	Q56
11181	Z3	L23	Q57
11182	Z3	L23	Q58
11183	Z3	L23	Q59
11184	Z3	L23	Q60
11185	Z3	L23	Q61
11186	Z3	L23	Q62
11187	Z3	L23	Q63
11188	Z3	L23	Q64
11189	Z3	L23	Q65
11190	Z3	L23	Q66
11191	Z3	L23	Q67
11192	Z3	L23	Q68
11193	Z3	L23	Q69
11194	Z3	L23	Q70
11195	Z3	L23	Q71
11196	Z3	L23	Q72
11197	Z3	L23	Q73
11198	Z3	L23	Q74
11199	Z3	L23	Q75
11200	Z3	L23	Q76
11201	Z3	L23	Q77
11202	Z3	L23	Q78
11203	Z3	L23	Q79
11204	Z3	L23	Q80
11205	Z3	L23	Q81
11206	Z3	L23	Q82
11207	Z3	L23	Q83
11208	Z3	L23	Q84
11209	Z3	L23	Q85
11210	Z3	L23	Q86
11211	Z3	L23	Q87
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11213	Z3	L23	Q89
11214	Z3	L23	Q90
11215	Z3	L23	Q91
11216	Z3	L23	Q92
11217	Z3	L23	Q93
11218	Z3	L23	Q94
11219	Z3	L23	Q95
11220	Z3	L23	Q96
11221	Z3	L23	Q97
11222	Z3	L23	Q98
11223	Z3	L23	Q99
11224	Z3	L23	Q100
11225	Z3	L23	Q101
11226	Z3	L23	Q102
11227	Z3	L23	Q103
11228	Z3	L24	Q1

[Table 1-62]

11229	Z3	L24	Q2
11230	Z3	L24	Q3
11231	Z3	L24	Q4
11232	Z3	L24	Q5
11233	Z3	L24	Q6
11234	Z3	L24	Q7
11235	Z3	L24	Q8
11236	Z3	L24	Q9
11237	Z3	L24	Q10
11238	Z3	L24	Q11
11239	Z3	L24	Q12
11240	Z3	L24	Q13
11241	Z3	L24	Q14
11242	Z3	L24	Q15
11243	Z3	L24	Q16
11244	Z3	L24	Q17
11245	Z3	L24	Q18
11246	Z3	L24	Q19
11247	Z3	L24	Q20
11248	Z3	L24	Q21
11249	Z3	L24	Q22
11250	Z3	L24	Q23
11251	Z3	L24	Q24
11252	Z3	L24	Q25
11253	Z3	L24	Q26
11254	Z3	L24	Q27
11255	Z3	L24	Q28
11256	Z3	L24	Q29
11257	Z3	L24	Q30
11258	Z3	L24	Q31
11259	Z3	L24	Q32
11260	Z3	L24	Q33
11261	Z3	L24	Q34
11262	Z3	L24	Q35
11263	Z3	L24	Q36
11264	Z3	L24	Q37
11265	Z3	L24	Q38
11266	Z3	L24	Q39
11267	Z3	L24	Q40
11268	Z3	L24	Q41
11269	Z3	L24	Q42
11270	Z3	L24	Q43
11271	Z3	L24	Q44
11272	Z3	L24	Q45
11273	Z3	L24	Q46
11274	Z3	L24	Q47
11275	Z3	L24	Q48
11276	Z3	L24	Q49
11277	Z3	L24	Q50
11278	Z3	L24	Q51
11279	Z3	L24	Q52
11280	Z3	L24	Q53
11281	Z3	L24	Q54
11282	Z3	L24	Q55
11283	Z3	L24	Q56
11284	Z3	L24	Q57
11285	Z3	L24	Q58
11286	Z3	L24	Q59
11287	Z3	L24	Q60
11288	Z3	L24	Q61
11289	Z3	L24	Q62
11290	Z3	L24	Q63
11291	Z3	L24	Q64
11292	Z3	L24	Q65
11293	Z3	L24	Q66
11294	Z3	L24	Q67
11295	Z3	L24	Q68
11296	Z3	L24	Q69
11297	Z3	L24	Q70
11298	Z3	L24	Q71
11299	Z3	L24	Q72
11300	Z3	L24	Q73
11301	Z3	L24	Q74
11302	Z3	L24	Q75
11303	Z3	L24	Q76
11304	Z3	L24	Q77
11305	Z3	L24	Q78
11306	Z3	L24	Q79
11307	Z3	L24	Q80
11308	Z3	L24	Q81
11309	Z3	L24	Q82
11310	Z3	L24	Q83
11311	Z3	L24	Q84
11312	Z3	L24	Q85
11313	Z3	L24	Q86
11314	Z3	L24	Q87
11315	Z3	L24	Q88
11316	Z3	L24	Q89
11317	Z3	L24	Q90
11318	Z3	L24	Q91
11319	Z3	L24	Q92
11320	Z3	L24	Q93
11321	Z3	L24	Q94
11322	Z3	L24	Q95
11323	Z3	L24	Q96
11324	Z3	L24	Q97
11325	Z3	L24	Q98
11326	Z3	L24	Q99
11327	Z3	L24	Q100
11328	Z3	L24	Q101
11329	Z3	L24	Q102
11330	Z3	L24	Q103
11331	Z3	L25	Q1
11332	Z3	L25	Q2
11333	Z3	L25	Q3
11334	Z3	L25	Q4
11335	Z3	L25	Q5
11336	Z3	L25	Q6
11337	Z3	L25	Q7
11338	Z3	L25	Q8
11339	Z3	L25	Q9
11340	Z3	L25	Q10
11341	Z3	L25	Q11
11342	Z3	L25	Q12
11343	Z3	L25	Q13
11344	Z3	L25	Q14
11345	Z3	L25	Q15
11346	Z3	L25	Q16
11347	Z3	L25	Q17
11348	Z3	L25	Q18
11349	Z3	L25	Q19
11350	Z3	L25	Q20
11351	Z3	L25	Q21
11352	Z3	L25	Q22
11353	Z3	L25	Q23
11354	Z3	L25	Q24
11355	Z3	L25	Q25
11356	Z3	L25	Q26
11357	Z3	L25	Q27
11358	Z3	L25	Q28
11359	Z3	L25	Q29
11360	Z3	L25	Q30
11361	Z3	L25	Q31
11362	Z3	L25	Q32
11363	Z3	L25	Q33
11364	Z3	L25	Q34
11365	Z3	L25	Q35
11366	Z3	L25	Q36
11367	Z3	L25	Q37
11368	Z3	L25	Q38
11369	Z3	L25	Q39
11370	Z3	L25	Q40
11371	Z3	L25	Q41
11372	Z3	L25	Q42
11373	Z3	L25	Q43
11374	Z3	L25	Q44
11375	Z3	L25	Q45
11376	Z3	L25	Q46
11377	Z3	L25	Q47
11378	Z3	L25	Q48
11379	Z3	L25	Q49
11380	Z3	L25	Q50
11381	Z3	L25	Q51
11382	Z3	L25	Q52
11383	Z3	L25	Q53
11384	Z3	L25	Q54
11385	Z3	L25	Q55
11386	Z3	L25	Q56
11387	Z3	L25	Q57
11388	Z3	L25	Q58
11389	Z3	L25	Q59
11390	Z3	L25	Q60
11391	Z3	L25	Q61
11392	Z3	L25	Q62
11393	Z3	L25	Q63
11394	Z3	L25	Q64
11395	Z3	L25	Q65
11396	Z3	L25	Q66
11397	Z3	L25	Q67
11398	Z3	L25	Q68
11399	Z3	L25	Q69
11400	Z3	L25	Q70
11401	Z3	L25	Q71
11402	Z3	L25	Q72
11403	Z3	L25	Q73
11404	Z3	L25	Q74
11405	Z3	L25	Q75
11406	Z3	L25	Q76
11407	Z3	L25	Q77
11408	Z3	L25	Q78
11409	Z3	L25	Q79
11410	Z3	L25	Q80
11411	Z3	L25	Q81
11412	Z3	L25	Q82
11413	Z3	L25	Q83
11414	Z3	L25	Q84
11415	Z3	L25	Q85
11416	Z3	L25	Q86
11417	Z3	L25	Q87
11418	Z3	L25	Q88
11419	Z3	L25	Q89
11420	Z3	L25	Q90
11421	Z3	L25	Q91
11422	Z3	L25	Q92
11423	Z3	L25	Q93
11424	Z3	L25	Q94
11425	Z3	L25	Q95
11426	Z3	L25	Q96
11427	Z3	L25	Q97
11428	Z3	L25	Q98
11429	Z3	L25	Q99

[Table 1-63]

11430	Z3	L25	Q100
11431	Z3	L25	Q101
11432	Z3	L25	Q102
11433	Z3	L25	Q103
11434	Z3	L26	Q1
11435	Z3	L26	Q2
11436	Z3	L26	Q3
11437	Z3	L26	Q4
11438	Z3	L26	Q5
11439	Z3	L26	Q6
11440	Z3	L26	Q7
11441	Z3	L26	Q8
11442	Z3	L26	Q9
11443	Z3	L26	Q10
11444	Z3	L26	Q11
11445	Z3	L26	Q12
11446	Z3	L26	Q13
11447	Z3	L26	Q14
11448	Z3	L26	Q15
11449	Z3	L26	Q16
11450	Z3	L26	Q17
11451	Z3	L26	Q18
11452	Z3	L26	Q19
11453	Z3	L26	Q20
11454	Z3	L26	Q21
11455	Z3	L26	Q22
11456	Z3	L26	Q23
11457	Z3	L26	Q24
11458	Z3	L26	Q25
11459	Z3	L26	Q26
11460	Z3	L26	Q27
11461	Z3	L26	Q28
11462	Z3	L26	Q29
11463	Z3	L26	Q30
11464	Z3	L26	Q31
11465	Z3	L26	Q32
11466	Z3	L26	Q33
11467	Z3	L26	Q34
11468	Z3	L26	Q35
11469	Z3	L26	Q36
11470	Z3	L26	Q37
11471	Z3	L26	Q38
11472	Z3	L26	Q39
11473	Z3	L26	Q40
11474	Z3	L26	Q41
11475	Z3	L26	Q42
11476	Z3	L26	Q43
11477	Z3	L26	Q44
11478	Z3	L26	Q45
11479	Z3	L26	Q46
11480	Z3	L26	Q47
11481	Z3	L26	Q48
11482	Z3	L26	Q49
11483	Z3	L26	Q50
11484	Z3	L26	Q51
11485	Z3	L26	Q52
11486	Z3	L26	Q53
11487	Z3	L26	Q54
11488	Z3	L26	Q55
11489	Z3	L26	Q56
11490	Z3	L26	Q57
11491	Z3	L26	Q58
11492	Z3	L26	Q59
11493	Z3	L26	Q60
11494	Z3	L26	Q61
11495	Z3	L26	Q62
11496	Z3	L26	Q63
11497	Z3	L26	Q64
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11499	Z3	L26	Q66
11500	Z3	L26	Q67
11501	Z3	L26	Q68
11502	Z3	L26	Q69
11503	Z3	L26	Q70
11504	Z3	L26	Q71
11505	Z3	L26	Q72
11506	Z3	L26	Q73
11507	Z3	L26	Q74
11508	Z3	L26	Q75
11509	Z3	L26	Q76
11510	Z3	L26	Q77
11511	Z3	L26	Q78
11512	Z3	L26	Q79
11513	Z3	L26	Q80
11514	Z3	L26	Q81
11515	Z3	L26	Q82
11516	Z3	L26	Q83
11517	Z3	L26	Q84
11518	Z3	L26	Q85
11519	Z3	L26	Q86
11520	Z3	L26	Q87
11521	Z3	L26	Q88
11522	Z3	L26	Q89
11523	Z3	L26	Q90
11524	Z3	L26	Q91
11525	Z3	L26	Q92
11526	Z3	L26	Q93
11527	Z3	L26	Q94
11528	Z3	L26	Q95
11529	Z3	L26	Q96
11530	Z3	L26	Q97
11531	Z3	L26	Q98
11532	Z3	L26	Q99
11533	Z3	L26	Q100
11534	Z3	L26	Q101
11535	Z3	L26	Q102
11536	Z3	L26	Q103
11537	Z3	L27	Q1
11538	Z3	L27	Q2
11539	Z3	L27	Q3
11540	Z3	L27	Q4
11541	Z3	L27	Q5
11542	Z3	L27	Q6
11543	Z3	L27	Q7
11544	Z3	L27	Q8
11545	Z3	L27	Q9
11546	Z3	L27	Q10
11547	Z3	L27	Q11
11548	Z3	L27	Q12
11549	Z3	L27	Q13
11550	Z3	L27	Q14
11551	Z3	L27	Q15
11552	Z3	L27	Q16
11553	Z3	L27	Q17
11554	Z3	L27	Q18
11555	Z3	L27	Q19
11556	Z3	L27	Q20
11557	Z3	L27	Q21
11558	Z3	L27	Q22
11559	Z3	L27	Q23
11560	Z3	L27	Q24
11561	Z3	L27	Q25
11562	Z3	L27	Q26
11563	Z3	L27	Q27
11564	Z3	L27	Q28
11565	Z3	L27	Q29
11566	Z3	L27	Q30
11567	Z3	L27	Q31
11568	Z3	L27	Q32
11569	Z3	L27	Q33
11570	Z3	L27	Q34
11571	Z3	L27	Q35
11572	Z3	L27	Q36
11573	Z3	L27	Q37
11574	Z3	L27	Q38
11575	Z3	L27	Q39
11576	Z3	L27	Q40
11577	Z3	L27	Q41
11578	Z3	L27	Q42
11579	Z3	L27	Q43
11580	Z3	L27	Q44
11581	Z3	L27	Q45
11582	Z3	L27	Q46
11583	Z3	L27	Q47
11584	Z3	L27	Q48
11585	Z3	L27	Q49
11586	Z3	L27	Q50
11587	Z3	L27	Q51
11588	Z3	L27	Q52
11589	Z3	L27	Q53
11590	Z3	L27	Q54
11591	Z3	L27	Q55
11592	Z3	L27	Q56
11593	Z3	L27	Q57
11594	Z3	L27	Q58
11595	Z3	L27	Q59
11596	Z3	L27	Q60
11597	Z3	L27	Q61
11598	Z3	L27	Q62
11599	Z3	L27	Q63
11600	Z3	L27	Q64
11601	Z3	L27	Q65
11602	Z3	L27	Q66
11603	Z3	L27	Q67
11604	Z3	L27	Q68
11605	Z3	L27	Q69
11606	Z3	L27	Q70
11607	Z3	L27	Q71
11608	Z3	L27	Q72
11609	Z3	L27	Q73
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11612	Z3	L27	Q76
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11614	Z3	L27	Q78
11615	Z3	L27	Q79
11616	Z3	L27	Q80
11617	Z3	L27	Q81
11618	Z3	L27	Q82
11619	Z3	L27	Q83
11620	Z3	L27	Q84
11621	Z3	L27	Q85
11622	Z3	L27	Q86
11623	Z3	L27	Q87
11624	Z3	L27	Q88
11625	Z3	L27	Q89
11626	Z3	L27	Q90
11627	Z3	L27	Q91
11628	Z3	L27	Q92
11629	Z3	L27	Q93
11630	Z3	L27	Q94

[Table 1-64]

11631	Z3	L27	Q95
11632	Z3	L27	Q96
11633	Z3	L27	Q97
11634	Z3	L27	Q98
11635	Z3	L27	Q99
11636	Z3	L27	Q100
11637	Z3	L27	Q101
11638	Z3	L27	Q102
11639	Z3	L27	Q103
11640	Z3	L28	Q1
11641	Z3	L28	Q2
11642	Z3	L28	Q3
11643	Z3	L28	Q4
11644	Z3	L28	Q5
11645	Z3	L28	Q6
11646	Z3	L28	Q7
11647	Z3	L28	Q8
11648	Z3	L28	Q9
11649	Z3	L28	Q10
11650	Z3	L28	Q11
11651	Z3	L28	Q12
11652	Z3	L28	Q13
11653	Z3	L28	Q14
11654	Z3	L28	Q15
11655	Z3	L28	Q16
11656	Z3	L28	Q17
11657	Z3	L28	Q18
11658	Z3	L28	Q19
11659	Z3	L28	Q20
11660	Z3	L28	Q21
11661	Z3	L28	Q22
11662	Z3	L28	Q23
11663	Z3	L28	Q24
11664	Z3	L28	Q25
11665	Z3	L28	Q26
11666	Z3	L28	Q27
11667	Z3	L28	Q28
11668	Z3	L28	Q29
11669	Z3	L28	Q30
11670	Z3	L28	Q31
11671	Z3	L28	Q32
11672	Z3	L28	Q33
11673	Z3	L28	Q34
11674	Z3	L28	Q35
11675	Z3	L28	Q36
11676	Z3	L28	Q37
11677	Z3	L28	Q38
11678	Z3	L28	Q39
11679	Z3	L28	Q40
11680	Z3	L28	Q41
11681	Z3	L28	Q42
11682	Z3	L28	Q43
11683	Z3	L28	Q44
11684	Z3	L28	Q45
11685	Z3	L28	Q46
11686	Z3	L28	Q47
11687	Z3	L28	Q48
11688	Z3	L28	Q49
11689	Z3	L28	Q50
11690	Z3	L28	Q51
11691	Z3	L28	Q52
11692	Z3	L28	Q53
11693	Z3	L28	Q54
11694	Z3	L28	Q55
11695	Z3	L28	Q56
11696	Z3	L28	Q57
11697	Z3	L28	Q58
11698	Z3	L28	Q59
11699	Z3	L28	Q60
11700	Z3	L28	Q61
11701	Z3	L28	Q62
11702	Z3	L28	Q63
11703	Z3	L28	Q64
11704	Z3	L28	Q65
11705	Z3	L28	Q66
11706	Z3	L28	Q67
11707	Z3	L28	Q68
11708	Z3	L28	Q69
11709	Z3	L28	Q70
11710	Z3	L28	Q71
11711	Z3	L28	Q72
11712	Z3	L28	Q73
11713	Z3	L28	Q74
11714	Z3	L28	Q75
11715	Z3	L28	Q76
11716	Z3	L28	Q77
11717	Z3	L28	Q78
11718	Z3	L28	Q79
11719	Z3	L28	Q80
11720	Z3	L28	Q81
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11722	Z3	L28	Q83
11723	Z3	L28	Q84
11724	Z3	L28	Q85
11725	Z3	L28	Q86
11726	Z3	L28	Q87
11727	Z3	L28	Q88
11728	Z3	L28	Q89
11729	Z3	L28	Q90
11730	Z3	L28	Q91
11731	Z3	L28	Q92
11732	Z3	L28	Q93
11733	Z3	L28	Q94
11734	Z3	L28	Q95
11735	Z3	L28	Q96
11736	Z3	L28	Q97
11737	Z3	L28	Q98
11738	Z3	L28	Q99
11739	Z3	L28	Q100
11740	Z3	L28	Q101
11741	Z3	L28	Q102
11742	Z3	L28	Q103
11743	Z3	L29	Q1
11744	Z3	L29	Q2
11745	Z3	L29	Q3
11746	Z3	L29	Q4
11747	Z3	L29	Q5
11748	Z3	L29	Q6
11749	Z3	L29	Q7
11750	Z3	L29	Q8
11751	Z3	L29	Q9
11752	Z3	L29	Q10
11753	Z3	L29	Q11
11754	Z3	L29	Q12
11755	Z3	L29	Q13
11756	Z3	L29	Q14
11757	Z3	L29	Q15
11758	Z3	L29	Q16
11759	Z3	L29	Q17
11760	Z3	L29	Q18
11761	Z3	L29	Q19
11762	Z3	L29	Q20
11763	Z3	L29	Q21
11764	Z3	L29	Q22
11765	Z3	L29	Q23
11766	Z3	L29	Q24
11767	Z3	L29	Q25
11768	Z3	L29	Q26
11769	Z3	L29	Q27
11770	Z3	L29	Q28
11771	Z3	L29	Q29
11772	Z3	L29	Q30
11773	Z3	L29	Q31
11774	Z3	L29	Q32
11775	Z3	L29	Q33
11776	Z3	L29	Q34
11777	Z3	L29	Q35
11778	Z3	L29	Q36
11779	Z3	L29	Q37
11780	Z3	L29	Q38
11781	Z3	L29	Q39
11782	Z3	L29	Q40
11783	Z3	L29	Q41
11784	Z3	L29	Q42
11785	Z3	L29	Q43
11786	Z3	L29	Q44
11787	Z3	L29	Q45
11788	Z3	L29	Q46
11789	Z3	L29	Q47
11790	Z3	L29	Q48
11791	Z3	L29	Q49
11792	Z3	L29	Q50
11793	Z3	L29	Q51
11794	Z3	L29	Q52
11795	Z3	L29	Q53
11796	Z3	L29	Q54
11797	Z3	L29	Q55
11798	Z3	L29	Q56
11799	Z3	L29	Q57
11800	Z3	L29	Q58
11801	Z3	L29	Q59
11802	Z3	L29	Q60
11803	Z3	L29	Q61
11804	Z3	L29	Q62
11805	Z3	L29	Q63
11806	Z3	L29	Q64
11807	Z3	L29	Q65
11808	Z3	L29	Q66
11809	Z3	L29	Q67
11810	Z3	L29	Q68
11811	Z3	L29	Q69
11812	Z3	L29	Q70
11813	Z3	L29	Q71
11814	Z3	L29	Q72
11815	Z3	L29	Q73
11816	Z3	L29	Q74
11817	Z3	L29	Q75
11818	Z3	L29	Q76
11819	Z3	L29	Q77
11820	Z3	L29	Q78
11821	Z3	L29	Q79
11822	Z3	L29	Q80
11823	Z3	L29	Q81
11824	Z3	L29	Q82
11825	Z3	L29	Q83
11826	Z3	L29	Q84
11827	Z3	L29	Q85
11828	Z3	L29	Q86
11829	Z3	L29	Q87
11830	Z3	L29	Q88
11831	Z3	L29	Q89

[Table 1-65]

11832	Z3	L29	Q90
11833	Z3	L29	Q91
11834	Z3	L29	Q92
11835	Z3	L29	Q93
11836	Z3	L29	Q94
11837	Z3	L29	Q95
11838	Z3	L29	Q96
11839	Z3	L29	Q97
11840	Z3	L29	Q98
11841	Z3	L29	Q99
11842	Z3	L29	Q100
11843	Z3	L29	Q101
11844	Z3	L29	Q102
11845	Z3	L29	Q103
11846	Z3	L30	Q1
11847	Z3	L30	Q2
11848	Z3	L30	Q3
11849	Z3	L30	Q4
11850	Z3	L30	Q5
11851	Z3	L30	Q6
11852	Z3	L30	Q7
11853	Z3	L30	Q8
11854	Z3	L30	Q9
11855	Z3	L30	Q10
11856	Z3	L30	Q11
11857	Z3	L30	Q12
11858	Z3	L30	Q13
11859	Z3	L30	Q14
11860	Z3	L30	Q15
11861	Z3	L30	Q16
11862	Z3	L30	Q17
11863	Z3	L30	Q18
11864	Z3	L30	Q19
11865	Z3	L30	Q20
11866	Z3	L30	Q21
11867	Z3	L30	Q22
11868	Z3	L30	Q23
11869	Z3	L30	Q24
11870	Z3	L30	Q25
11871	Z3	L30	Q26
11872	Z3	L30	Q27
11873	Z3	L30	Q28
11874	Z3	L30	Q29
11875	Z3	L30	Q30
11876	Z3	L30	Q31
11877	Z3	L30	Q32
11878	Z3	L30	Q33
11879	Z3	L30	Q34
11880	Z3	L30	Q35
11881	Z3	L30	Q36
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11883	Z3	L30	Q38
11884	Z3	L30	Q39
11885	Z3	L30	Q40
11886	Z3	L30	Q41
11887	Z3	L30	Q42
11888	Z3	L30	Q43
11889	Z3	L30	Q44
11890	Z3	L30	Q45
11891	Z3	L30	Q46
11892	Z3	L30	Q47
11893	Z3	L30	Q48
11894	Z3	L30	Q49
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11903	Z3	L30	Q58
11904	Z3	L30	Q59
11905	Z3	L30	Q60
11906	Z3	L30	Q61
11907	Z3	L30	Q62
11908	Z3	L30	Q63
11909	Z3	L30	Q64
11910	Z3	L30	Q65
11911	Z3	L30	Q66
11912	Z3	L30	Q67
11913	Z3	L30	Q68
11914	Z3	L30	Q69
11915	Z3	L30	Q70
11916	Z3	L30	Q71
11917	Z3	L30	Q72
11918	Z3	L30	Q73
11919	Z3	L30	Q74
11920	Z3	L30	Q75
11921	Z3	L30	Q76
11922	Z3	L30	Q77
11923	Z3	L30	Q78
11924	Z3	L30	Q79
11925	Z3	L30	Q80
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11927	Z3	L30	Q82
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11933	Z3	L30	Q88
11934	Z3	L30	Q89
11935	Z3	L30	Q90
11936	Z3	L30	Q91
11937	Z3	L30	Q92
11938	Z3	L30	Q93
11939	Z3	L30	Q94
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11943	Z3	L30	Q98
11944	Z3	L30	Q99
11945	Z3	L30	Q100
11946	Z3	L30	Q101
11947	Z3	L30	Q102
11948	Z3	L30	Q103
11949	Z3	L31	Q1
11950	Z3	L31	Q2
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11957	Z3	L31	Q9
11958	Z3	L31	Q10
11959	Z3	L31	Q11
11960	Z3	L31	Q12
11961	Z3	L31	Q13
11962	Z3	L31	Q14
11963	Z3	L31	Q15
11964	Z3	L31	Q16
11965	Z3	L31	Q17
11966	Z3	L31	Q18
11967	Z3	L31	Q19
11968	Z3	L31	Q20
11969	Z3	L31	Q21
11970	Z3	L31	Q22
11971	Z3	L31	Q23
11972	Z3	L31	Q24
11973	Z3	L31	Q25
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11977	Z3	L31	Q29
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11982	Z3	L31	Q34
11983	Z3	L31	Q35
11984	Z3	L31	Q36
11985	Z3	L31	Q37
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11991	Z3	L31	Q43
11992	Z3	L31	Q44
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11994	Z3	L31	Q46
11995	Z3	L31	Q47
11996	Z3	L31	Q48
11997	Z3	L31	Q49
11998	Z3	L31	Q50
11999	Z3	L31	Q51
12000	Z3	L31	Q52
12001	Z3	L31	Q53
12002	Z3	L31	Q54
12003	Z3	L31	Q55
12004	Z3	L31	Q56
12005	Z3	L31	Q57
12006	Z3	L31	Q58
12007	Z3	L31	Q59
12008	Z3	L31	Q60
12009	Z3	L31	Q61
12010	Z3	L31	Q62
12011	Z3	L31	Q63
12012	Z3	L31	Q64
12013	Z3	L31	Q65
12014	Z3	L31	Q66
12015	Z3	L31	Q67
12016	Z3	L31	Q68
12017	Z3	L31	Q69
12018	Z3	L31	Q70
12019	Z3	L31	Q71
12020	Z3	L31	Q72
12021	Z3	L31	Q73
12022	Z3	L31	Q74
12023	Z3	L31	Q75
12024	Z3	L31	Q76
12025	Z3	L31	Q77
12026	Z3	L31	Q78
12027	Z3	L31	Q79
12028	Z3	L31	Q80
12029	Z3	L31	Q81
12030	Z3	L31	Q82
12031	Z3	L31	Q83
12032	Z3	L31	Q84

[Table 1-66]

12033	Z3	L31	Q85
12034	Z3	L31	Q86
12035	Z3	L31	Q87
12036	Z3	L31	Q88
12037	Z3	L31	Q89
12038	Z3	L31	Q90
12039	Z3	L31	Q91
12040	Z3	L31	Q92
12041	Z3	L31	Q93
12042	Z3	L31	Q94
12043	Z3	L31	Q95
12044	Z3	L31	Q96
12045	Z3	L31	Q97
12046	Z3	L31	Q98
12047	Z3	L31	Q99
12048	Z3	L31	Q100
12049	Z3	L31	Q101
12050	Z3	L31	Q102
12051	Z3	L31	Q103
12052	Z3	L32	Q1
12053	Z3	L32	Q2
12054	Z3	L32	Q3
12055	Z3	L32	Q4
12056	Z3	L32	Q5
12057	Z3	L32	Q6
12058	Z3	L32	Q7
12059	Z3	L32	Q8
12060	Z3	L32	Q9
12061	Z3	L32	Q10
12062	Z3	L32	Q11
12063	Z3	L32	Q12
12064	Z3	L32	Q13
12065	Z3	L32	Q14
12066	Z3	L32	Q15
12067	Z3	L32	Q16
12068	Z3	L32	Q17
12069	Z3	L32	Q18
12070	Z3	L32	Q19
12071	Z3	L32	Q20
12072	Z3	L32	Q21
12073	Z3	L32	Q22
12074	Z3	L32	Q23
12075	Z3	L32	Q24
12076	Z3	L32	Q25
12077	Z3	L32	Q26
12078	Z3	L32	Q27
12079	Z3	L32	Q28
12080	Z3	L32	Q29
12081	Z3	L32	Q30
12082	Z3	L32	Q31
12083	Z3	L32	Q32
12084	Z3	L32	Q33
12085	Z3	L32	Q34
12086	Z3	L32	Q35
12087	Z3	L32	Q36
12088	Z3	L32	Q37
12089	Z3	L32	Q38
12090	Z3	L32	Q39
12091	Z3	L32	Q40
12092	Z3	L32	Q41
12093	Z3	L32	Q42
12094	Z3	L32	Q43
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12100	Z3	L32	Q49
12101	Z3	L32	Q50
12102	Z3	L32	Q51
12103	Z3	L32	Q52
12104	Z3	L32	Q53
12105	Z3	L32	Q54
12106	Z3	L32	Q55
12107	Z3	L32	Q56
12108	Z3	L32	Q57
12109	Z3	L32	Q58
12110	Z3	L32	Q59
12111	Z3	L32	Q60
12112	Z3	L32	Q61
12113	Z3	L32	Q62
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12115	Z3	L32	Q64
12116	Z3	L32	Q65
12117	Z3	L32	Q66
12118	Z3	L32	Q67
12119	Z3	L32	Q68
12120	Z3	L32	Q69
12121	Z3	L32	Q70
12122	Z3	L32	Q71
12123	Z3	L32	Q72
12124	Z3	L32	Q73
12125	Z3	L32	Q74
12126	Z3	L32	Q75
12127	Z3	L32	Q76
12128	Z3	L32	Q77
12129	Z3	L32	Q78
12130	Z3	L32	Q79
12131	Z3	L32	Q80
12132	Z3	L32	Q81
12133	Z3	L32	Q82
12134	Z3	L32	Q83
12135	Z3	L32	Q84
12136	Z3	L32	Q85
12137	Z3	L32	Q86
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12139	Z3	L32	Q88
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12144	Z3	L32	Q93
12145	Z3	L32	Q94
12146	Z3	L32	Q95
12147	Z3	L32	Q96
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12149	Z3	L32	Q98
12150	Z3	L32	Q99
12151	Z3	L32	Q100
12152	Z3	L32	Q101
12153	Z3	L32	Q102
12154	Z3	L32	Q103
12155	Z3	L33	Q1
12156	Z3	L33	Q2
12157	Z3	L33	Q3
12158	Z3	L33	Q4
12159	Z3	L33	Q5
12160	Z3	L33	Q6
12161	Z3	L33	Q7
12162	Z3	L33	Q8
12163	Z3	L33	Q9
12164	Z3	L33	Q10
12165	Z3	L33	Q11
12166	Z3	L33	Q12
12167	Z3	L33	Q13
12168	Z3	L33	Q14
12169	Z3	L33	Q15
12170	Z3	L33	Q16
12171	Z3	L33	Q17
12172	Z3	L33	Q18
12173	Z3	L33	Q19
12174	Z3	L33	Q20
12175	Z3	L33	Q21
12176	Z3	L33	Q22
12177	Z3	L33	Q23
12178	Z3	L33	Q24
12179	Z3	L33	Q25
12180	Z3	L33	Q26
12181	Z3	L33	Q27
12182	Z3	L33	Q28
12183	Z3	L33	Q29
12184	Z3	L33	Q30
12185	Z3	L33	Q31
12186	Z3	L33	Q32
12187	Z3	L33	Q33
12188	Z3	L33	Q34
12189	Z3	L33	Q35
12190	Z3	L33	Q36
12191	Z3	L33	Q37
12192	Z3	L33	Q38
12193	Z3	L33	Q39
12194	Z3	L33	Q40
12195	Z3	L33	Q41
12196	Z3	L33	Q42
12197	Z3	L33	Q43
12198	Z3	L33	Q44
12199	Z3	L33	Q45
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12201	Z3	L33	Q47
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12203	Z3	L33	Q49
12204	Z3	L33	Q50
12205	Z3	L33	Q51
12206	Z3	L33	Q52
12207	Z3	L33	Q53
12208	Z3	L33	Q54
12209	Z3	L33	Q55
12210	Z3	L33	Q56
12211	Z3	L33	Q57
12212	Z3	L33	Q58
12213	Z3	L33	Q59
12214	Z3	L33	Q60
12215	Z3	L33	Q61
12216	Z3	L33	Q62
12217	Z3	L33	Q63
12218	Z3	L33	Q64
12219	Z3	L33	Q65
12220	Z3	L33	Q66
12221	Z3	L33	Q67
12222	Z3	L33	Q68
12223	Z3	L33	Q69
12224	Z3	L33	Q70
12225	Z3	L33	Q71
12226	Z3	L33	Q72
12227	Z3	L33	Q73
12228	Z3	L33	Q74
12229	Z3	L33	Q75
12230	Z3	L33	Q76
12231	Z3	L33	Q77
12232	Z3	L33	Q78
12233	Z3	L33	Q79

[Table 1-67]

12234	Z3	L33	Q80
12235	Z3	L33	Q81
12236	Z3	L33	Q82
12237	Z3	L33	Q83
12238	Z3	L33	Q84
12239	Z3	L33	Q85
12240	Z3	L33	Q86
12241	Z3	L33	Q87
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12243	Z3	L33	Q89
12244	Z3	L33	Q90
12245	Z3	L33	Q91
12246	Z3	L33	Q92
12247	Z3	L33	Q93
12248	Z3	L33	Q94
12249	Z3	L33	Q95
12250	Z3	L33	Q96
12251	Z3	L33	Q97
12252	Z3	L33	Q98
12253	Z3	L33	Q99
12254	Z3	L33	Q100
12255	Z3	L33	Q101
12256	Z3	L33	Q102
12257	Z3	L33	Q103
12258	Z3	L34	Q1
12259	Z3	L34	Q2
12260	Z3	L34	Q3
12261	Z3	L34	Q4
12262	Z3	L34	Q5
12263	Z3	L34	Q6
12264	Z3	L34	Q7
12265	Z3	L34	Q8
12266	Z3	L34	Q9
12267	Z3	L34	Q10
12268	Z3	L34	Q11
12269	Z3	L34	Q12
12270	Z3	L34	Q13
12271	Z3	L34	Q14
12272	Z3	L34	Q15
12273	Z3	L34	Q16
12274	Z3	L34	Q17
12275	Z3	L34	Q18
12276	Z3	L34	Q19
12277	Z3	L34	Q20
12278	Z3	L34	Q21
12279	Z3	L34	Q22
12280	Z3	L34	Q23
12281	Z3	L34	Q24
12282	Z3	L34	Q25
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12286	Z3	L34	Q29
12287	Z3	L34	Q30
12288	Z3	L34	Q31
12289	Z3	L34	Q32
12290	Z3	L34	Q33
12291	Z3	L34	Q34
12292	Z3	L34	Q35
12293	Z3	L34	Q36
12294	Z3	L34	Q37
12295	Z3	L34	Q38
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12303	Z3	L34	Q46
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12306	Z3	L34	Q49
12307	Z3	L34	Q50
12308	Z3	L34	Q51
12309	Z3	L34	Q52
12310	Z3	L34	Q53
12311	Z3	L34	Q54
12312	Z3	L34	Q55
12313	Z3	L34	Q56
12314	Z3	L34	Q57
12315	Z3	L34	Q58
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12330	Z3	L34	Q73
12331	Z3	L34	Q74
12332	Z3	L34	Q75
12333	Z3	L34	Q76
12334	Z3	L34	Q77
12335	Z3	L34	Q78
12336	Z3	L34	Q79
12337	Z3	L34	Q80
12338	Z3	L34	Q81
12339	Z3	L34	Q82
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12351	Z3	L34	Q94
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12356	Z3	L34	Q99
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12358	Z3	L34	Q101
12359	Z3	L34	Q102
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12369	Z3	L35	Q9
12370	Z3	L35	Q10
12371	Z3	L35	Q11
12372	Z3	L35	Q12
12373	Z3	L35	Q13
12374	Z3	L35	Q14
12375	Z3	L35	Q15
12376	Z3	L35	Q16
12377	Z3	L35	Q17
12378	Z3	L35	Q18
12379	Z3	L35	Q19
12380	Z3	L35	Q20
12381	Z3	L35	Q21
12382	Z3	L35	Q22
12383	Z3	L35	Q23
12384	Z3	L35	Q24
12385	Z3	L35	Q25
12386	Z3	L35	Q26
12387	Z3	L35	Q27
12388	Z3	L35	Q28
12389	Z3	L35	Q29
12390	Z3	L35	Q30
12391	Z3	L35	Q31
12392	Z3	L35	Q32
12393	Z3	L35	Q33
12394	Z3	L35	Q34
12395	Z3	L35	Q35
12396	Z3	L35	Q36
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12401	Z3	L35	Q41
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12403	Z3	L35	Q43
12404	Z3	L35	Q44
12405	Z3	L35	Q45
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12408	Z3	L35	Q48
12409	Z3	L35	Q49
12410	Z3	L35	Q50
12411	Z3	L35	Q51
12412	Z3	L35	Q52
12413	Z3	L35	Q53
12414	Z3	L35	Q54
12415	Z3	L35	Q55
12416	Z3	L35	Q56
12417	Z3	L35	Q57
12418	Z3	L35	Q58
12419	Z3	L35	Q59
12420	Z3	L35	Q60
12421	Z3	L35	Q61
12422	Z3	L35	Q62
12423	Z3	L35	Q63
12424	Z3	L35	Q64
12425	Z3	L35	Q65
12426	Z3	L35	Q66
12427	Z3	L35	Q67
12428	Z3	L35	Q68
12429	Z3	L35	Q69
12430	Z3	L35	Q70
12431	Z3	L35	Q71
12432	Z3	L35	Q72
12433	Z3	L35	Q73
12434	Z3	L35	Q74

[Table 1-68]

12435	Z3	L35	Q75
12436	Z3	L35	Q76
12437	Z3	L35	Q77
12438	Z3	L35	Q78
12439	Z3	L35	Q79
12440	Z3	L35	Q80
12441	Z3	L35	Q81
12442	Z3	L35	Q82
12443	Z3	L35	Q83
12444	Z3	L35	Q84
12445	Z3	L35	Q85
12446	Z3	L35	Q86
12447	Z3	L35	Q87
12448	Z3	L35	Q88
12449	Z3	L35	Q89
12450	Z3	L35	Q90
12451	Z3	L35	Q91
12452	Z3	L35	Q92
12453	Z3	L35	Q93
12454	Z3	L35	Q94
12455	Z3	L35	Q95
12456	Z3	L35	Q96
12457	Z3	L35	Q97
12458	Z3	L35	Q98
12459	Z3	L35	Q99
12460	Z3	L35	Q100
12461	Z3	L35	Q101
12462	Z3	L35	Q102
12463	Z3	L35	Q103
12464	Z3	L36	Q1
12465	Z3	L36	Q2
12466	Z3	L36	Q3
12467	Z3	L36	Q4
12468	Z3	L36	Q5
12469	Z3	L36	Q6
12470	Z3	L36	Q7
12471	Z3	L36	Q8
12472	Z3	L36	Q9
12473	Z3	L36	Q10
12474	Z3	L36	Q11
12475	Z3	L36	Q12
12476	Z3	L36	Q13
12477	Z3	L36	Q14
12478	Z3	L36	Q15
12479	Z3	L36	Q16
12480	Z3	L36	Q17
12481	Z3	L36	Q18
12482	Z3	L36	Q19
12483	Z3	L36	Q20
12484	Z3	L36	Q21
12485	Z3	L36	Q22
12486	Z3	L36	Q23
12487	Z3	L36	Q24
12488	Z3	L36	Q25
12489	Z3	L36	Q26
12490	Z3	L36	Q27
12491	Z3	L36	Q28
12492	Z3	L36	Q29
12493	Z3	L36	Q30
12494	Z3	L36	Q31
12495	Z3	L36	Q32
12496	Z3	L36	Q33
12497	Z3	L36	Q34
12498	Z3	L36	Q35
12499	Z3	L36	Q36
12500	Z3	L36	Q37
12501	Z3	L36	Q38
12502	Z3	L36	Q39
12503	Z3	L36	Q40
12504	Z3	L36	Q41
12505	Z3	L36	Q42
12506	Z3	L36	Q43
12507	Z3	L36	Q44
12508	Z3	L36	Q45
12509	Z3	L36	Q46
12510	Z3	L36	Q47
12511	Z3	L36	Q48
12512	Z3	L36	Q49
12513	Z3	L36	Q50
12514	Z3	L36	Q51
12515	Z3	L36	Q52
12516	Z3	L36	Q53
12517	Z3	L36	Q54
12518	Z3	L36	Q55
12519	Z3	L36	Q56
12520	Z3	L36	Q57
12521	Z3	L36	Q58
12522	Z3	L36	Q59
12523	Z3	L36	Q60
12524	Z3	L36	Q61
12525	Z3	L36	Q62
12526	Z3	L36	Q63
12527	Z3	L36	Q64
12528	Z3	L36	Q65
12529	Z3	L36	Q66
12530	Z3	L36	Q67
12531	Z3	L36	Q68
12532	Z3	L36	Q69
12533	Z3	L36	Q70
12534	Z3	L36	Q71
12535	Z3	L36	Q72
12536	Z3	L36	Q73
12537	Z3	L36	Q74
12538	Z3	L36	Q75
12539	Z3	L36	Q76
12540	Z3	L36	Q77
12541	Z3	L36	Q78
12542	Z3	L36	Q79
12543	Z3	L36	Q80
12544	Z3	L36	Q81
12545	Z3	L36	Q82
12546	Z3	L36	Q83
12547	Z3	L36	Q84
12548	Z3	L36	Q85
12549	Z3	L36	Q86
12550	Z3	L36	Q87
12551	Z3	L36	Q88
12552	Z3	L36	Q89
12553	Z3	L36	Q90
12554	Z3	L36	Q91
12555	Z3	L36	Q92
12556	Z3	L36	Q93
12557	Z3	L36	Q94
12558	Z3	L36	Q95
12559	Z3	L36	Q96
12560	Z3	L36	Q97
12561	Z3	L36	Q98
12562	Z3	L36	Q99
12563	Z3	L36	Q100
12564	Z3	L36	Q101
12565	Z3	L36	Q102
12566	Z3	L36	Q103
12567	Z4	L15	Q1
12568	Z4	L15	Q2
12569	Z4	L15	Q3
12570	Z4	L15	Q4
12571	Z4	L15	Q5
12572	Z4	L15	Q6
12573	Z4	L15	Q7
12574	Z4	L15	Q8
12575	Z4	L15	Q9
12576	Z4	L15	Q10
12577	Z4	L15	Q11
12578	Z4	L15	Q12
12579	Z4	L15	Q13
12580	Z4	L15	Q14
12581	Z4	L15	Q15
12582	Z4	L15	Q16
12583	Z4	L15	Q17
12584	Z4	L15	Q18
12585	Z4	L15	Q19
12586	Z4	L15	Q20
12587	Z4	L15	Q21
12588	Z4	L15	Q22
12589	Z4	L15	Q23
12590	Z4	L15	Q24
12591	Z4	L15	Q25
12592	Z4	L15	Q26
12593	Z4	L15	Q27
12594	Z4	L15	Q28
12595	Z4	L15	Q29
12596	Z4	L15	Q30
12597	Z4	L15	Q31
12598	Z4	L15	Q32
12599	Z4	L15	Q33
12600	Z4	L15	Q34
12601	Z4	L15	Q35
12602	Z4	L15	Q36
12603	Z4	L15	Q37
12604	Z4	L15	Q38
12605	Z4	L15	Q39
12606	Z4	L15	Q40
12607	Z4	L15	Q41
12608	Z4	L15	Q42
12609	Z4	L15	Q43
12610	Z4	L15	Q44
12611	Z4	L15	Q45
12612	Z4	L15	Q46
12613	Z4	L15	Q47
12614	Z4	L15	Q48
12615	Z4	L15	Q49
12616	Z4	L15	Q50
12617	Z4	L15	Q51
12618	Z4	L15	Q52
12619	Z4	L15	Q53
12620	Z4	L15	Q54
12621	Z4	L15	Q55
12622	Z4	L15	Q56
12623	Z4	L15	Q57
12624	Z4	L15	Q58
12625	Z4	L15	Q59
12626	Z4	L15	Q60
12627	Z4	L15	Q61
12628	Z4	L15	Q62
12629	Z4	L15	Q63
12630	Z4	L15	Q64
12631	Z4	L15	Q65
12632	Z4	L15	Q66
12633	Z4	L15	Q67
12634	Z4	L15	Q68
12635	Z4	L15	Q69

[Table 1-69]

12636	Z4	L15	Q70
12637	Z4	L15	Q71
12638	Z4	L15	Q72
12639	Z4	L15	Q73
12640	Z4	L15	Q74
12641	Z4	L15	Q75
12642	Z4	L15	Q76
12643	Z4	L15	Q77
12644	Z4	L15	Q78
12645	Z4	L15	Q79
12646	Z4	L15	Q80
12647	Z4	L15	Q81
12648	Z4	L15	Q82
12649	Z4	L15	Q83
12650	Z4	L15	Q84
12651	Z4	L15	Q85
12652	Z4	L15	Q86
12653	Z4	L15	Q87
12654	Z4	L15	Q88
12655	Z4	L15	Q89
12656	Z4	L15	Q90
12657	Z4	L15	Q91
12658	Z4	L15	Q92
12659	Z4	L15	Q93
12660	Z4	L15	Q94
12661	Z4	L15	Q95
12662	Z4	L15	Q96
12663	Z4	L15	Q97
12664	Z4	L15	Q98
12665	Z4	L15	Q99
12666	Z4	L15	Q100
12667	Z4	L15	Q101
12668	Z4	L15	Q102
12669	Z4	L15	Q103
12670	Z4	L16	Q1
12671	Z4	L16	Q2
12672	Z4	L16	Q3
12673	Z4	L16	Q4
12674	Z4	L16	Q5
12675	Z4	L16	Q6
12676	Z4	L16	Q7
12677	Z4	L16	Q8
12678	Z4	L16	Q9
12679	Z4	L16	Q10
12680	Z4	L16	Q11
12681	Z4	L16	Q12
12682	Z4	L16	Q13
12683	Z4	L16	Q14
12684	Z4	L16	Q15
12685	Z4	L16	Q16
12686	Z4	L16	Q17
12687	Z4	L16	Q18
12688	Z4	L16	Q19
12689	Z4	L16	Q20
12690	Z4	L16	Q21
12691	Z4	L16	Q22
12692	Z4	L16	Q23
12693	Z4	L16	Q24
12694	Z4	L16	Q25
12695	Z4	L16	Q26
12696	Z4	L16	Q27
12697	Z4	L16	Q28
12698	Z4	L16	Q29
12699	Z4	L16	Q30
12700	Z4	L16	Q31
12701	Z4	L16	Q32
12702	Z4	L16	Q33

12703	Z4	L16	Q34
12704	Z4	L16	Q35
12705	Z4	L16	Q36
12706	Z4	L16	Q37
12707	Z4	L16	Q38
12708	Z4	L16	Q39
12709	Z4	L16	Q40
12710	Z4	L16	Q41
12711	Z4	L16	Q42
12712	Z4	L16	Q43
12713	Z4	L16	Q44
12714	Z4	L16	Q45
12715	Z4	L16	Q46
12716	Z4	L16	Q47
12717	Z4	L16	Q48
12718	Z4	L16	Q49
12719	Z4	L16	Q50
12720	Z4	L16	Q51
12721	Z4	L16	Q52
12722	Z4	L16	Q53
12723	Z4	L16	Q54
12724	Z4	L16	Q55
12725	Z4	L16	Q56
12726	Z4	L16	Q57
12727	Z4	L16	Q58
12728	Z4	L16	Q59
12729	Z4	L16	Q60
12730	Z4	L16	Q61
12731	Z4	L16	Q62
12732	Z4	L16	Q63
12733	Z4	L16	Q64
12734	Z4	L16	Q65
12735	Z4	L16	Q66
12736	Z4	L16	Q67
12737	Z4	L16	Q68
12738	Z4	L16	Q69
12739	Z4	L16	Q70
12740	Z4	L16	Q71
12741	Z4	L16	Q72
12742	Z4	L16	Q73
12743	Z4	L16	Q74
12744	Z4	L16	Q75
12745	Z4	L16	Q76
12746	Z4	L16	Q77
12747	Z4	L16	Q78
12748	Z4	L16	Q79
12749	Z4	L16	Q80
12750	Z4	L16	Q81
12751	Z4	L16	Q82
12752	Z4	L16	Q83
12753	Z4	L16	Q84
12754	Z4	L16	Q85
12755	Z4	L16	Q86
12756	Z4	L16	Q87
12757	Z4	L16	Q88
12758	Z4	L16	Q89
12759	Z4	L16	Q90
12760	Z4	L16	Q91
12761	Z4	L16	Q92
12762	Z4	L16	Q93
12763	Z4	L16	Q94
12764	Z4	L16	Q95
12765	Z4	L16	Q96
12766	Z4	L16	Q97
12767	Z4	L16	Q98
12768	Z4	L16	Q99
12769	Z4	L16	Q100

12770	Z4	L16	Q101
12771	Z4	L16	Q102
12772	Z4	L16	Q103
12773	Z4	L17	Q1
12774	Z4	L17	Q2
12775	Z4	L17	Q3
12776	Z4	L17	Q4
12777	Z4	L17	Q5
12778	Z4	L17	Q6
12779	Z4	L17	Q7
12780	Z4	L17	Q8
12781	Z4	L17	Q9
12782	Z4	L17	Q10
12783	Z4	L17	Q11
12784	Z4	L17	Q12
12785	Z4	L17	Q13
12786	Z4	L17	Q14
12787	Z4	L17	Q15
12788	Z4	L17	Q16
12789	Z4	L17	Q17
12790	Z4	L17	Q18
12791	Z4	L17	Q19
12792	Z4	L17	Q20
12793	Z4	L17	Q21
12794	Z4	L17	Q22
12795	Z4	L17	Q23
12796	Z4	L17	Q24
12797	Z4	L17	Q25
12798	Z4	L17	Q26
12799	Z4	L17	Q27
12800	Z4	L17	Q28
12801	Z4	L17	Q29
12802	Z4	L17	Q30
12803	Z4	L17	Q31
12804	Z4	L17	Q32
12805	Z4	L17	Q33
12806	Z4	L17	Q34
12807	Z4	L17	Q35
12808	Z4	L17	Q36
12809	Z4	L17	Q37
12810	Z4	L17	Q38
12811	Z4	L17	Q39
12812	Z4	L17	Q40
12813	Z4	L17	Q41
12814	Z4	L17	Q42
12815	Z4	L17	Q43
12816	Z4	L17	Q44
12817	Z4	L17	Q45
12818	Z4	L17	Q46
12819	Z4	L17	Q47
12820	Z4	L17	Q48
12821	Z4	L17	Q49
12822	Z4	L17	Q50
12823	Z4	L17	Q51
12824	Z4	L17	Q52
12825	Z4	L17	Q53
12826	Z4	L17	Q54
12827	Z4	L17	Q55
12828	Z4	L17	Q56
12829	Z4	L17	Q57
12830	Z4	L17	Q58
12831	Z4	L17	Q59
12832	Z4	L17	Q60
12833	Z4	L17	Q61
12834	Z4	L17	Q62
12835	Z4	L17	Q63
12836	Z4	L17	Q64

[Table 1-70]

12837	Z4	L17	Q65
12838	Z4	L17	Q66
12839	Z4	L17	Q67
12840	Z4	L17	Q68
12841	Z4	L17	Q69
12842	Z4	L17	Q70
12843	Z4	L17	Q71
12844	Z4	L17	Q72
12845	Z4	L17	Q73
12846	Z4	L17	Q74
12847	Z4	L17	Q75
12848	Z4	L17	Q76
12849	Z4	L17	Q77
12850	Z4	L17	Q78
12851	Z4	L17	Q79
12852	Z4	L17	Q80
12853	Z4	L17	Q81
12854	Z4	L17	Q82
12855	Z4	L17	Q83
12856	Z4	L17	Q84
12857	Z4	L17	Q85
12858	Z4	L17	Q86
12859	Z4	L17	Q87
12860	Z4	L17	Q88
12861	Z4	L17	Q89
12862	Z4	L17	Q90
12863	Z4	L17	Q91
12864	Z4	L17	Q92
12865	Z4	L17	Q93
12866	Z4	L17	Q94
12867	Z4	L17	Q95
12868	Z4	L17	Q96
12869	Z4	L17	Q97
12870	Z4	L17	Q98
12871	Z4	L17	Q99
12872	Z4	L17	Q100
12873	Z4	L17	Q101
12874	Z4	L17	Q102
12875	Z4	L17	Q103
12876	Z4	L18	Q1
12877	Z4	L18	Q2
12878	Z4	L18	Q3
12879	Z4	L18	Q4
12880	Z4	L18	Q5
12881	Z4	L18	Q6
12882	Z4	L18	Q7
12883	Z4	L18	Q8
12884	Z4	L18	Q9
12885	Z4	L18	Q10
12886	Z4	L18	Q11
12887	Z4	L18	Q12
12888	Z4	L18	Q13
12889	Z4	L18	Q14
12890	Z4	L18	Q15
12891	Z4	L18	Q16
12892	Z4	L18	Q17
12893	Z4	L18	Q18
12894	Z4	L18	Q19
12895	Z4	L18	Q20
12896	Z4	L18	Q21
12897	Z4	L18	Q22
12898	Z4	L18	Q23
12899	Z4	L18	Q24
12900	Z4	L18	Q25
12901	Z4	L18	Q26
12902	Z4	L18	Q27
12903	Z4	L18	Q28
12904	Z4	L18	Q29
12905	Z4	L18	Q30
12906	Z4	L18	Q31
12907	Z4	L18	Q32
12908	Z4	L18	Q33
12909	Z4	L18	Q34
12910	Z4	L18	Q35
12911	Z4	L18	Q36
12912	Z4	L18	Q37
12913	Z4	L18	Q38
12914	Z4	L18	Q39
12915	Z4	L18	Q40
12916	Z4	L18	Q41
12917	Z4	L18	Q42
12918	Z4	L18	Q43
12919	Z4	L18	Q44
12920	Z4	L18	Q45
12921	Z4	L18	Q46
12922	Z4	L18	Q47
12923	Z4	L18	Q48
12924	Z4	L18	Q49
12925	Z4	L18	Q50
12926	Z4	L18	Q51
12927	Z4	L18	Q52
12928	Z4	L18	Q53
12929	Z4	L18	Q54
12930	Z4	L18	Q55
12931	Z4	L18	Q56
12932	Z4	L18	Q57
12933	Z4	L18	Q58
12934	Z4	L18	Q59
12935	Z4	L18	Q60
12936	Z4	L18	Q61
12937	Z4	L18	Q62
12938	Z4	L18	Q63
12939	Z4	L18	Q64
12940	Z4	L18	Q65
12941	Z4	L18	Q66
12942	Z4	L18	Q67
12943	Z4	L18	Q68
12944	Z4	L18	Q69
12945	Z4	L18	Q70
12946	Z4	L18	Q71
12947	Z4	L18	Q72
12948	Z4	L18	Q73
12949	Z4	L18	Q74
12950	Z4	L18	Q75
12951	Z4	L18	Q76
12952	Z4	L18	Q77
12953	Z4	L18	Q78
12954	Z4	L18	Q79
12955	Z4	L18	Q80
12956	Z4	L18	Q81
12957	Z4	L18	Q82
12958	Z4	L18	Q83
12959	Z4	L18	Q84
12960	Z4	L18	Q85
12961	Z4	L18	Q86
12962	Z4	L18	Q87
12963	Z4	L18	Q88
12964	Z4	L18	Q89
12965	Z4	L18	Q90
12966	Z4	L18	Q91
12967	Z4	L18	Q92
12968	Z4	L18	Q93
12969	Z4	L18	Q94
12970	Z4	L18	Q95
12971	Z4	L18	Q96
12972	Z4	L18	Q97
12973	Z4	L18	Q98
12974	Z4	L18	Q99
12975	Z4	L18	Q100
12976	Z4	L18	Q101
12977	Z4	L18	Q102
12978	Z4	L18	Q103
12979	Z4	L19	Q1
12980	Z4	L19	Q2
12981	Z4	L19	Q3
12982	Z4	L19	Q4
12983	Z4	L19	Q5
12984	Z4	L19	Q6
12985	Z4	L19	Q7
12986	Z4	L19	Q8
12987	Z4	L19	Q9
12988	Z4	L19	Q10
12989	Z4	L19	Q11
12990	Z4	L19	Q12
12991	Z4	L19	Q13
12992	Z4	L19	Q14
12993	Z4	L19	Q15
12994	Z4	L19	Q16
12995	Z4	L19	Q17
12996	Z4	L19	Q18
12997	Z4	L19	Q19
12998	Z4	L19	Q20
12999	Z4	L19	Q21
13000	Z4	L19	Q22
13001	Z4	L19	Q23
13002	Z4	L19	Q24
13003	Z4	L19	Q25
13004	Z4	L19	Q26
13005	Z4	L19	Q27
13006	Z4	L19	Q28
13007	Z4	L19	Q29
13008	Z4	L19	Q30
13009	Z4	L19	Q31
13010	Z4	L19	Q32
13011	Z4	L19	Q33
13012	Z4	L19	Q34
13013	Z4	L19	Q35
13014	Z4	L19	Q36
13015	Z4	L19	Q37
13016	Z4	L19	Q38
13017	Z4	L19	Q39
13018	Z4	L19	Q40
13019	Z4	L19	Q41
13020	Z4	L19	Q42
13021	Z4	L19	Q43
13022	Z4	L19	Q44
13023	Z4	L19	Q45
13024	Z4	L19	Q46
13025	Z4	L19	Q47
13026	Z4	L19	Q48
13027	Z4	L19	Q49
13028	Z4	L19	Q50
13029	Z4	L19	Q51
13030	Z4	L19	Q52
13031	Z4	L19	Q53
13032	Z4	L19	Q54
13033	Z4	L19	Q55
13034	Z4	L19	Q56
13035	Z4	L19	Q57
13036	Z4	L19	Q58
13037	Z4	L19	Q59

[Table 1-71]

13038	Z4	L19	Q60
13039	Z4	L19	Q61
13040	Z4	L19	Q62
13041	Z4	L19	Q63
13042	Z4	L19	Q64
13043	Z4	L19	Q65
13044	Z4	L19	Q66
13045	Z4	L19	Q67
13046	Z4	L19	Q68
13047	Z4	L19	Q69
13048	Z4	L19	Q70
13049	Z4	L19	Q71
13050	Z4	L19	Q72
13051	Z4	L19	Q73
13052	Z4	L19	Q74
13053	Z4	L19	Q75
13054	Z4	L19	Q76
13055	Z4	L19	Q77
13056	Z4	L19	Q78
13057	Z4	L19	Q79
13058	Z4	L19	Q80
13059	Z4	L19	Q81
13060	Z4	L19	Q82
13061	Z4	L19	Q83
13062	Z4	L19	Q84
13063	Z4	L19	Q85
13064	Z4	L19	Q86
13065	Z4	L19	Q87
13066	Z4	L19	Q88
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13069	Z4	L19	Q91
13070	Z4	L19	Q92
13071	Z4	L19	Q93
13072	Z4	L19	Q94
13073	Z4	L19	Q95
13074	Z4	L19	Q96
13075	Z4	L19	Q97
13076	Z4	L19	Q98
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13078	Z4	L19	Q100
13079	Z4	L19	Q101
13080	Z4	L19	Q102
13081	Z4	L19	Q103
13082	Z4	L20	Q1
13083	Z4	L20	Q2
13084	Z4	L20	Q3
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13097	Z4	L20	Q16
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13103	Z4	L20	Q22
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13124	Z4	L20	Q43
13125	Z4	L20	Q44
13126	Z4	L20	Q45
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13150	Z4	L20	Q69
13151	Z4	L20	Q70
13152	Z4	L20	Q71
13153	Z4	L20	Q72
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13158	Z4	L20	Q77
13159	Z4	L20	Q78
13160	Z4	L20	Q79
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13163	Z4	L20	Q82
13164	Z4	L20	Q83
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13166	Z4	L20	Q85
13167	Z4	L20	Q86
13168	Z4	L20	Q87
13169	Z4	L20	Q88
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13203	Z4	L21	Q19
13204	Z4	L21	Q20
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13206	Z4	L21	Q22
13207	Z4	L21	Q23
13208	Z4	L21	Q24
13209	Z4	L21	Q25
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13219	Z4	L21	Q35
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13221	Z4	L21	Q37
13222	Z4	L21	Q38
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13228	Z4	L21	Q44
13229	Z4	L21	Q45
13230	Z4	L21	Q46
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13233	Z4	L21	Q49
13234	Z4	L21	Q50
13235	Z4	L21	Q51
13236	Z4	L21	Q52
13237	Z4	L21	Q53
13238	Z4	L21	Q54

[Table 1-72]

13239	Z4	L21	Q55
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13241	Z4	L21	Q57
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13243	Z4	L21	Q59
13244	Z4	L21	Q60
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13248	Z4	L21	Q64
13249	Z4	L21	Q65
13250	Z4	L21	Q66
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13253	Z4	L21	Q69
13254	Z4	L21	Q70
13255	Z4	L21	Q71
13256	Z4	L21	Q72
13257	Z4	L21	Q73
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13259	Z4	L21	Q75
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13266	Z4	L21	Q82
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13303	Z4	L22	Q16
13304	Z4	L22	Q17
13305	Z4	L22	Q18
13306	Z4	L22	Q19
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13309	Z4	L22	Q22
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13317	Z4	L22	Q30
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13319	Z4	L22	Q32
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13322	Z4	L22	Q35
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13324	Z4	L22	Q37
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13332	Z4	L22	Q45
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13334	Z4	L22	Q47
13335	Z4	L22	Q48
13336	Z4	L22	Q49
13337	Z4	L22	Q50
13338	Z4	L22	Q51
13339	Z4	L22	Q52
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13342	Z4	L22	Q55
13343	Z4	L22	Q56
13344	Z4	L22	Q57
13345	Z4	L22	Q58
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13363	Z4	L22	Q76
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13406	Z4	L23	Q16
13407	Z4	L23	Q17
13408	Z4	L23	Q18
13409	Z4	L23	Q19
13410	Z4	L23	Q20
13411	Z4	L23	Q21
13412	Z4	L23	Q22
13413	Z4	L23	Q23
13414	Z4	L23	Q24
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13423	Z4	L23	Q33
13424	Z4	L23	Q34
13425	Z4	L23	Q35
13426	Z4	L23	Q36
13427	Z4	L23	Q37
13428	Z4	L23	Q38
13429	Z4	L23	Q39
13430	Z4	L23	Q40
13431	Z4	L23	Q41
13432	Z4	L23	Q42
13433	Z4	L23	Q43
13434	Z4	L23	Q44
13435	Z4	L23	Q45
13436	Z4	L23	Q46
13437	Z4	L23	Q47
13438	Z4	L23	Q48
13439	Z4	L23	Q49

[Table 1-73]

13440	Z4	L23	Q50
13441	Z4	L23	Q51
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13443	Z4	L23	Q53
13444	Z4	L23	Q54
13445	Z4	L23	Q55
13446	Z4	L23	Q56
13447	Z4	L23	Q57
13448	Z4	L23	Q58
13449	Z4	L23	Q59
13450	Z4	L23	Q60
13451	Z4	L23	Q61
13452	Z4	L23	Q62
13453	Z4	L23	Q63
13454	Z4	L23	Q64
13455	Z4	L23	Q65
13456	Z4	L23	Q66
13457	Z4	L23	Q67
13458	Z4	L23	Q68
13459	Z4	L23	Q69
13460	Z4	L23	Q70
13461	Z4	L23	Q71
13462	Z4	L23	Q72
13463	Z4	L23	Q73
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13466	Z4	L23	Q76
13467	Z4	L23	Q77
13468	Z4	L23	Q78
13469	Z4	L23	Q79
13470	Z4	L23	Q80
13471	Z4	L23	Q81
13472	Z4	L23	Q82
13473	Z4	L23	Q83
13474	Z4	L23	Q84
13475	Z4	L23	Q85
13476	Z4	L23	Q86
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13492	Z4	L23	Q102
13493	Z4	L23	Q103
13494	Z4	L24	Q1
13495	Z4	L24	Q2
13496	Z4	L24	Q3
13497	Z4	L24	Q4
13498	Z4	L24	Q5
13499	Z4	L24	Q6
13500	Z4	L24	Q7
13501	Z4	L24	Q8
13502	Z4	L24	Q9
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13526	Z4	L24	Q33
13527	Z4	L24	Q34
13528	Z4	L24	Q35
13529	Z4	L24	Q36
13530	Z4	L24	Q37
13531	Z4	L24	Q38
13532	Z4	L24	Q39
13533	Z4	L24	Q40
13534	Z4	L24	Q41
13535	Z4	L24	Q42
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13542	Z4	L24	Q49
13543	Z4	L24	Q50
13544	Z4	L24	Q51
13545	Z4	L24	Q52
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13549	Z4	L24	Q56
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13634	Z4	L25	Q38
13635	Z4	L25	Q39
13636	Z4	L25	Q40
13637	Z4	L25	Q41
13638	Z4	L25	Q42
13639	Z4	L25	Q43
13640	Z4	L25	Q44

[Table 1-74]

13641	Z4	L25	Q45
13642	Z4	L25	Q46
13643	Z4	L25	Q47
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13645	Z4	L25	Q49
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13655	Z4	L25	Q59
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13658	Z4	L25	Q62
13659	Z4	L25	Q63
13660	Z4	L25	Q64
13661	Z4	L25	Q65
13662	Z4	L25	Q66
13663	Z4	L25	Q67
13664	Z4	L25	Q68
13665	Z4	L25	Q69
13666	Z4	L25	Q70
13667	Z4	L25	Q71
13668	Z4	L25	Q72
13669	Z4	L25	Q73
13670	Z4	L25	Q74
13671	Z4	L25	Q75
13672	Z4	L25	Q76
13673	Z4	L25	Q77
13674	Z4	L25	Q78
13675	Z4	L25	Q79
13676	Z4	L25	Q80
13677	Z4	L25	Q81
13678	Z4	L25	Q82
13679	Z4	L25	Q83
13680	Z4	L25	Q84
13681	Z4	L25	Q85
13682	Z4	L25	Q86
13683	Z4	L25	Q87
13684	Z4	L25	Q88
13685	Z4	L25	Q89
13686	Z4	L25	Q90
13687	Z4	L25	Q91
13688	Z4	L25	Q92
13689	Z4	L25	Q93
13690	Z4	L25	Q94
13691	Z4	L25	Q95
13692	Z4	L25	Q96
13693	Z4	L25	Q97
13694	Z4	L25	Q98
13695	Z4	L25	Q99
13696	Z4	L25	Q100
13697	Z4	L25	Q101
13698	Z4	L25	Q102
13699	Z4	L25	Q103
13700	Z4	L26	Q1
13701	Z4	L26	Q2
13702	Z4	L26	Q3
13703	Z4	L26	Q4
13704	Z4	L26	Q5
13705	Z4	L26	Q6
13706	Z4	L26	Q7
13707	Z4	L26	Q8

13708	Z4	L26	Q9
13709	Z4	L26	Q10
13710	Z4	L26	Q11
13711	Z4	L26	Q12
13712	Z4	L26	Q13
13713	Z4	L26	Q14
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13715	Z4	L26	Q16
13716	Z4	L26	Q17
13717	Z4	L26	Q18
13718	Z4	L26	Q19
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13722	Z4	L26	Q23
13723	Z4	L26	Q24
13724	Z4	L26	Q25
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13738	Z4	L26	Q39
13739	Z4	L26	Q40
13740	Z4	L26	Q41
13741	Z4	L26	Q42
13742	Z4	L26	Q43
13743	Z4	L26	Q44
13744	Z4	L26	Q45
13745	Z4	L26	Q46
13746	Z4	L26	Q47
13747	Z4	L26	Q48
13748	Z4	L26	Q49
13749	Z4	L26	Q50
13750	Z4	L26	Q51
13751	Z4	L26	Q52
13752	Z4	L26	Q53
13753	Z4	L26	Q54
13754	Z4	L26	Q55
13755	Z4	L26	Q56
13756	Z4	L26	Q57
13757	Z4	L26	Q58
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13763	Z4	L26	Q64
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13766	Z4	L26	Q67
13767	Z4	L26	Q68
13768	Z4	L26	Q69
13769	Z4	L26	Q70
13770	Z4	L26	Q71
13771	Z4	L26	Q72
13772	Z4	L26	Q73
13773	Z4	L26	Q74
13774	Z4	L26	Q75

13775	Z4	L26	Q76
13776	Z4	L26	Q77
13777	Z4	L26	Q78
13778	Z4	L26	Q79
13779	Z4	L26	Q80
13780	Z4	L26	Q81
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13798	Z4	L26	Q99
13799	Z4	L26	Q100
13800	Z4	L26	Q101
13801	Z4	L26	Q102
13802	Z4	L26	Q103
13803	Z4	L27	Q1
13804	Z4	L27	Q2
13805	Z4	L27	Q3
13806	Z4	L27	Q4
13807	Z4	L27	Q5
13808	Z4	L27	Q6
13809	Z4	L27	Q7
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13818	Z4	L27	Q16
13819	Z4	L27	Q17
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13824	Z4	L27	Q22
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13826	Z4	L27	Q24
13827	Z4	L27	Q25
13828	Z4	L27	Q26
13829	Z4	L27	Q27
13830	Z4	L27	Q28
13831	Z4	L27	Q29
13832	Z4	L27	Q30
13833	Z4	L27	Q31
13834	Z4	L27	Q32
13835	Z4	L27	Q33
13836	Z4	L27	Q34
13837	Z4	L27	Q35
13838	Z4	L27	Q36
13839	Z4	L27	Q37
13840	Z4	L27	Q38
13841	Z4	L27	Q39

[Table 1-75]

13842	Z4	L27	Q40
13843	Z4	L27	Q41
13844	Z4	L27	Q42
13845	Z4	L27	Q43
13846	Z4	L27	Q44
13847	Z4	L27	Q45
13848	Z4	L27	Q46
13849	Z4	L27	Q47
13850	Z4	L27	Q48
13851	Z4	L27	Q49
13852	Z4	L27	Q50
13853	Z4	L27	Q51
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13855	Z4	L27	Q53
13856	Z4	L27	Q54
13857	Z4	L27	Q55
13858	Z4	L27	Q56
13859	Z4	L27	Q57
13860	Z4	L27	Q58
13861	Z4	L27	Q59
13862	Z4	L27	Q60
13863	Z4	L27	Q61
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13866	Z4	L27	Q64
13867	Z4	L27	Q65
13868	Z4	L27	Q66
13869	Z4	L27	Q67
13870	Z4	L27	Q68
13871	Z4	L27	Q69
13872	Z4	L27	Q70
13873	Z4	L27	Q71
13874	Z4	L27	Q72
13875	Z4	L27	Q73
13876	Z4	L27	Q74
13877	Z4	L27	Q75
13878	Z4	L27	Q76
13879	Z4	L27	Q77
13880	Z4	L27	Q78
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13882	Z4	L27	Q80
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13921	Z4	L28	Q16
13922	Z4	L28	Q17
13923	Z4	L28	Q18
13924	Z4	L28	Q19
13925	Z4	L28	Q20
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13927	Z4	L28	Q22
13928	Z4	L28	Q23
13929	Z4	L28	Q24
13930	Z4	L28	Q25
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13938	Z4	L28	Q33
13939	Z4	L28	Q34
13940	Z4	L28	Q35
13941	Z4	L28	Q36
13942	Z4	L28	Q37
13943	Z4	L28	Q38
13944	Z4	L28	Q39
13945	Z4	L28	Q40
13946	Z4	L28	Q41
13947	Z4	L28	Q42
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13953	Z4	L28	Q48
13954	Z4	L28	Q49
13955	Z4	L28	Q50
13956	Z4	L28	Q51
13957	Z4	L28	Q52
13958	Z4	L28	Q53
13959	Z4	L28	Q54
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13961	Z4	L28	Q56
13962	Z4	L28	Q57
13963	Z4	L28	Q58
13964	Z4	L28	Q59
13965	Z4	L28	Q60
13966	Z4	L28	Q61
13967	Z4	L28	Q62
13968	Z4	L28	Q63
13969	Z4	L28	Q64
13970	Z4	L28	Q65
13971	Z4	L28	Q66
13972	Z4	L28	Q67
13973	Z4	L28	Q68
13974	Z4	L28	Q69
13975	Z4	L28	Q70
13976	Z4	L28	Q71
13977	Z4	L28	Q72
13978	Z4	L28	Q73
13979	Z4	L28	Q74
13980	Z4	L28	Q75
13981	Z4	L28	Q76
13982	Z4	L28	Q77
13983	Z4	L28	Q78
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13998	Z4	L28	Q93
13999	Z4	L28	Q94
14000	Z4	L28	Q95
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14004	Z4	L28	Q99
14005	Z4	L28	Q100
14006	Z4	L28	Q101
14007	Z4	L28	Q102
14008	Z4	L28	Q103
14009	Z4	L29	Q1
14010	Z4	L29	Q2
14011	Z4	L29	Q3
14012	Z4	L29	Q4
14013	Z4	L29	Q5
14014	Z4	L29	Q6
14015	Z4	L29	Q7
14016	Z4	L29	Q8
14017	Z4	L29	Q9
14018	Z4	L29	Q10
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14024	Z4	L29	Q16
14025	Z4	L29	Q17
14026	Z4	L29	Q18
14027	Z4	L29	Q19
14028	Z4	L29	Q20
14029	Z4	L29	Q21
14030	Z4	L29	Q22
14031	Z4	L29	Q23
14032	Z4	L29	Q24
14033	Z4	L29	Q25
14034	Z4	L29	Q26
14035	Z4	L29	Q27
14036	Z4	L29	Q28
14037	Z4	L29	Q29
14038	Z4	L29	Q30
14039	Z4	L29	Q31
14040	Z4	L29	Q32
14041	Z4	L29	Q33
14042	Z4	L29	Q34

[Table 1-76]

14043	Z4	L29	Q35
14044	Z4	L29	Q36
14045	Z4	L29	Q37
14046	Z4	L29	Q38
14047	Z4	L29	Q39
14048	Z4	L29	Q40
14049	Z4	L29	Q41
14050	Z4	L29	Q42
14051	Z4	L29	Q43
14052	Z4	L29	Q44
14053	Z4	L29	Q45
14054	Z4	L29	Q46
14055	Z4	L29	Q47
14056	Z4	L29	Q48
14057	Z4	L29	Q49
14058	Z4	L29	Q50
14059	Z4	L29	Q51
14060	Z4	L29	Q52
14061	Z4	L29	Q53
14062	Z4	L29	Q54
14063	Z4	L29	Q55
14064	Z4	L29	Q56
14065	Z4	L29	Q57
14066	Z4	L29	Q58
14067	Z4	L29	Q59
14068	Z4	L29	Q60
14069	Z4	L29	Q61
14070	Z4	L29	Q62
14071	Z4	L29	Q63
14072	Z4	L29	Q64
14073	Z4	L29	Q65
14074	Z4	L29	Q66
14075	Z4	L29	Q67
14076	Z4	L29	Q68
14077	Z4	L29	Q69
14078	Z4	L29	Q70
14079	Z4	L29	Q71
14080	Z4	L29	Q72
14081	Z4	L29	Q73
14082	Z4	L29	Q74
14083	Z4	L29	Q75
14084	Z4	L29	Q76
14085	Z4	L29	Q77
14086	Z4	L29	Q78
14087	Z4	L29	Q79
14088	Z4	L29	Q80
14089	Z4	L29	Q81
14090	Z4	L29	Q82
14091	Z4	L29	Q83
14092	Z4	L29	Q84
14093	Z4	L29	Q85
14094	Z4	L29	Q86
14095	Z4	L29	Q87
14096	Z4	L29	Q88
14097	Z4	L29	Q89
14098	Z4	L29	Q90
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14108	Z4	L29	Q100
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14110	Z4	L29	Q102
14111	Z4	L29	Q103
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14113	Z4	L30	Q2
14114	Z4	L30	Q3
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14119	Z4	L30	Q8
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14125	Z4	L30	Q14
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14127	Z4	L30	Q16
14128	Z4	L30	Q17
14129	Z4	L30	Q18
14130	Z4	L30	Q19
14131	Z4	L30	Q20
14132	Z4	L30	Q21
14133	Z4	L30	Q22
14134	Z4	L30	Q23
14135	Z4	L30	Q24
14136	Z4	L30	Q25
14137	Z4	L30	Q26
14138	Z4	L30	Q27
14139	Z4	L30	Q28
14140	Z4	L30	Q29
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14144	Z4	L30	Q33
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14147	Z4	L30	Q36
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14149	Z4	L30	Q38
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14157	Z4	L30	Q46
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14159	Z4	L30	Q48
14160	Z4	L30	Q49
14161	Z4	L30	Q50
14162	Z4	L30	Q51
14163	Z4	L30	Q52
14164	Z4	L30	Q53
14165	Z4	L30	Q54
14166	Z4	L30	Q55
14167	Z4	L30	Q56
14168	Z4	L30	Q57
14169	Z4	L30	Q58
14170	Z4	L30	Q59
14171	Z4	L30	Q60
14172	Z4	L30	Q61
14173	Z4	L30	Q62
14174	Z4	L30	Q63
14175	Z4	L30	Q64
14176	Z4	L30	Q65
14177	Z4	L30	Q66
14178	Z4	L30	Q67
14179	Z4	L30	Q68
14180	Z4	L30	Q69
14181	Z4	L30	Q70
14182	Z4	L30	Q71
14183	Z4	L30	Q72
14184	Z4	L30	Q73
14185	Z4	L30	Q74
14186	Z4	L30	Q75
14187	Z4	L30	Q76
14188	Z4	L30	Q77
14189	Z4	L30	Q78
14190	Z4	L30	Q79
14191	Z4	L30	Q80
14192	Z4	L30	Q81
14193	Z4	L30	Q82
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14197	Z4	L30	Q86
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14209	Z4	L30	Q98
14210	Z4	L30	Q99
14211	Z4	L30	Q100
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14213	Z4	L30	Q102
14214	Z4	L30	Q103
14215	Z4	L31	Q1
14216	Z4	L31	Q2
14217	Z4	L31	Q3
14218	Z4	L31	Q4
14219	Z4	L31	Q5
14220	Z4	L31	Q6
14221	Z4	L31	Q7
14222	Z4	L31	Q8
14223	Z4	L31	Q9
14224	Z4	L31	Q10
14225	Z4	L31	Q11
14226	Z4	L31	Q12
14227	Z4	L31	Q13
14228	Z4	L31	Q14
14229	Z4	L31	Q15
14230	Z4	L31	Q16
14231	Z4	L31	Q17
14232	Z4	L31	Q18
14233	Z4	L31	Q19
14234	Z4	L31	Q20
14235	Z4	L31	Q21
14236	Z4	L31	Q22
14237	Z4	L31	Q23
14238	Z4	L31	Q24
14239	Z4	L31	Q25
14240	Z4	L31	Q26
14241	Z4	L31	Q27
14242	Z4	L31	Q28
14243	Z4	L31	Q29

[Table 1-77]

14244	Z4	L31	Q30
14245	Z4	L31	Q31
14246	Z4	L31	Q32
14247	Z4	L31	Q33
14248	Z4	L31	Q34
14249	Z4	L31	Q35
14250	Z4	L31	Q36
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14252	Z4	L31	Q38
14253	Z4	L31	Q39
14254	Z4	L31	Q40
14255	Z4	L31	Q41
14256	Z4	L31	Q42
14257	Z4	L31	Q43
14258	Z4	L31	Q44
14259	Z4	L31	Q45
14260	Z4	L31	Q46
14261	Z4	L31	Q47
14262	Z4	L31	Q48
14263	Z4	L31	Q49
14264	Z4	L31	Q50
14265	Z4	L31	Q51
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14271	Z4	L31	Q57
14272	Z4	L31	Q58
14273	Z4	L31	Q59
14274	Z4	L31	Q60
14275	Z4	L31	Q61
14276	Z4	L31	Q62
14277	Z4	L31	Q63
14278	Z4	L31	Q64
14279	Z4	L31	Q65
14280	Z4	L31	Q66
14281	Z4	L31	Q67
14282	Z4	L31	Q68
14283	Z4	L31	Q69
14284	Z4	L31	Q70
14285	Z4	L31	Q71
14286	Z4	L31	Q72
14287	Z4	L31	Q73
14288	Z4	L31	Q74
14289	Z4	L31	Q75
14290	Z4	L31	Q76
14291	Z4	L31	Q77
14292	Z4	L31	Q78
14293	Z4	L31	Q79
14294	Z4	L31	Q80
14295	Z4	L31	Q81
14296	Z4	L31	Q82
14297	Z4	L31	Q83
14298	Z4	L31	Q84
14299	Z4	L31	Q85
14300	Z4	L31	Q86
14301	Z4	L31	Q87
14302	Z4	L31	Q88
14303	Z4	L31	Q89
14304	Z4	L31	Q90
14305	Z4	L31	Q91
14306	Z4	L31	Q92
14307	Z4	L31	Q93
14308	Z4	L31	Q94
14309	Z4	L31	Q95
14310	Z4	L31	Q96
14311	Z4	L31	Q97
14312	Z4	L31	Q98
14313	Z4	L31	Q99
14314	Z4	L31	Q100
14315	Z4	L31	Q101
14316	Z4	L31	Q102
14317	Z4	L31	Q103
14318	Z4	L32	Q1
14319	Z4	L32	Q2
14320	Z4	L32	Q3
14321	Z4	L32	Q4
14322	Z4	L32	Q5
14323	Z4	L32	Q6
14324	Z4	L32	Q7
14325	Z4	L32	Q8
14326	Z4	L32	Q9
14327	Z4	L32	Q10
14328	Z4	L32	Q11
14329	Z4	L32	Q12
14330	Z4	L32	Q13
14331	Z4	L32	Q14
14332	Z4	L32	Q15
14333	Z4	L32	Q16
14334	Z4	L32	Q17
14335	Z4	L32	Q18
14336	Z4	L32	Q19
14337	Z4	L32	Q20
14338	Z4	L32	Q21
14339	Z4	L32	Q22
14340	Z4	L32	Q23
14341	Z4	L32	Q24
14342	Z4	L32	Q25
14343	Z4	L32	Q26
14344	Z4	L32	Q27
14345	Z4	L32	Q28
14346	Z4	L32	Q29
14347	Z4	L32	Q30
14348	Z4	L32	Q31
14349	Z4	L32	Q32
14350	Z4	L32	Q33
14351	Z4	L32	Q34
14352	Z4	L32	Q35
14353	Z4	L32	Q36
14354	Z4	L32	Q37
14355	Z4	L32	Q38
14356	Z4	L32	Q39
14357	Z4	L32	Q40
14358	Z4	L32	Q41
14359	Z4	L32	Q42
14360	Z4	L32	Q43
14361	Z4	L32	Q44
14362	Z4	L32	Q45
14363	Z4	L32	Q46
14364	Z4	L32	Q47
14365	Z4	L32	Q48
14366	Z4	L32	Q49
14367	Z4	L32	Q50
14368	Z4	L32	Q51
14369	Z4	L32	Q52
14370	Z4	L32	Q53
14371	Z4	L32	Q54
14372	Z4	L32	Q55
14373	Z4	L32	Q56
14374	Z4	L32	Q57
14375	Z4	L32	Q58
14376	Z4	L32	Q59
14377	Z4	L32	Q60
14378	Z4	L32	Q61
14379	Z4	L32	Q62
14380	Z4	L32	Q63
14381	Z4	L32	Q64
14382	Z4	L32	Q65
14383	Z4	L32	Q66
14384	Z4	L32	Q67
14385	Z4	L32	Q68
14386	Z4	L32	Q69
14387	Z4	L32	Q70
14388	Z4	L32	Q71
14389	Z4	L32	Q72
14390	Z4	L32	Q73
14391	Z4	L32	Q74
14392	Z4	L32	Q75
14393	Z4	L32	Q76
14394	Z4	L32	Q77
14395	Z4	L32	Q78
14396	Z4	L32	Q79
14397	Z4	L32	Q80
14398	Z4	L32	Q81
14399	Z4	L32	Q82
14400	Z4	L32	Q83
14401	Z4	L32	Q84
14402	Z4	L32	Q85
14403	Z4	L32	Q86
14404	Z4	L32	Q87
14405	Z4	L32	Q88
14406	Z4	L32	Q89
14407	Z4	L32	Q90
14408	Z4	L32	Q91
14409	Z4	L32	Q92
14410	Z4	L32	Q93
14411	Z4	L32	Q94
14412	Z4	L32	Q95
14413	Z4	L32	Q96
14414	Z4	L32	Q97
14415	Z4	L32	Q98
14416	Z4	L32	Q99
14417	Z4	L32	Q100
14418	Z4	L32	Q101
14419	Z4	L32	Q102
14420	Z4	L32	Q103
14421	Z4	L33	Q1
14422	Z4	L33	Q2
14423	Z4	L33	Q3
14424	Z4	L33	Q4
14425	Z4	L33	Q5
14426	Z4	L33	Q6
14427	Z4	L33	Q7
14428	Z4	L33	Q8
14429	Z4	L33	Q9
14430	Z4	L33	Q10
14431	Z4	L33	Q11
14432	Z4	L33	Q12
14433	Z4	L33	Q13
14434	Z4	L33	Q14
14435	Z4	L33	Q15
14436	Z4	L33	Q16
14437	Z4	L33	Q17
14438	Z4	L33	Q18
14439	Z4	L33	Q19
14440	Z4	L33	Q20
14441	Z4	L33	Q21
14442	Z4	L33	Q22
14443	Z4	L33	Q23
14444	Z4	L33	Q24

[Table 1-78]

14445	Z4	L33	Q25
14446	Z4	L33	Q26
14447	Z4	L33	Q27
14448	Z4	L33	Q28
14449	Z4	L33	Q29
14450	Z4	L33	Q30
14451	Z4	L33	Q31
14452	Z4	L33	Q32
14453	Z4	L33	Q33
14454	Z4	L33	Q34
14455	Z4	L33	Q35
14456	Z4	L33	Q36
14457	Z4	L33	Q37
14458	Z4	L33	Q38
14459	Z4	L33	Q39
14460	Z4	L33	Q40
14461	Z4	L33	Q41
14462	Z4	L33	Q42
14463	Z4	L33	Q43
14464	Z4	L33	Q44
14465	Z4	L33	Q45
14466	Z4	L33	Q46
14467	Z4	L33	Q47
14468	Z4	L33	Q48
14469	Z4	L33	Q49
14470	Z4	L33	Q50
14471	Z4	L33	Q51
14472	Z4	L33	Q52
14473	Z4	L33	Q53
14474	Z4	L33	Q54
14475	Z4	L33	Q55
14476	Z4	L33	Q56
14477	Z4	L33	Q57
14478	Z4	L33	Q58
14479	Z4	L33	Q59
14480	Z4	L33	Q60
14481	Z4	L33	Q61
14482	Z4	L33	Q62
14483	Z4	L33	Q63
14484	Z4	L33	Q64
14485	Z4	L33	Q65
14486	Z4	L33	Q66
14487	Z4	L33	Q67
14488	Z4	L33	Q68
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14490	Z4	L33	Q70
14491	Z4	L33	Q71
14492	Z4	L33	Q72
14493	Z4	L33	Q73
14494	Z4	L33	Q74
14495	Z4	L33	Q75
14496	Z4	L33	Q76
14497	Z4	L33	Q77
14498	Z4	L33	Q78
14499	Z4	L33	Q79
14500	Z4	L33	Q80
14501	Z4	L33	Q81
14502	Z4	L33	Q82
14503	Z4	L33	Q83
14504	Z4	L33	Q84
14505	Z4	L33	Q85
14506	Z4	L33	Q86
14507	Z4	L33	Q87
14508	Z4	L33	Q88
14509	Z4	L33	Q89
14510	Z4	L33	Q90
14511	Z4	L33	Q91
14512	Z4	L33	Q92
14513	Z4	L33	Q93
14514	Z4	L33	Q94
14515	Z4	L33	Q95
14516	Z4	L33	Q96
14517	Z4	L33	Q97
14518	Z4	L33	Q98
14519	Z4	L33	Q99
14520	Z4	L33	Q100
14521	Z4	L33	Q101
14522	Z4	L33	Q102
14523	Z4	L33	Q103
14524	Z4	L34	Q1
14525	Z4	L34	Q2
14526	Z4	L34	Q3
14527	Z4	L34	Q4
14528	Z4	L34	Q5
14529	Z4	L34	Q6
14530	Z4	L34	Q7
14531	Z4	L34	Q8
14532	Z4	L34	Q9
14533	Z4	L34	Q10
14534	Z4	L34	Q11
14535	Z4	L34	Q12
14536	Z4	L34	Q13
14537	Z4	L34	Q14
14538	Z4	L34	Q15
14539	Z4	L34	Q16
14540	Z4	L34	Q17
14541	Z4	L34	Q18
14542	Z4	L34	Q19
14543	Z4	L34	Q20
14544	Z4	L34	Q21
14545	Z4	L34	Q22
14546	Z4	L34	Q23
14547	Z4	L34	Q24
14548	Z4	L34	Q25
14549	Z4	L34	Q26
14550	Z4	L34	Q27
14551	Z4	L34	Q28
14552	Z4	L34	Q29
14553	Z4	L34	Q30
14554	Z4	L34	Q31
14555	Z4	L34	Q32
14556	Z4	L34	Q33
14557	Z4	L34	Q34
14558	Z4	L34	Q35
14559	Z4	L34	Q36
14560	Z4	L34	Q37
14561	Z4	L34	Q38
14562	Z4	L34	Q39
14563	Z4	L34	Q40
14564	Z4	L34	Q41
14565	Z4	L34	Q42
14566	Z4	L34	Q43
14567	Z4	L34	Q44
14568	Z4	L34	Q45
14569	Z4	L34	Q46
14570	Z4	L34	Q47
14571	Z4	L34	Q48
14572	Z4	L34	Q49
14573	Z4	L34	Q50
14574	Z4	L34	Q51
14575	Z4	L34	Q52
14576	Z4	L34	Q53
14577	Z4	L34	Q54
14578	Z4	L34	Q55
14579	Z4	L34	Q56
14580	Z4	L34	Q57
14581	Z4	L34	Q58
14582	Z4	L34	Q59
14583	Z4	L34	Q60
14584	Z4	L34	Q61
14585	Z4	L34	Q62
14586	Z4	L34	Q63
14587	Z4	L34	Q64
14588	Z4	L34	Q65
14589	Z4	L34	Q66
14590	Z4	L34	Q67
14591	Z4	L34	Q68
14592	Z4	L34	Q69
14593	Z4	L34	Q70
14594	Z4	L34	Q71
14595	Z4	L34	Q72
14596	Z4	L34	Q73
14597	Z4	L34	Q74
14598	Z4	L34	Q75
14599	Z4	L34	Q76
14600	Z4	L34	Q77
14601	Z4	L34	Q78
14602	Z4	L34	Q79
14603	Z4	L34	Q80
14604	Z4	L34	Q81
14605	Z4	L34	Q82
14606	Z4	L34	Q83
14607	Z4	L34	Q84
14608	Z4	L34	Q85
14609	Z4	L34	Q86
14610	Z4	L34	Q87
14611	Z4	L34	Q88
14612	Z4	L34	Q89
14613	Z4	L34	Q90
14614	Z4	L34	Q91
14615	Z4	L34	Q92
14616	Z4	L34	Q93
14617	Z4	L34	Q94
14618	Z4	L34	Q95
14619	Z4	L34	Q96
14620	Z4	L34	Q97
14621	Z4	L34	Q98
14622	Z4	L34	Q99
14623	Z4	L34	Q100
14624	Z4	L34	Q101
14625	Z4	L34	Q102
14626	Z4	L34	Q103
14627	Z4	L35	Q1
14628	Z4	L35	Q2
14629	Z4	L35	Q3
14630	Z4	L35	Q4
14631	Z4	L35	Q5
14632	Z4	L35	Q6
14633	Z4	L35	Q7
14634	Z4	L35	Q8
14635	Z4	L35	Q9
14636	Z4	L35	Q10
14637	Z4	L35	Q11
14638	Z4	L35	Q12
14639	Z4	L35	Q13
14640	Z4	L35	Q14
14641	Z4	L35	Q15
14642	Z4	L35	Q16
14643	Z4	L35	Q17
14644	Z4	L35	Q18
14645	Z4	L35	Q19

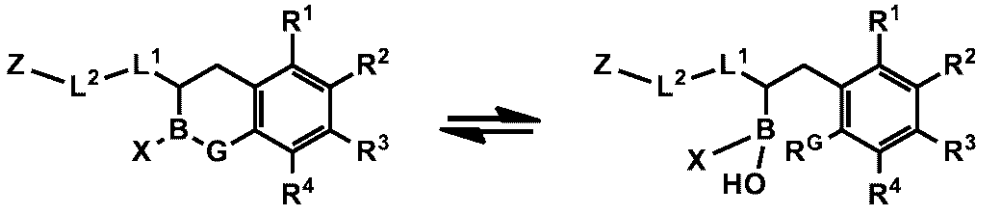
[Table 1-79]

14646	Z4	L35	Q20
14647	Z4	L35	Q21
14648	Z4	L35	Q22
14649	Z4	L35	Q23
14650	Z4	L35	Q24
14651	Z4	L35	Q25
14652	Z4	L35	Q26
14653	Z4	L35	Q27
14654	Z4	L35	Q28
14655	Z4	L35	Q29
14656	Z4	L35	Q30
14657	Z4	L35	Q31
14658	Z4	L35	Q32
14659	Z4	L35	Q33
14660	Z4	L35	Q34
14661	Z4	L35	Q35
14662	Z4	L35	Q36
14663	Z4	L35	Q37
14664	Z4	L35	Q38
14665	Z4	L35	Q39
14666	Z4	L35	Q40
14667	Z4	L35	Q41
14668	Z4	L35	Q42
14669	Z4	L35	Q43
14670	Z4	L35	Q44
14671	Z4	L35	Q45
14672	Z4	L35	Q46
14673	Z4	L35	Q47
14674	Z4	L35	Q48
14675	Z4	L35	Q49
14676	Z4	L35	Q50
14677	Z4	L35	Q51
14678	Z4	L35	Q52
14679	Z4	L35	Q53
14680	Z4	L35	Q54
14681	Z4	L35	Q55
14682	Z4	L35	Q56
14683	Z4	L35	Q57
14684	Z4	L35	Q58
14685	Z4	L35	Q59
14686	Z4	L35	Q60
14687	Z4	L35	Q61
14688	Z4	L35	Q62
14689	Z4	L35	Q63
14690	Z4	L35	Q64
14691	Z4	L35	Q65
14692	Z4	L35	Q66
14693	Z4	L35	Q67
14694	Z4	L35	Q68
14695	Z4	L35	Q69
14696	Z4	L35	Q70
14697	Z4	L35	Q71
14698	Z4	L35	Q72
14699	Z4	L35	Q73
14700	Z4	L35	Q74
14701	Z4	L35	Q75
14702	Z4	L35	Q76
14703	Z4	L35	Q77
14704	Z4	L35	Q78
14705	Z4	L35	Q79
14706	Z4	L35	Q80
14707	Z4	L35	Q81
14708	Z4	L35	Q82
14709	Z4	L35	Q83
14710	Z4	L35	Q84
14711	Z4	L35	Q85
14712	Z4	L35	Q86
14713	Z4	L35	Q87
14714	Z4	L35	Q88
14715	Z4	L35	Q89
14716	Z4	L35	Q90
14717	Z4	L35	Q91
14718	Z4	L35	Q92
14719	Z4	L35	Q93
14720	Z4	L35	Q94
14721	Z4	L35	Q95
14722	Z4	L35	Q96
14723	Z4	L35	Q97
14724	Z4	L35	Q98
14725	Z4	L35	Q99
14726	Z4	L35	Q100
14727	Z4	L35	Q101
14728	Z4	L35	Q102
14729	Z4	L35	Q103
14730	Z4	L36	Q1
14731	Z4	L36	Q2
14732	Z4	L36	Q3
14733	Z4	L36	Q4
14734	Z4	L36	Q5
14735	Z4	L36	Q6
14736	Z4	L36	Q7
14737	Z4	L36	Q8
14738	Z4	L36	Q9
14739	Z4	L36	Q10
14740	Z4	L36	Q11
14741	Z4	L36	Q12
14742	Z4	L36	Q13
14743	Z4	L36	Q14
14744	Z4	L36	Q15
14745	Z4	L36	Q16
14746	Z4	L36	Q17
14747	Z4	L36	Q18
14748	Z4	L36	Q19
14749	Z4	L36	Q20
14750	Z4	L36	Q21
14751	Z4	L36	Q22
14752	Z4	L36	Q23
14753	Z4	L36	Q24
14754	Z4	L36	Q25
14755	Z4	L36	Q26
14756	Z4	L36	Q27
14757	Z4	L36	Q28
14758	Z4	L36	Q29
14759	Z4	L36	Q30
14760	Z4	L36	Q31
14761	Z4	L36	Q32
14762	Z4	L36	Q33
14763	Z4	L36	Q34
14764	Z4	L36	Q35
14765	Z4	L36	Q36
14766	Z4	L36	Q37
14767	Z4	L36	Q38
14768	Z4	L36	Q39
14769	Z4	L36	Q40
14770	Z4	L36	Q41
14771	Z4	L36	Q42
14772	Z4	L36	Q43
14773	Z4	L36	Q44
14774	Z4	L36	Q45
14775	Z4	L36	Q46
14776	Z4	L36	Q47
14777	Z4	L36	Q48
14778	Z4	L36	Q49
14779	Z4	L36	Q50
14780	Z4	L36	Q51
14781	Z4	L36	Q52
14782	Z4	L36	Q53
14783	Z4	L36	Q54
14784	Z4	L36	Q55
14785	Z4	L36	Q56
14786	Z4	L36	Q57
14787	Z4	L36	Q58
14788	Z4	L36	Q59
14789	Z4	L36	Q60
14790	Z4	L36	Q61
14791	Z4	L36	Q62
14792	Z4	L36	Q63
14793	Z4	L36	Q64
14794	Z4	L36	Q65
14795	Z4	L36	Q66
14796	Z4	L36	Q67
14797	Z4	L36	Q68
14798	Z4	L36	Q69
14799	Z4	L36	Q70
14800	Z4	L36	Q71
14801	Z4	L36	Q72
14802	Z4	L36	Q73
14803	Z4	L36	Q74
14804	Z4	L36	Q75
14805	Z4	L36	Q76
14806	Z4	L36	Q77
14807	Z4	L36	Q78
14808	Z4	L36	Q79
14809	Z4	L36	Q80
14810	Z4	L36	Q81
14811	Z4	L36	Q82
14812	Z4	L36	Q83
14813	Z4	L36	Q84
14814	Z4	L36	Q85
14815	Z4	L36	Q86
14816	Z4	L36	Q87
14817	Z4	L36	Q88
14818	Z4	L36	Q89
14819	Z4	L36	Q90
14820	Z4	L36	Q91
14821	Z4	L36	Q92
14822	Z4	L36	Q93
14823	Z4	L36	Q94
14824	Z4	L36	Q95
14825	Z4	L36	Q96
14826	Z4	L36	Q97
14827	Z4	L36	Q98
14828	Z4	L36	Q99
14829	Z4	L36	Q100
14830	Z4	L36	Q101
14831	Z4	L36	Q102
14832	Z4	L36	Q103

[0125]

A specific example of another embodiment of the compound of the invention includes a compound represented by formula (11):

[Chemical Formula 663]



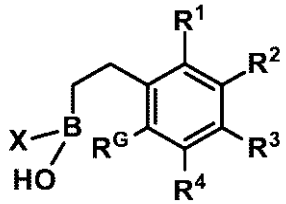
(1a) (11)

or a pharmaceutically acceptable salt thereof, wherein Z, L^1, L^2, X, R^1, R^2, R^3, and R^4 are the same as the definitions herein, R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, and R^{a1} is the same as the definition herein.

[0126]

A specific example of another embodiment of the compound of the invention includes a compound represented by formula (12):

[Chemical Formula 664]



(12)

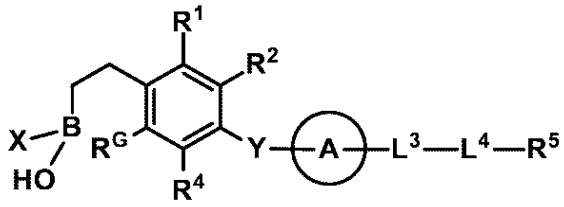
or a pharmaceutically acceptable salt thereof, wherein X, R^1, R^2, R^3, and R^4 are the same as the definitions herein, R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, and R^{a1} is the same as the definition herein. A compound of formula (12) is in an interchangeable relationship with, and thus can be biologically equivalent with, a compound of formula (1a) or (3a) due to an equilibrium reaction in an aqueous solution or in the body.

[0127]

A specific example of another embodiment of the

compound of the invention includes a compound represented by formula (13):

[Chemical Formula 665]



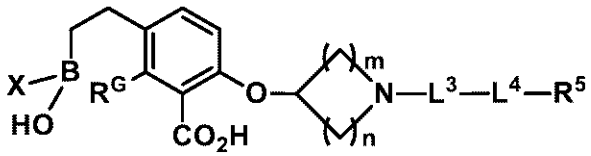
(13)

or a pharmaceutically acceptable salt thereof, wherein X, Y, ring A, L^3, L^4, R^1, R^2, R^4, and R^5 are the same as the definitions herein, R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, and R^{a1} is the same as the definition herein.

[0128]

A specific example of a preferred embodiment of the compound of the invention includes a compound represented by formula (14):

[Chemical Formula 666]



(14)

or a pharmaceutically acceptable salt thereof, wherein X, L^3, L^4, m, n, and R^5 are the same as the definitions herein, R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, and R^{a1} is the same as the definition herein.

[0129]

The compound of the invention is described further hereinafter.

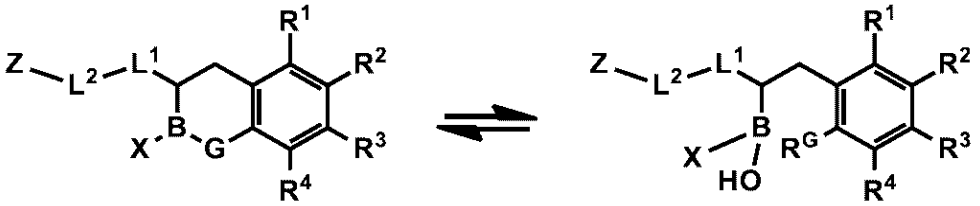
The compound of the invention can have, depending on the type of substituent, a tautomer, stereoisomers such as geometric isomer, and enantiomer, which are encompassed by the present invention. Specifically, if the compound of the invention has one or more asymmetric carbon atoms, there is a diastereomer or an enantiomer, where a mixture of such a

diastereomer or enantiomer or isolated diastereomer or enantiomer are also encompassed by the compound of the invention.

[0130]

The compound of the invention can also have a structure represented by the following formula (11) due to an equilibrium state or the like, depending on the environment conditions such as temperature or humidity, or a physical factor in a solid, liquid, solution, or the like. The compound of the invention also encompasses compounds with such a structure.

[Chemical Formula 667]



(1a) (11)

In formula (11), X represents a hydroxyl group, a thiol group, or $-NHR^{a1}$, Z, L^1, L^2, R^G, R^1, R^2, R^3, R^4, and R^{a1} are defined the same as the definitions herein, and formula (1a) is defined the same as the definition herein.

[0131]

For example, the structures of the compounds in the Examples herein are based on estimation considered the most appropriate by those skilled in the art using proton nuclear magnetic resonance spectrum (^{1}H-NMR), liquid chromatography mass spectrometry (LCMS), or the like, but the structures are just estimates under each specific measurement environment. In particular, the structure of formula (1a), the structure of formula (1b), and the structure of formula (11) are possibly converted to each other or partially converted to one of the structures and mixed due to a property unique to each compound, various environmental conditions such as temperature or humidity, or physical factor in a solid, liquid, solution or the like.

[0132]

The compound of the invention also includes various hydrates, solvates, and crystalline polymorphisms.

[0133]

Furthermore, the compound of the invention may be substituted with an isotope (e.g., ^{2}H (or D), ^{3}H (or T), ^{11}C, ^{13}C, ^{14}C, ^{13}N, ^{15}N, ^{15}O, ^{35}S, ^{18}F, ^{125}I, or the like). Such compounds are also encompassed by the compound of the invention.

[0134]

Prodrugs of the compound of the invention are also within the scope of the invention. As used herein, a prodrug refers to a derivative that results in the compound of formula (1a), (1b), or (11) by acid hydrolysis or enzymatic degradation in the body. If, for example, the compound of formula (1a), (1b), or (11) has a hydroxyl group, amino group, or carboxyl group, these groups can be modified in accordance with a conventional method to manufacture a prodrug.

[0135]

Examples for a compound with a carboxy group include compounds whose carboxyl group has been converted to an alkoxycarbonyl group, alkylthiocarbonyl group, or alkylaminocarbonyl group.

[0136]

Examples for a compound with an amino group include compounds whose amino group has been substituted with an alkanoyl group to be converted to an alkanoylamino group, substituted with an alkoxycarbonyl group to be converted to an alkoxycarbonylamino group, modified to an alkanoyloxymethylamino group, or converted to a hydroxylamine.

[0137]

Examples for a compound with a hydroxyl group include compounds whose hydroxyl group has been substituted with the alkanoyl group described above to be converted to an

alkanoyloxy group, converted to a phosphate ester, or converted to an alkanoyloxymethyloxy group.

[0138]

Examples of the alkyl moiety of a group used in producing these prodrugs include the alkyl group described above. The alkyl group is optionally substituted with, for example, an alkoxy group or the like. Preferred examples thereof include the following.

[0139]

Examples of compounds whose carboxyl group has been converted to an alkoxycarbonyl group include alkoxycarbonyl such as methoxycarbonyl and ethoxycarbonyl, and alkoxycarbonyl substituted with an alkoxy group such as methoxymethoxycarbonyl, ethoxymethoxycarbonyl, 2-methoxyethoxycarbonyl, 2-methoxyethoxymethoxycarbonyl, and pivaloyloxymethoxycarbonyl.

[0140]

As used herein, "pharmaceutically acceptable salt" refers to an acid addition salt or base addition salt which is pharmaceutically acceptable for use. Examples of "pharmaceutically acceptable salts" include, but are not limited to, acid addition salts such as acetate, propionate, butyrate, formate, trifluoroacetate, maleate, fumarate, tartrate, citrate, stearate, succinate, ethylsuccinate, malonate, lactobionate, gluconate, glucoheptonate, benzoate, methanesulfonate, benzenesulfonate, para-toluenesulfonate (tosylate), laurylsulfate, malate, ascorbate, mandelate, saccharinate, xinafoate, pamoate, cinnamate, adipate, cysteine salt, N-acetyl cysteine salt, hydrochloride, hydrobromide, phosphate, sulfate, hydroiodide, nicotinate, oxalate, picrate, thiocyanate, undecanoate, acrylic acid polymer salt, and carboxyvinyl polymer; inorganic base addition salts such as lithium salt, sodium salt, potassium salt, and calcium salt; organic base addition salts such as morpholine and piperidine; amino acid addition salts wherein the amino acid is aspartic acid or glutamic acid;

and the like.

[0141]

The compounds of the invention can be administered directly, or as a formulation, medicament, or a pharmaceutical composition using a suitable dosage form, by oral or parenteral administration. Specific examples of such dosage forms include, but are not limited to, tablets, capsules, powder, granules, liquid agents, suspension, injections, patches, poultice, and the like. These formulations can be manufactured by a known method using an additive that is commonly used as a pharmaceutical additive.

[0142]

As these additives, an excipient, disintegrant, binding agent, fluidizer, lubricant, coating agent, solubilizing agent, solubilization promotor, thickener, dispersant, stabilizer, sweetener, flavoring agent, or the like can be used depending on the objective. Specific examples of these additives include, but are not limited to, lactose, mannitol, crystalline cellulose, low-substituted hydroxypropyl cellulose, corn starch, partially pregelatinized starch, carmellose calcium, croscarmellose sodium, hydroxypropyl cellulose, hydroxypropyl methylcellulose, polyvinyl alcohol, magnesium stearate, sodium stearyl fumarate, polyethylene glycol, propylene glycol, titanium oxide, talc, and the like.

[0143]

The dosage of the compound of the invention is appropriately selected depending on the animal targeted for administration, route of administration, disease, patient's age, body weight, and symptom. For example, the dosage is 0.01 mg as the lower limit (preferably 100 mg) and 10000 mg as the upper limit (preferably 6000 mg) per day for adults for oral administration. This amount can be administered once daily, or divided into several doses.

[0144]

The compound of the invention is a compound with

inhibitory activity against β-lactamase. Thus, the compound can be a prophylactic or therapeutic agent that is useful for a bacterial infection by combined use with an antimicrobial agent. Specific examples of such bacterial infections include sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, an odontogenic infection, and the like.

[0145]

The compound of the invention can be used in combination with at least one agent selected from an antimicrobial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, or an anti-allergic agent for treating one or more bacterial infections described herein. The agent is preferably an antimicrobial agent, and more preferably a β-lactam agent. Specific examples thereof include amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin,

cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide, ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442. The timing of dosing of the compound of the invention and therapeutic agents thereof is not limited. The compound and therapeutic agent can be administered concurrently or sequentially to a subject being administered therewith. The compound of the invention and the therapeutic agents can be formulated as a combined agent. The dosage of the therapeutic agent can be appropriately selected based on the clinically used dose. The ratio of the compound of the invention and the therapeutic agents can be appropriately selected depending on the subject of administration, route of administration, target disease, symptom, combination, or the like.

[0146]

In another embodiment, the compound of the invention can be combined and administered concomitantly or administered at different times upon use of a pharmaceutical composition comprising an antimicrobial agent such as a β-lactam agent. Such a pharmaceutical composition comprising a β-lactam agent is also within the scope of the invention, and can be used for treating or preventing a bacterial infection such as sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema,

secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[0147]

Such a medicament, formulation, or pharmaceutical composition can be manufactured by mixing the compound of the invention and/or an addition agent (e.g., antimicrobial agent such as a β-lactam agent) with any suitable component, together or separately, as a combined agent or as separate agents using any technology that is known in the art. An appropriate formulation such as a tablet, capsule, powder, granule, liquid agent, suspension, injection, patch, or poultice can be formulated by using any technology that is known in the art. If the compound of the invention and/or an addition agent (e.g., antimicrobial agent such as a β-lactam agent) are prepared as separate agents, they can be provided as a kit of two agents. The kit can provide one of the components as a single agent, with instructions (package insert or the like) instructing to combine and administer the other component (for the compound of the invention, the additional agent (e.g., antimicrobial agent such as a β-lactam agent); for the addition agent (e.g., antimicrobial agent such as a β-lactam agent), the compound of the invention) concurrently or at different times.

[0148]

If the compound of the invention is used as an active ingredient of a medicament, the compound can be intended for use in not just humans, but also animals other than humans (cat, dog, cow, chicken, fish, and the like).

[0149]

Hereinafter, the method of manufacturing the compound

of the invention is described with examples, but the present invention is not limited thereto.

[0150]

The compound of the invention can be manufactured by, for example, the manufacturing methods described below, but the methods are not limited to such methods. These manufacturing methods can be appropriately improved upon based on the expertise of those skilled in the art of organic synthetic chemistry. Salts of the compounds used as a starting material can be used in the manufacturing method described below, as long as the reaction is not affected.

[0151]

In the manufacturing methods described below, even if use of a protecting group is not specifically described, a functional group other than those at the reaction point can be protected as needed and deprotected after the completion of a reaction or after a series of reactions to obtain a compound of interest if one of the functional groups other than those at the reaction point is altered under the reaction condition or if it is unsuitable for post-reaction processing. Common protecting groups described in the document (T. W. Greene and P. G. M. Wuts, "Protective Group in Organic Synthesis", 3rd Ed., John Wiley and Sons, Inc., New York (1999)) or the like can be used as the protecting groups used in these processes. A protecting group can be introduced or removed by a method that is commonly used in organic synthetic chemistry (e.g., method described in the aforementioned document or the like) or a method in accordance therewith.

[0152]

The starting material and intermediate in the manufacturing methods described below can be purchased as a commercially available product or are available by synthesis in accordance with a method described in a known document or a known method from a known compound. Salts of the starting material and intermediate can also be used, as

long as the reaction is not affected.

[0153]

The intermediate and compound of interest in the manufacturing methods described below can also be converted into another compound encompassed by the present invention by appropriately converting their functional groups. A functional group can be converted, in doing so, by a method that is commonly used in organic synthetic chemistry (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) or a method in accordance therewith.

[0154]

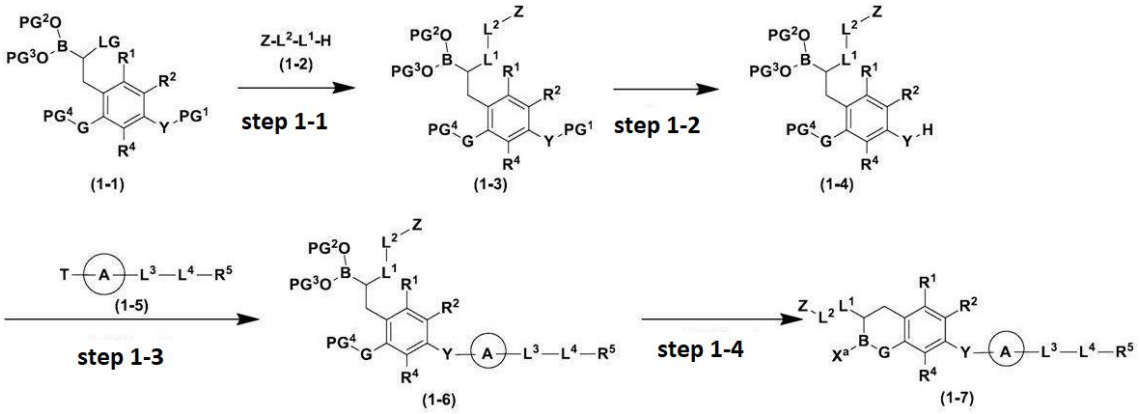
An inert solvent in the manufacturing methods described below refers to a solvent that does not react with starting materials, reagents, bases, acids, catalysts, ligands, or the like used in a reaction (hereinafter, also referred to as "starting materials or the like used in a reaction"). A solvent used in each step can be used as an inert solvent even if the solvent reacts with the starting materials or the like used in the reaction, as long as the reaction of interest proceeds to result in a compound of interest.

[0155]

Manufacturing Method 1

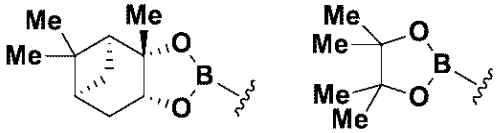
The compound of formula (1a), which is represented by formula (1-7) can be manufactured, for example, by the following manufacturing method.

[Chemical Formula 668]



wherein L^1, L^2, Y, Z, ring A, L^3, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, LG represents a leaving group (e.g., a halogen atom such as chlorine, bromine, or iodine, a lower alkylsulfonyloxy group such as methanesulfonyloxy, a trihalogenomethanesulfonyloxy group such as trifluoromethanesulfonyloxy, an arylsulfonyloxy group such as benzenesulfonyloxy or p-toluenesulfonyloxy, or the like), T represents a hydroxyl group or a leaving group (e.g., a halogen atom such as chlorine, bromine, or iodine, a lower alkylsulfonyloxy group such as methanesulfonyloxy, a trihalogenomethanesulfonyloxy group such as trifluoromethanesulfonyloxy, an arylsulfonyloxy group such as benzenesulfonyloxy or p-toluenesulfonyloxy, or the like), PG^1 represents a protecting group of a hydroxyl group (e.g., a tert-butoxycarbonyl group, acetyl group, methoxymethyl group, p-methoxybenzyl group, tert-butyldimethylsilyl group, trimethylsilyl group, or the like), and PG^2 and PG^3 represent protecting groups of boronic acid (e.g., an optionally substituted C_{1-6} alkyl group, a structure represented by the following formula, or the like).

[Chemical Formula 669]



PG^4 represents a hydrogen atom, a protecting group of a hydroxyl group (e.g., a tert-butoxycarbonyl group, acetyl group, methoxymethyl group, p-methoxybenzyl group, tert-butyldimethylsilyl group, trimethylsilyl group, or the like), a protecting group of a thiol group (e.g., an acetamidomethyl group or trityl group), or a protecting group of an amino group (e.g., an ethoxycarbonyl group, tert-butoxycarbonyl group, acetyl group, benzoyl group, trifluoroacetyl group, benzyloxycarbonyl group, 3- or 4-chlorobenzyloxycarbonyl group, triphenylmethyl group, methanesulfonyl group, p-toluenesulfonyl group, trimethylsilyl group, benzyloxycarbonyl group, 3- or 4-chlorobenzyloxycarbonyl group, benzylsulfonyl group, benzyl group, 4-nitrobenzyl group, 4-methoxybenzyl group, methyl group, ethyl group, or the like).

[0156]

A commercially available product or a compound manufactured by a known method (e.g., WO 2016/003929, WO 2016/149393, or the like) can be used as a starting raw material compound (1-1).

[0157]

A commercially available product that is purchased or a compound synthesized in accordance with a method described in a known document (WO 2016/149393, Journal of Heterocyclic Chemistry, 15(8), 1295, 1978, Journal of Heterocyclic Chemistry, 44(2), 279, 2007, Eur. J. Med. Chem., 64, 54, 2013, J. Med. Chem., 2012, 55, 2945., J. Med. Chem., 2005, 48, 1984, Tetrahedron Letters, 57, 2888, 2016, WO 2012/018668, or the like) or a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (1-2).

[0158]

A commercially available product that is purchased or a compound synthesized in accordance with a method described

in a known document (e.g., WO 2008/008895, WO 2011/118818, J. Med. Chem., 28(11), 1721, 1985, Tetrahedron, 67(52), 10208, 2011, Tetrahedron Letters, 26(39), 4739, 1985, J. Antibiot. 59(4), 241, 2006, or the like) or a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (1-5).

[0159]

As compound (1-2) and compound (1-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0160]

Step 1-1: Compound (1-3) can be manufactured by reacting compound (1-1) with compound (1-2) in an inert solvent in the presence of a base under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, halogenated hydrocarbon solvents such as dichloromethane or dichloroethane, aprotic solvents such as N,N-dimethylformamide (DMF), N-methylpyrrolidone (NMP), and dimethyl sulfoxide (DMSO), and the like. Examples of base include potassium tert-butoxy, sodium hydride, triethylamine, diisopropylethylamine, potassium carbonate, sodium carbonate, and the like. A base can be used at 0.001 to 100 equivalents with respect to compound (1-1), which is preferably 0.5 to 10 equivalents. Compound (1-2) can be used at 0.001 to 100 equivalents with respect to compound (1-1), which is preferably 1 to 10 equivalents. The reaction temperature is selected from the range of about -10°C to about 100°C.

[0161]

Step 1-2: Compound (1-4) can be manufactured by deprotecting the protecting group PG^1 of compound (1-3). This step can be performed in accordance with the method described in, for example, the document (T. W. Greene and P.

G. M. Wuts, "Protective Group in Organic Synthesis", 3rd Ed., John Wiley and Sons, Inc., New York (1999)) or the like.

[0162]

Step 1-3: Compound (1-6) can be manufactured using Manufacturing Method (1-3-1) or Manufacturing Method (1-3-2) described below.

Step 1-3-1: If Y is an oxygen atom and T is a hydroxyl group, compound (1-6) can be manufactured by reacting compound (1-4) with compound (1-5) under the so-called Mitsunobu reaction in an inert solvent, in the presence of an azo compound analog and organic phosphorous compound or in the presence of a phosphorane compound under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, hydrocarbon solvents such as toluene and benzene, and the like. Examples of azo compound analog include diethyl azodicarboxylate, diisopropyl azodicarboxylate, and the like. An azo compound analog can be used at 0.001 to 100 molar equivalents with respect to compound (1-4), which is preferably 1 to 10 molar equivalents. Examples of the organic phosphorous compound include triphenylphosphine, tributylphosphine, and the like. An organic phosphorous compound can be used at 0.001 to 100 molar equivalents with respect to compound (1-4), which is preferably 1 to 10 molar equivalents. Examples of phosphorane compounds include (cyanomethylene)tributylphosphorane, (cyanomethylene)trimethylphosphorane, and the like. A phosphorane compound can be used at 0.001 to 100 molar equivalents with respect to compound (1-4), which is preferably 1 to 10 molar equivalents. The reaction temperature is selected from the range of about -10°C to about 100°C.

Step 1-3-2: If Y is an oxygen atom, a sulfur atom, or -NR^j- and T is a leaving group (e.g., a halogen atom such as chlorine, bromine, or iodine, a lower alkylsulfonyloxy

group such as a methanesulfonyloxy group, a trihalogenomethanesulfonyloxy group such as a trifluoromethanesulfonyloxy group, an arylsulfonyloxy group such as a benzenesulfonyloxy group or p-toluenesulfonyloxy group, or the like), compound (1-6) can be manufactured by reacting compound (1-4) with compound (1-5) in an inert solvent, in the presence of a base under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, halogenated hydrocarbon solvents such as dichloromethane and dichloroethane, aprotic solvents such as N,N-dimethylformamide (DMF), N-methylpyrrolidone (NMP), and dimethyl sulfoxide (DMSO), and the like. Examples of bases include potassium tert-butoxy, sodium hydride, triethylamine, diisopropylethylamine, potassium carbonate, sodium carbonate, cesium carbonate, and the like. A base can be used at 0.001 to 100 molar equivalents with respect to compound (1-1), which is preferably 0.5 to 10 molar equivalents. Compound (1-5) can be used at 0.001 to 100 molar equivalents with respect to compound (1-4), which is preferably 1 to 10 molar equivalents. The reaction temperature is selected from the range of about -10°C to about 100°C.

[0163]

Step 1-4: This reaction can manufacture a compound from a corresponding compound (1-6) in accordance with a known method (e.g., WO 2014/151958, WO 2015/191907, WO 2016/003929, or the like). Preferably, a compound can be manufactured using Manufacturing Method (1-4-1) or Manufacturing Method 1-4-2) described below.

Manufacturing Method (1-4-1): Compound (1-7) can be manufactured by using compound (1-6) as a starting material and reacting the compound with boronic acid under acidic conditions in an inert solvent. Examples of boronic acid include phenylboronic acid and 2-methylpropyl boronic acid. The boronic acid can be used in the range of 0.001 to 100 equivalents with respect to compound (1-6), which is

preferably 1 to 3 equivalents. Examples of acids include hydrochloric acid, trifluoroacetic acid, and the like. An acid can be used in the range of 0.001 to 100 equivalents with respect to compound (1-6), which is preferably 1 to 10 equivalents. Specific examples of inert solvents include halogenated hydrocarbon solvents such as dichloromethane and dichloroethane, hydrocarbon solvents such as hexane and heptane, ether solvents such as THF and CPME, nitrile solvents such as acetonitrile and propionitrile, and water, which can be used alone or as a mixture solvent. The acids described above can also be directly used as a solvent. A mixture solvent of hexane/acetonitrile is preferably used as a solvent. The reaction temperature is selected from the range of about -10°C to about 100°C.

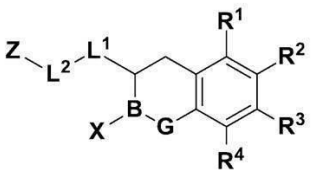
Manufacturing Method (1-4-2): Compound (1-7) can be manufactured by using compound (1-6) as the starting material and reacting the compound with triethylsilane in a trifluoroacetic acid solvent. Triethylsilane can be used in the range of 0.001 to 100 equivalents with respect to compound (1-6), which is preferably 1 to 50 equivalents. The reaction temperature is selected from the range of about -10°C to about 70°C.

[0164]

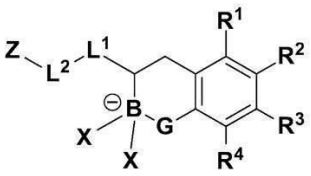
Manufacturing Method 1A

A compound of formula (1a) can be purchased or manufactured from a preparable corresponding material in the same manner as the manufacturing method of compound (1-7) described above. The compound is obtained in some cases as a compound of formula (1b), for example, by reacting with a reagent that generates nucleophilic X^- (X anion) (e.g., alkali metal salt generating a hydroxide anion HO^-, alkali metal salt of C_{1-6} alkoxide generating a C_{1-6} alkoxide anion, the alkali metal salt of amide generating amide anion $R^{a2}R^{b1}N^-$, or the like), depending on the property of compound (1a).

[Chemical Formula 670]



(1a)

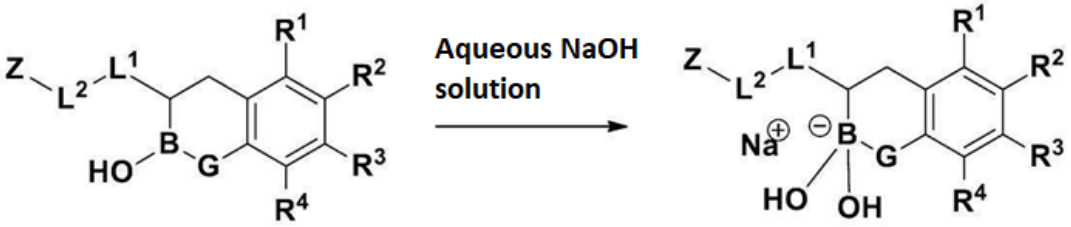


(1b)

wherein X, Z, L^1, L^2, G, R^1, R^2, R^3, and R^4 are defined the same as item 1.

For example, a compound of formula (1a'), which is a compound of formula (1a) wherein X is a hydroxyl group, is obtained in some cases as a sodium salt compound of formula (1b'), depending on the property of the compound, by treatment with an aqueous sodium hydroxide solution.

[Chemical Formula 671]

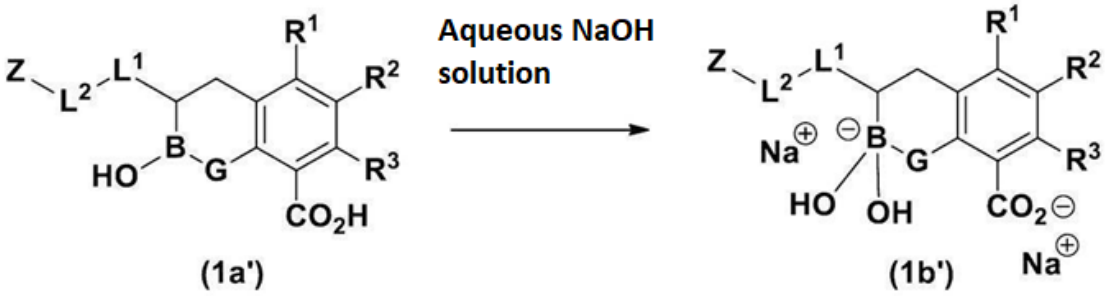


(1a')　　(1b')

wherein Z, L^1, L^2, G, R^1, R^2, R^3, and R^4 are defined the same as item 1.

For example, a compound of formula (1a''), which is a compound of formula (1a) wherein X is a hydroxyl group and R^4 is a carboxyl group, is obtained in some cases as a disodium salt compound of formula (1b''), depending on the property of the compound, by treatment with an aqueous sodium hydroxide solution.

[Chemical Formula 672]



(1a')　　(1b')

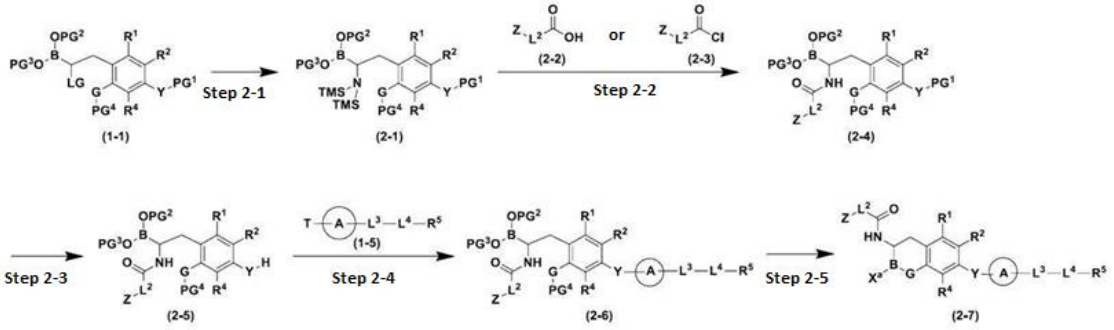
wherein Z, L^1, L^2, G, R^1, R^2, and R^3 are defined the same as item 1.

[0165]

Manufacturing Method 2

Compounds of formula (1a) represented by formula (2-7) described below can be manufactured, for example, by the manufacturing method described below. Compound (2-7) represents compound (1-7) wherein L^1 is $-NR^d(C=O)-$ and R^d is a hydrogen atom.

[Chemical Formula 673]



wherein L^2, Y, Z, ring A, L^3, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, T, LG, PG^1, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1, and TMS represents a trimethylsilyl group.

[0166]

A commercially available product that is purchased or a compound manufactured by the method described in Manufacturing Method 1 can be used as the starting material compound (1-1) and compound (1-5). Further, a commercially available product that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (2-2) and compound (2-3). As compound (1-5), compound (2-2), and compound (2-3), a salt thereof can also be used, and the compound with a functional group that is

protected can also be used as needed, as long as the reaction is not affected.

[0167]

Step 2-1: Compound (2-1) can be manufactured by reacting compound (1-1) with hexamethyldisilazane lithium in an inert solvent under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and diethyl ether, and the like. Hexamethyldisilazane lithium can be used at 0.001 to 100 equivalents with respect to compound (1-1), which is preferably 1 to 10 equivalents. The reaction temperature is selected from the range of about -78°C to about 50°C.

[0168]

Step 2-2: Compound (2-4) can be manufactured by reacting compound (2-1) with compound (2-2) or (2-3) in an inert solvent in the presence or absence of a condensing agent and/or base under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, halogenated hydrocarbon solvents such as dichloromethane and chloroform, aprotic solvents such as DMF, NMP, and DMSO, and the like. (2-2) or (2-3) can be used at 0.001 to 100 equivalents with respect to compound (2-1), which is preferably 1 to 10 equivalents. Various condensing agents that are used in a conventional method can be used as the condensing agent. Examples thereof include 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide (including hydrochloride), O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate, N,N'-dicyclohexylcarbodiimide, 4-(4,6-dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholinium chloride, hydrates thereof, and the like. A condensing agent can be used at 0.001 to 100 equivalents with respect to compound (2-1), which is preferably 1 to 10 equivalents. Examples of bases include diisopropylethylamine, triethylamine, and the like. A base can be used at 0.001 to 100 equivalents with respect to compound (2-1), which is preferably 1 to 10 equivalents.

The reaction temperature is selected from the range of about -78°C to about 100°C.

[0169]

Step 2-3: Compound (2-5) can be manufactured by using compound (2-4) as a starting material and using conditions in accordance with step 1-2 of Manufacturing Method 1 described above.

[0170]

Step 2-4: Compound (2-6) can be manufactured by using compound (2-5) as a starting material, and reacting the compound with compound (1-5) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0171]

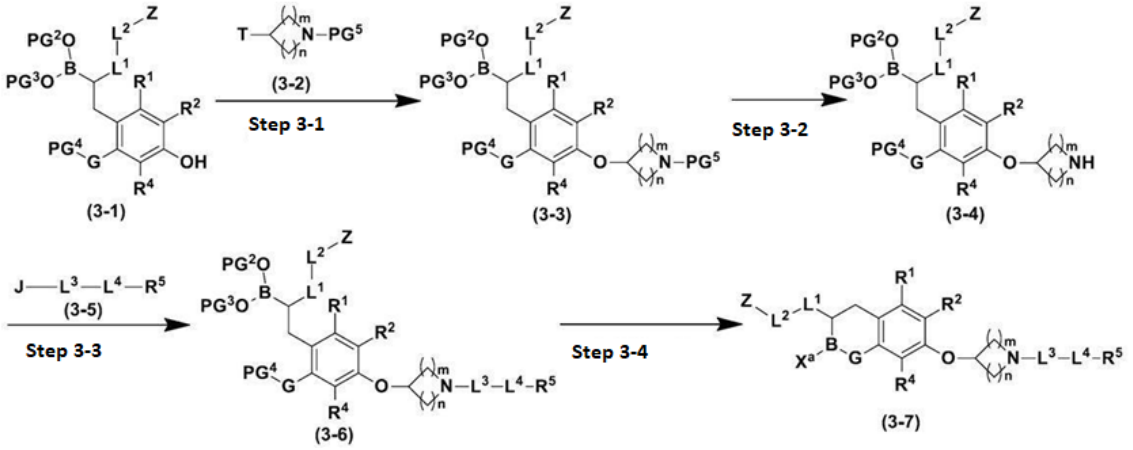
Step 2-5: Compound (2-7) can be manufactured by using compound (2-6) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0172]

Manufacturing Method 3

A compound of formula (1a) represented by formula (3-7) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 674]



wherein L^1, L^2, Z, L^3, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, m and n are defined the same as item 28,

X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, T, LG, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1, PG^5 represents a protecting group of an amino group (e.g., an ethoxycarbonyl group, tert-butoxycarbonyl group, acetyl group, benzoyl group, trifluoroacetyl group, benzyloxycarbonyl group, 3- or 4-chlorobenzyloxycarbonyl group, triphenylmethyl group, methanesulfonyl group, p-toluenesulfonyl group, trimethylsilyl group, benzyloxycarbonyl group, 3- or 4-chlorobenzyloxycarbonyl group, benzylsulfonyl group, benzyl group, 4-nitrobenzyl group, 4-methoxybenzyl group, methyl group, ethyl group, or the like), and J represents a hydroxyl group or a leaving group (e.g., a halogen atom such as chlorine, bromine, or iodine, a lower alkylsulfonyloxy group such as methanesulfonyloxy, a trihalogenomethanesulfonyloxy group such as trifluoromethanesulfonyloxy, an arylsulfonyloxy group such as benzenesulfonyloxy or p-toluenesulfonyloxy, or the like).

[0173]

A commercially available product that is purchased or a compound manufactured by the methods described in Manufacturing Method 1 and Manufacturing Method 2 can be used as the starting material compound (3-1) and compound (3-2). Further, a commercially available product that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (3-2) and compound (3-5). As compound (3-2) and compound (3-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0174]

Step 3-1: Compound (3-3) can be manufactured by using

compound (3-1) as a starting material, and reacting the compound with compound (3-2) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0175]

Step 3-2: Compound (3-4) can be manufactured by deprotecting the protecting group PG^5 of compound (3-3). This step can be performed in accordance with the method described in, for example, the document (T. W. Greene and P. G. M. Wuts, "Protective Group in Organic Synthesis", 3rd Ed., John Wiley and Sons, Inc., New York (1999)) or the like.

[0176]

Step 3-3: Compound (3-6) can be manufactured by using compound (3-4) as a starting material and using conditions in accordance with step 2-2 of Manufacturing Method 2 described above.

[0177]

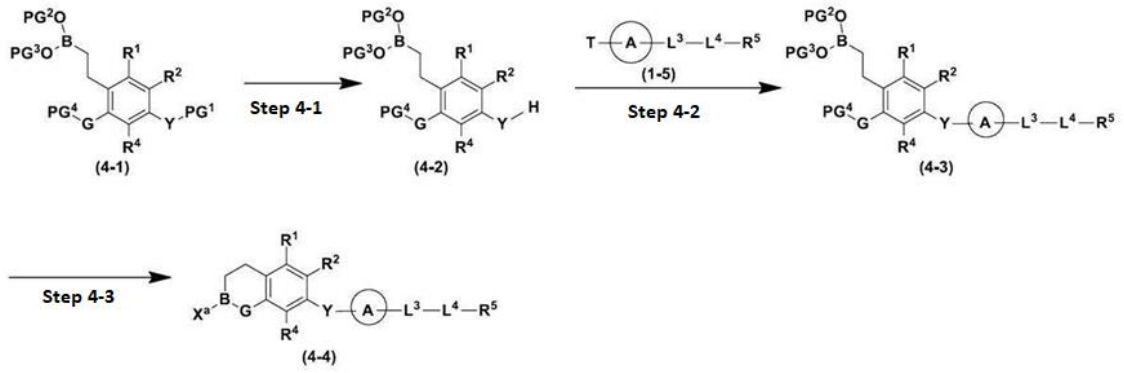
Step 3-4: Compound (3-7) can be manufactured by using compound (3-6) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0178]

Manufacturing Method 4

A compound of formula (1a) represented by formula (4-4) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 675]



wherein Y, ring A, L^3, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and T, PG^1, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1.

[0179]

A commercially available product that is purchased or a compound manufactured by the method described in Manufacturing Method 1 can be used as the starting material compound (4-1) and compound (1-5). As compound (1-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0180]

Step 4-1: Compound (4-2) can be manufactured by using compound (4-1) as a starting material and using conditions in accordance with step 1-2 of Manufacturing Method 1 described above.

[0181]

Step 4-2: Compound (4-3) can be manufactured by using compound (4-2) as a starting material, and reacting the compound with compound (1-5) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0182]

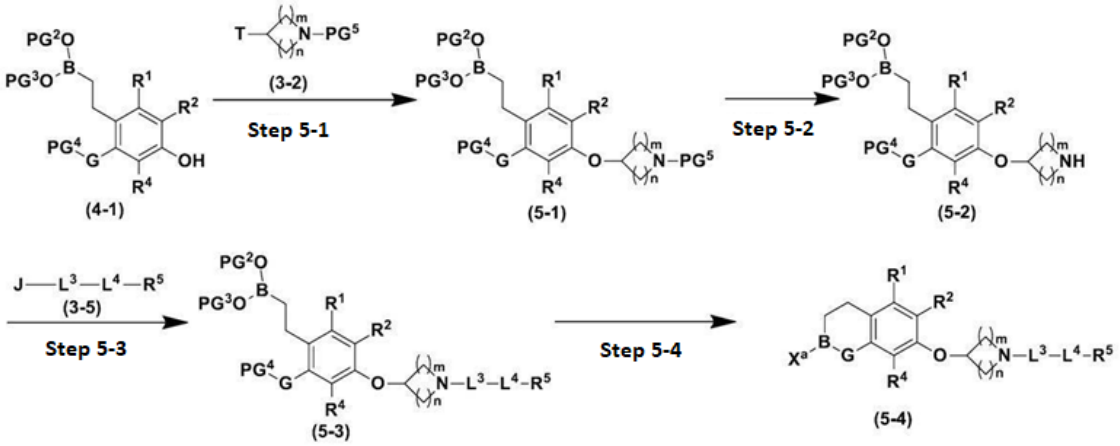
Step 4-3: Compound (4-4) can be manufactured by using compound (4-3) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0183]

Manufacturing Method 5

A compound of formula (1a) represented by formula (5-4) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 676]



wherein L^3, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, T, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1, and PG^5 and J are defined the same as the definitions described in Manufacturing Method 3.

[0184]

A commercially available product that is purchased or a compound manufactured by the methods described in Manufacturing Method 1 and Manufacturing Method 3 can be used as the starting material compound (4-1), compound (3-2), and compound (3-5). As compound (3-2) and compound (3-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0185]

Step 5-1: Compound (5-1) can be manufactured by using compound (4-1) as a starting material, and reacting the compound with compound (3-2) by using conditions in accordance with step 3-1 of Manufacturing Method 3 described above.

[0186]

Step 5-2: Compound (5-2) can be manufactured by using compound (5-1) as a starting material and using conditions

in accordance with step 3-2 of Manufacturing Method 3 described above.

[0187]

Step 5-3: Compound (5-3) can be manufactured by using compound (5-2) as a starting material, and reacting the compound with compound (3-5) by using conditions in accordance with step 3-3 of Manufacturing Method 3 described above.

[0188]

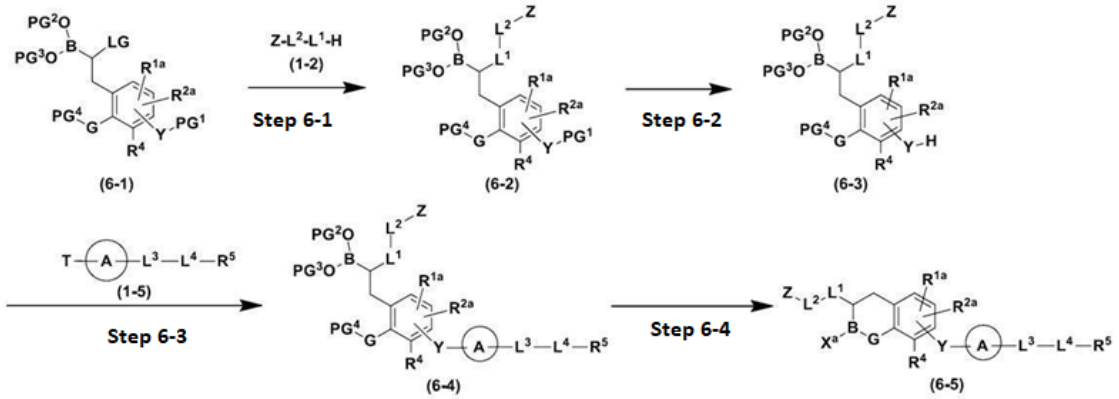
Step 5-4: Compound (5-4) can be manufactured by using compound (5-3) as a starting material and using conditions in accordance with step 3-4 of Manufacturing Method 3 described above.

[0189]

Manufacturing Method 6

A compound of formula (1a) represented by formula (6-5) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 677]



wherein L^1, L^2, Y, Z, ring A, L^3, L^4, G, R^4, and R^5 are defined the same as item 1, wherein one end of Y, R^{1a}, and R^{2a} each attach to one of three attachable positions denoted as unsubstituted on a benzene ring in the chemical formula, R^{1a} and R^{2a} represent the remaining two without a structure of formula (2) among R^1, R^2, and R^3 defined in item 1 herein, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and T, LG, PG^1, PG^2, PG^3, and PG^4 are

each defined the same as the definition described in Manufacturing Method 1.

[0190]

A commercially available product that is purchased or a compound manufactured by the method of Manufacturing Method 1 can be used as the starting material compound (6-1), compound (1-2), and compound (1-5). As compound (3-2) and compound (3-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0191]

Step (6-1): Compound (6-2) can be manufactured by using compound (6-1) as a starting material, and reacting the compound with compound (1-2) by using conditions in accordance with step 1-1 of Manufacturing Method 1 described above.

[0192]

Step (6-2): Compound (6-3) can be manufactured by using compound (6-2) as a starting material and using conditions in accordance with step 1-2 of Manufacturing Method 1 described above.

[0193]

Step (6-3): Compound (6-4) can be manufactured by using compound (6-3) as a starting material, and reacting the compound with compound (1-5) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0194]

Step (6-4): Compound (6-5) can be manufactured by using compound (6-4) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

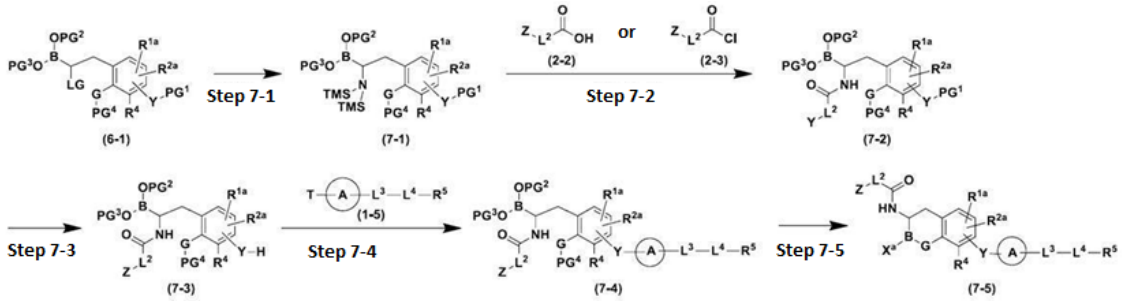
[0195]

Manufacturing Method 7

A compound of formula (1a) represented by formula (7-5) described below can be manufactured, for example, by the

manufacturing method described below. Said compound represents compound (6-5) wherein L^1 is $-NR^d(C=O)-$ and R^d is a hydrogen atom.

[Chemical Formula 678]



wherein L^2, Y, Z, ring A, L^3, L^4, G, R^4, and R^5 are defined the same as item 1, wherein one end of Y, R^{1a}, and R^{2a} each attach to one of three attachable positions denoted as unsubstituted on a benzene ring in the chemical formula, R^{1a} and R^{2a} represent the remaining two without a structure of formula (2) among R^1, R^2, and R^3 defined in item 1 herein, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, T, LG, PG^1, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1, and TMS represents trimethylsilyl.

[0196]

A commercially available product that is purchased or a compound manufactured by the method described in Manufacturing Method 1 can be used as the starting material compound (6-1), compound (1-2), and compound (1-5). Further, a commercially available product that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (2-2) and compound (2-3). As compound (2-2), compound (2-3), or compound (1-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0197]

Step 7-1: Compound (7-1) can be manufactured by using compound (6-1) as a starting material and using conditions in accordance with step 2-1 of Manufacturing Method 2 described above.

[0198]

Step 7-2: Compound (7-2) can be manufactured by using compound (7-3) as a starting material, and reacting the compound with compound (2-2) or compound (2-3) by using conditions in accordance with step 2-2 of Manufacturing Method 2 described above.

[0199]

Step 7-3: Compound (7-3) can be manufactured by using compound (7-2) as a starting material and using conditions in accordance with step 2-3 of Manufacturing Method 2 described above.

[0200]

Step 7-4: Compound (7-4) can be manufactured by using compound (7-3) as a starting material, and reacting the compound with compound (1-5) by using conditions in accordance with step 2-4 of Manufacturing Method 2 described above.

[0201]

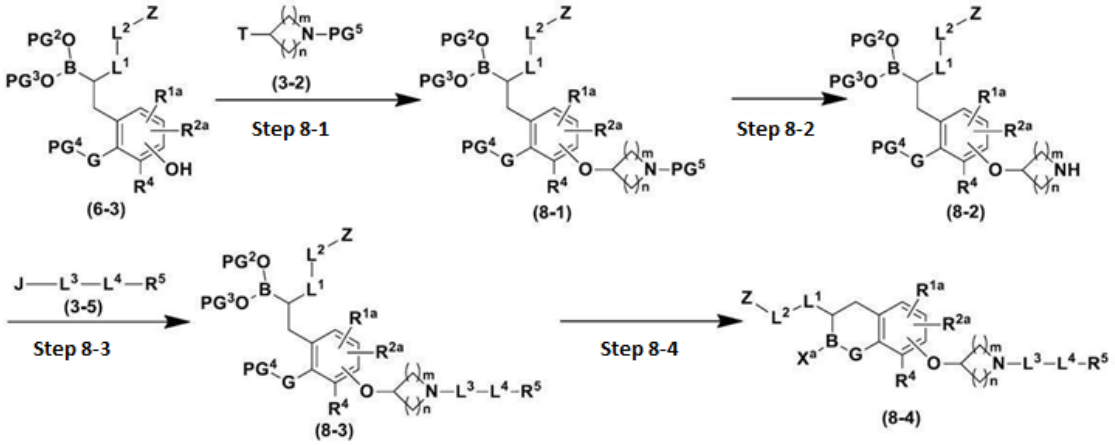
Step 7-5: Compound (7-5) can be manufactured by using compound (7-4) as a starting material and using conditions in accordance with step 2-5 of Manufacturing Method 2 described above.

[0202]

Manufacturing Method 8

A compound of formula (1a) represented by formula (8-4) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 679]



where L^1, L^2, Z, L^3, L^4, G, R^4, and R^5 are defined the same as item 1, wherein one end of an oxygen atom, R^{1a}, and R^{2a} for substitution on a benzene ring each attach to one of three attachable positions denoted as unsubstituted on a benzene ring in the chemical formula, R^{1a} and R^{2a} represent the remaining two without a structure of formula (2) among R^1, R^2, and R^3 defined in item 1 herein, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, T, PG^2, PG^3, and PG^4 are each defined the same as the definitions described in Manufacturing Method 1, and PG^5 and J are each defined the same as the definitions described in Manufacturing Method 3.

[0203]

A commercially available product that is purchased or a compound manufactured by the methods described in Manufacturing Method 1 and Manufacturing Method 2 can be used as the starting material compound (6-3). Further, a commercially available product that is purchased or a compound manufactured by the method described in Manufacturing Method 3 can be used as compound (3-2) and compound (3-5). As compound (3-2) and compound (3-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0204]

Step 8-1: Compound (8-1) can be manufactured by using compound (6-3) as a starting material, and reacting the compound with compound (3-2) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0205]

Step 8-2: Compound (8-2) can be manufactured by using compound (8-1) as a starting material and using conditions in accordance with step 3-2 of Manufacturing Method 3 described above.

[0206]

Step 8-3: Compound (8-3) can be manufactured by using compound (8-3) as a starting material, and reacting the compound with compound (3-5) by using conditions in accordance with step 3-3 of Manufacturing Method 3 described above.

[0207]

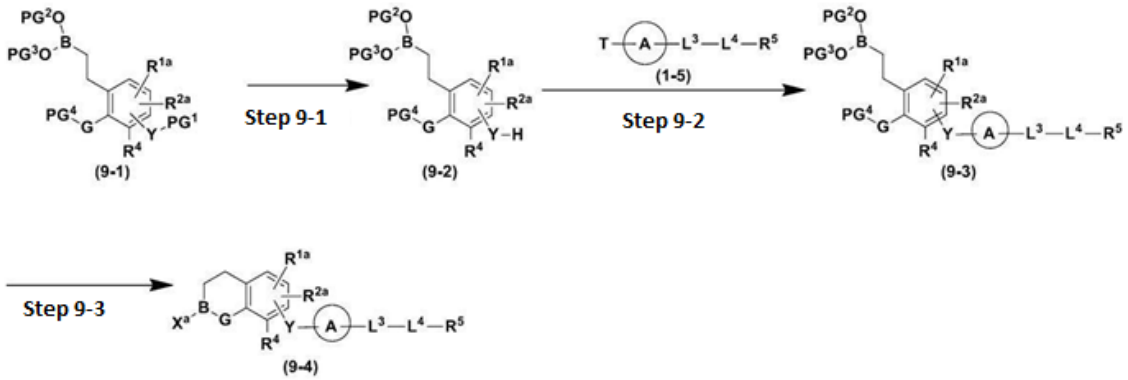
Step 8-4: Compound (8-4) can be manufactured by using compound (8-3) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0208]

Manufacturing Method 9

A compound of formula (1a) represented by formula (9-4) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 680]



wherein Y, ring A, L^3, L^4, G, R^4, and R^5 are defined the

same as item 1, wherein one end of Y, R^{1a}, and R^{2a} each attach to one of three attachable positions denoted as unsubstituted on a benzene ring in the chemical formula, R^{1a} and R^{2a} represent the remaining two without a structure of formula (2) among R^1, R^2, and R^3 defined in item 1 herein, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and T, LG, PG^1, PG^2, PG^3, and PG^4 are each defined the same as the definition described in Manufacturing Method 1.

[0209]

A commercially available product that is purchased or a compound manufactured by the method described in Manufacturing Method 1 can be used as the starting material compound (9-1) and compound (1-5). As compound (1-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0210]

Step 9-1: Compound (9-2) can be manufactured by using compound (9-1) as a starting material and using conditions in accordance with step 1-2 of Manufacturing Method 1 described above.

[0211]

Step 9-2: Compound (9-3) can be manufactured by using compound (9-2) as a starting material, and reacting the compound with compound (1-5) by using conditions in accordance with step 1-3 of Manufacturing Method 1 described above.

[0212]

Step 9-3: Compound (9-4) can be manufactured by using compound (9-3) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

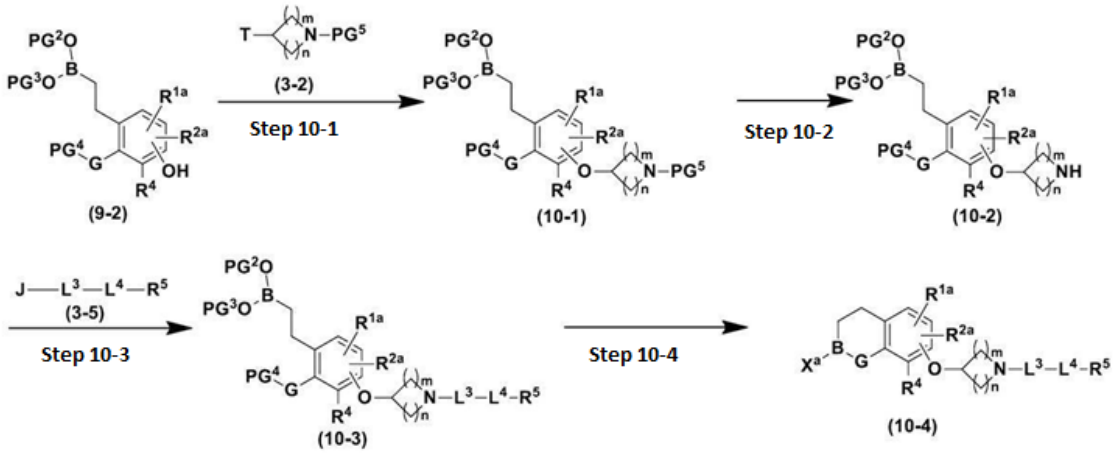
[0213]

Manufacturing Method 10

A compound of formula (1a) represented by formula (10-

4) described below can be manufactured, for example, by the manufacturing method described below.

[Chemical Formula 681]



wherein L^3, L^4, G, R^4, and R^5 are defined the same as item 1, T, PG^2, PG^3, and PG^4 are each defined the same as the definitions described in Manufacturing Method 1, wherein one end of an oxygen atom, R^{1a}, and R^{2a} for substitution on a benzene ring each attach to one of three attachable positions denoted as unsubstituted on a benzene ring in the chemical formula, R^{1a} and R^{2a} represent the remaining two without a structure of formula (2) among R^1, R^2, and R^3 defined in item 1 herein, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and PG^5 and J are defined the same as the definitions described in Manufacturing Method 3.

[0214]

A commercially available product that is purchased or a compound manufactured by the methods described in Manufacturing Method 1 and Manufacturing Method 3 can be used as the starting material compound (9-2), compound (3-2), and compound (3-5). As compound (3-2) and compound (3-5), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0215]

Step 10-1: Compound (10-1) can be manufactured by using

compound (9-2) as a starting material, and reacting the compound with compound (3-2) by using conditions in accordance with step 3-1 of Manufacturing Method 3 described above.

[0216]

Step 10-2: Compound (10-2) can be manufactured by using compound (10-1) as a starting material and using conditions in accordance with step 3-2 of Manufacturing Method 3 described above.

[0217]

Step 10-3: Compound (10-3) can be manufactured by using compound (10-2) as a starting material, and reacting the compound with compound (3-5) by using conditions in accordance with step 3-3 of Manufacturing Method 3 described above.

[0218]

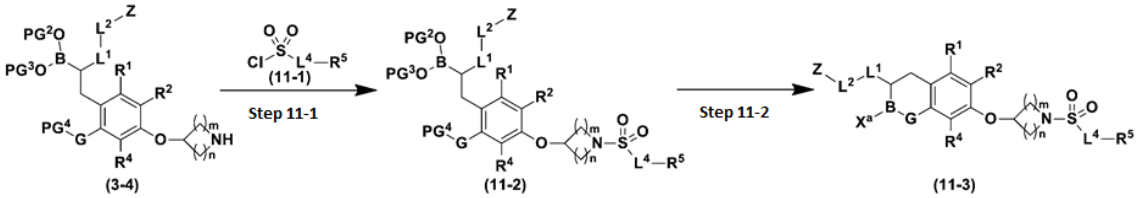
Step 10-4: Compound (10-4) can be manufactured by using compound (10-3) as a starting material and using conditions in accordance with step 3-4 of Manufacturing Method 3 described above.

[0219]

Manufacturing Method 11

A compound of formula (1a) represented by formula (11-3) described below can be manufactured, for example, by the manufacturing method described below. Said compound (11-3) represents compound (3-7) wherein L^3 is $-S(=O)_2-$.

[Chemical Formula 682]



wherein L^1, L^2, Z, L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and PG^2, PG^3, and PG^4 are each defined the same as the

definitions described in Manufacturing Method 1.

[0220]

A compound manufactured by the method described in Manufacturing Method 3 can be used as the starting material compound (3-4). Further, a commercially available product that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (11-1). As compound (11-1), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0221]

Step 11-1: Compound (11-2) can be manufactured by reacting compound (3-4) with compound (11-1) in an inert solvent in the presence or absence of a base under normal pressure or under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, halogenated hydrocarbon solvents such as dichloromethane and chloroform, and aprotic solvents such as DMF, NMP, and DMSO. Compound (11-1) can be used at 0.001 to 100 equivalents with respect to compound (3-4), which is preferably 1 to 10 equivalents. Examples of bases include diisopropylethylamine, triethylamine, and the like. A base can be used at 0.001 to 100 equivalents with respect to compound (3-4), which is preferably 1 to 10 equivalents. The reaction temperature is selected from the range of about -78°C to about 100°C.

[0222]

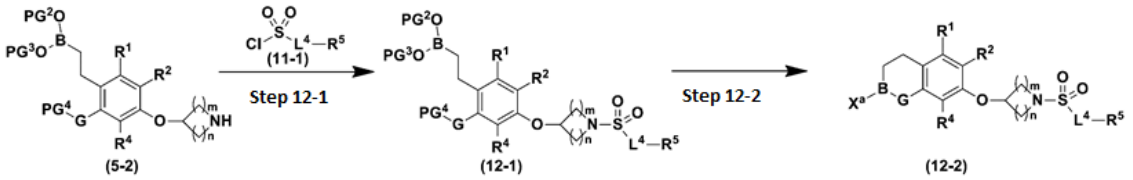
Step 11-2: Compound (11-3) can be manufactured by using compound (11-2) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0223]

Manufacturing Method 12

A compound of formula (1a) represented by formula (12-2) described below can be manufactured, for example, by the manufacturing method described below. Said compound (12-2) represents compound (5-4) wherein L^3 is $-S(=O)_2-$.

[Chemical Formula 683]



wherein L^4, G, R^1, R^2, R^4, and R^5 are defined the same as item 1, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, and PG^2, PG^3, and PG^4 are each defined the same as the definitions described in Manufacturing Method 1.

[0224]

A compound manufactured by the method described in Manufacturing Method 5 can be used as the starting material compound (5-2). Further, a commercially available product that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (11-1). As compound (11-1), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0225]

Step 12-1: Compound (12-1) can be manufactured by using compound (5-4) as a starting material and using conditions in accordance with step 11-1 of Manufacturing Method 11 described above.

[0226]

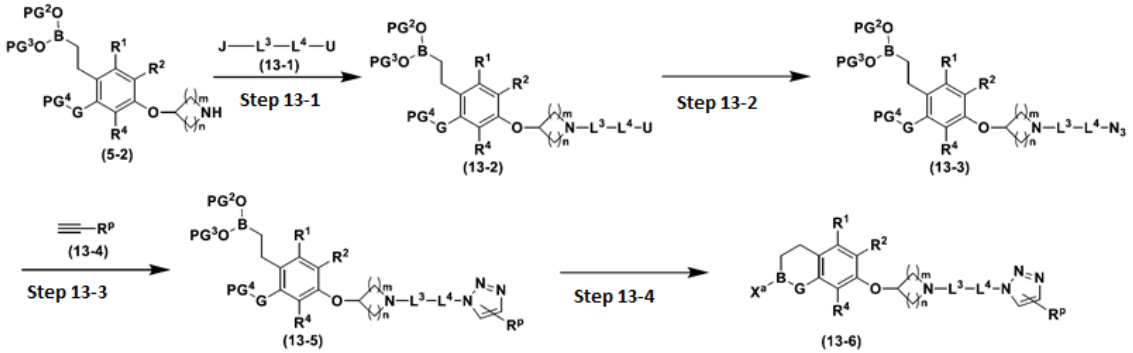
Step 12-2: Compound (12-2) can be manufactured by using compound (12-1) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0227]

Manufacturing Method 13

A compound of formula (1a) represented by formula (13-5) described below can be manufactured, for example, by the manufacturing method described below. Said compound (13-5) represents compound (5-4) wherein R^5 is optionally substituted 1H-1,2,3-triazole.

[Chemical Formula 684]



wherein L^3, L^4, G, R^1, R^2, and R^4 are defined the same as item 1, m and n are defined the same as item 28, X^a is a hydroxyl group or a C_{1-6} alkoxy group, H is a hydrogen atom, U represents an amino group, a nitro group, carboxylic acid, alcohol, or a leaving group (e.g., a halogen atom such as chlorine, bromine, or iodine, a lower alkylsulfonyloxy group such as methanesulfonyloxy, a trihalogenomethanesulfonyloxy group such as trifluoromethanesulfonyloxy, an arylsulfonyloxy group such as benzenesulfonyloxy or p-toluenesulfonyloxy, or the like), R^p is a group that is acceptable as a compound of formula (13-4) in R^a defined in item 36 or a group that can be converted into the R^a, PG^2, PG^3, and PG^4 are each defined the same as the definitions described in Manufacturing Method 1, and J is defined the same as the definition described in Manufacturing Method 3.

[0228]

A compound manufactured by the method described in Manufacturing Method 5 can be used as the starting material compound (5-2). Further, a commercially available product

that is purchased or a compound synthesized in accordance with a known method (e.g., the method described in R. C. Larock, "Comprehensive Organic Transformations", 2nd Ed., John Wiley and Sons, Inc., New York (1999) or the like) from a known compound can be used as compound (13-1). As compound (13-1), a salt thereof can also be used, and the compound with a functional group that is protected can also be used as needed, as long as the reaction is not affected.

[0229]

Step 13-1: Compound (13-2) can be manufactured using compound (5-4) as a starting material and using conditions in accordance with step 5-3 of Manufacturing Method 5 described above.

[0230]

Step 13-2: Compound (13-3) can be manufactured by reacting compound (13-2) with an aziding agent in an inert solvent in the presence or absence of a base under normal pressure. Specific examples of inert solvents include halogenated hydrocarbon solvents such as dichloromethane and chloroform and aprotic solvents such as DMF, NMP, and DMSO. Specific examples of aziding agents include sodium azide, trimethylsilyl azide, diphenylphosphoryl azide, and the like. An aziding agent can be used at 0.001 to 100 equivalents with respect to compound (13-2), which is preferably 1 to 10 equivalents. Examples of bases include diisopropylethylamine, triethylamine, 4-dimethylaminopyridine, and the like. A base can be used at 0.001 to 100 equivalents with respect to compound (13-2), which is preferably 1 to 10 equivalents. The reaction temperature is selected from the range of about -78°C to about 100°C.

[0231]

Step 13-3: Compound (13-5) can be manufactured by reacting compound (13-3) with compound (13-4) in an inert solvent in the presence or absence of a base in the presence or absence of a catalyst under normal pressure or

under pressure. Specific examples of inert solvents include ether solvents such as THF and DME, halogenated hydrocarbon solvents such as dichloromethane and chloroform, and aprotic solvents such as acetonitrile, DMF, NMP, and DMSO. Compound (13-4) can be used at 0.001 to 100 equivalents with respect to compound (13-3), which is preferably 1 to 10 equivalents. Examples of bases include diisopropylethylamine, triethylamine, and the like. A base can be used at 0.001 to 100 equivalents with respect to compound (13-3), which is preferably 1 to 10 equivalents. Specific examples of catalysts include copper sulfate, copper iodide, and (chloro[(1,2,3,4,5-h)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(triphenylphosphine)ruthenium(II). A catalyst can be used at 0.001 to 100 equivalents with respect to compound (13-3), which is preferably 0.01 to 10 equivalents. The reaction temperature is selected from the range of about -78°C to about 100°C.

[0232]

Step 13-4: Compound (12-6) can be manufactured using compound (12-5) as a starting material and using conditions in accordance with step 1-4 of Manufacturing Method 1 described above.

[0233]

The intermediate and compound of interest in the manufacturing methods described above can be isolated and purified by subjecting them to a purification method that is commonly used in organic synthesis chemistry (e.g., neutralization, filtration, extraction, washing, drying, concentration, recrystallization, various chromatography, or the like). Each intermediate can also be subjected to the subsequent reaction without any particular purification.

[0234]

Optically active forms of the compound of the invention can be manufactured by using an optically active starting material or intermediate, or by optically resolving a

racemate of the final product or intermediate. Examples of optional resolution methods include, but are not limited to, separation method using an optically active column and a separation method such as fractional crystallization method. A diastereomer of the compound of the invention can be manufactured by, for example, a separation method such as column chromatography or fractional crystallization, but the method is not limited thereto.

[0235]

A pharmaceutically acceptable salt of a compound represented by formula (1a) or (1b) can be manufactured by, for example, mixing a compound represented by formula (1) with a pharmaceutically acceptable acid or base in a solvent such as water, methanol, ethanol, 2-propanol, ethyl acetate, or acetone, but the manufacturing method is not limited thereto.

[0236]

As used herein, "or" is used when "at least one or more" of the listed matters in the sentence can be employed. When explicitly described herein as "within the range of two values", the range also includes the two values themselves.

[0237]

Reference literatures such as scientific literatures, patents, and patent applications cited herein are incorporated herein by reference to the same extent that the entirety of each document is specifically described.

[0238]

The present invention has been described while showing preferred embodiments to facilitate understanding. While the present invention is described hereinafter based on the Examples, the above descriptions and the following Examples are provided for the sole purpose of exemplification, not limitation of the present invention. Thus, the scope of the present invention is not limited to the embodiments and

Examples that are specifically described herein and is limited only by the scope of claims.

[Examples]

[0239]

While the present invention is described more specifically with Reference Examples, Examples, and Test Examples hereinafter, the preset invention is not limited thereto.

[0240]

Compounds were identified using proton nuclear magnetic resonance spectrum (^{1}H-NMR), liquid chromatography-mass spectrometry (LCMS), or the like. Tetramethylsilane was used as an internal standard for nuclear magnetic resonance spectrum.

[0241]

For column chromatography in the Reference Examples and Examples, Yamazen Corporation's silica gel column, YMC's ODS-A column, and YMC's YMC-Actus Triart C18 were used. For TLC (silica gel plate) in purification using a thin layer chromatography (TLC), Silica gel 60F254 (Merck) was used, and for TLC (NH silica gel plate), TLC plate NH (Fuji Silysia) was used.

[0242]

Various data described in the Reference Examples and Example was obtained with the following equipment.

NMR spectrum: [^{1}H-NMR] 400 MHz: JEOL JNM-AL series AL400, JEOL EX270, and 500 MHz: JEOL ECA-500.

600 Hz: Agilent DD2 600 MHz NMR Spectrometer.

LC-MS spectrum: Waters ACQUITY™ UltraPerformance LC, Waters AQUITY UPLC H-Class System, Shimadzu LCMS-2020.

[0243]

The compound names described in the Reference Examples and Examples were named using ACD/Name (ACD/Labs 12.0, Advanced Chemistry Development Inc.), which are not necessarily in accordance with the IUPAC nomenclature.

[0244]

The measuring conditions (hereinafter, also referred to as the measurement methods) for a high performance liquid chromatography-mass spectrometry (LCMS) system are described below. The observed mass spectrometry value [MS(m/z)] is indicated by $[M+1]^+$, and the time of retention at which the mass spectrometry value was observed is indicated by Rt (min). The measurement conditions A to C used for measurement are denoted in each actual measurement value. For example, "LCMS: $[M+H]^+$/Rt = 620/1.32^A" expresses that measurement was taken under measurement condition A.

[0245]

Measurement Condition A

Measuring equipment: Waters ACQUITY™ UltraPerformance LC

Column: ACQUITY UPLC BEH C18 1.7 μm 2.1 x 30 mm column

Solvent: solution A: 0.05% $HCOOH/H_2O$, solution B: CH_3CN

Gradient condition:

0.0 to 1.3 minutes; A/B = 90/10 to 5/95 (linear gradient)

1.3 to 1.5 minutes; A/B = 90/10

Flow rate: 0.80 mL/min

UV: 220 nm, 254 nm

Column temperature: 40°C

[0246]

Measurement Condition B

Measuring equipment: Waters AQUITY UPLC H-Class System

Column: Waters AQUITY UPLC HSS T3 1.8 μm 2.1 x 50 mm column

Solvent: solution A: 0.1% HCO_2H/H_2O, solution B: 0.1% HCO_2H/MeCN

Gradient condition:

0.0 to 2.4 minutes; A/B = 90/10 to 0/100 (linear gradient)

2.4 to 3.2 minutes; A/B = 0/100

Flow rate: 0.70 mL/min

UV: 190 to 800 nm

Column temperature: 40°C

[0247]

Measurement Condition C

Measuring equipment: Waters ACQUITY™ UltraPerformance LC
Column: ACQUITY UPLC BEH C18 1.7 μm 2.1 x 30 mm column
Solvent: solution A: 0.05% HCOOH/H_2O, solution B: CH_3CN
Gradient condition:
0.0 to 1.3 minutes; A/B = 99/1 to 5/95 (linear gradient)
1.3 to 1.5 minutes; A/B = 99/1
Flow rate: 0.80 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0248]

Measurement Condition D

Measuring equipment: Waters AQUITY UPLC H-Class System
Column: ACQUITY UPLC BEH C18 1.7 μm 2.1 x 50 mm column
Solvent: solution A: HCOOH/CH_3CN/H_2O (0.05/50/49.95), solution B: 0.05% HCOOH/CH_3CN
Gradient condition: 0.0 to 4.0 minutes; A/B = 100/0 to 0/100 (linear gradient)
4.0 to 5.0 minutes; A/B = 0/100
Flow rate: 0.50 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0249]

Measurement Condition E

Measuring equipment: Waters ACQUITY™ UltraPerformance LC
Column: ACQUITY UPLC BEH C18 1.7 μm 2.1 x 30 mm column
Solvent: solution A: 0.05% HCOOH/H_2O, solution B: CH_3CN
Gradient condition:
0.0 to 1.3 minutes; A/B = 60/40 to 5/95 (linear gradient)
1.3 to 1.5 minutes; A/B = 60/40
Flow rate: 0.80 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0250]

Measurement Condition F

Measuring equipment: Waters ACQUITY™ UltraPerformance LC
Column: ACQUITY UPLC BEH C18 1.7 μm 2.1 x 30 mm column

Solvent: solution A: 0.05% $HCOOH/H_2O$, solution B: CH_3CN
Gradient condition:
0.0 to 1.3 minutes; A/B = 98/2 to 4/96 (linear gradient)
1.3 to 1.5 minutes; A/B = 98/2
Flow rate: 0.80 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0251]

Measurement Condition G

Measuring equipment: Shimadzu LCMS-2020
Column: Phenomenex Kinetex 1.7 μm C18 (50 mm x 2.10 mm)
Solvent: solution A: 0.05% TFA/H_2O, solution B: CH_3CN
Gradient condition:
0.0 to 1.9 minutes; A/B = 99/1 to 1/99 (linear gradient)
1.91 to 3.00 minutes; A/B = 1/99
Flow rate: 0.50 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0252]

Measurement Condition H

Measuring equipment: Shimadzu LCMS-2020
Column: Phenomenex Kinetex 1.7 μm C18 (50 mm x 2.10 mm)
Solvent: solution A: 0.05% TFA/H_2O, solution B: CH_3CN
Gradient condition:
0.0 to 1.9 minutes; A/B = 90/10 to 1/99 (linear gradient)
1.91 to 3.00 minutes; A/B = 1/99
Flow rate: 0.50 mL/min
UV: 220 nm, 254 nm
Column temperature: 40°C

[0253]

Measurement Condition I

Measuring equipment: Waters AQUITY™ UPLC H-Class System
Column: Waters AQUITY UPLC BEH C18 1.7 μm 2.1 x 50 mm column
Solvent: solution A: 0.05% HCO_2H/H_2O, solution B: 0.05% HCO_2H/MeCN

Gradient condition:
0.0 to 4.0 minutes; A/B = 90/10 to 0/100 (linear gradient)
4.0 to 5.0 minutes; A/B = 0/100
Flow rate: 0.50 mL/min
UV: 220, 254 nm
Column temperature: 40°C

[0254]

The abbreviations described above and the following abbreviations are used in the Reference Examples, Examples, and Test Examples in some cases to simplify the description.

s: singlet
d: doublet
t: triplet
q: quadruplet
m: multiplet
br: broad
dd: double doublet
J: coupling constant
Hz: Hertz
δ: chemical shift
min: minute
THF: tetrahydrofuran
DMAP: N,N-dimethyl-4-aminopyridine
TFA: trifluoroacetic acid
DIPEA: N,N-diisopropylethylamine
DMF: dimethylformamide
DME: 1,2-dimethoxyethane
NMP: N-methylpyrrolidone
DMSO: dimethyl sulfoxide
Me: methyl
Et: ethyl
MeCN: acetonitrile
CPME: cyclopentyl methyl ether
Boc: tert-butoxycarbonyl
tBu or ^{t}Bu or t-Bu: tert-butyl
t-: tert-

Bn: benzyl

Cbz: benzyloxycarbonyl

Trt: trityl(triphenylmethyl)

Ms: methanesulfonyl, mesyl

HATU: 1-[bis(dimethylamino)methylene]-1H-1,2,3-triazolo[4,5-b]pyridinium 3-oxide hexafluorophosphate

N: normal

M: mol/L, molarity

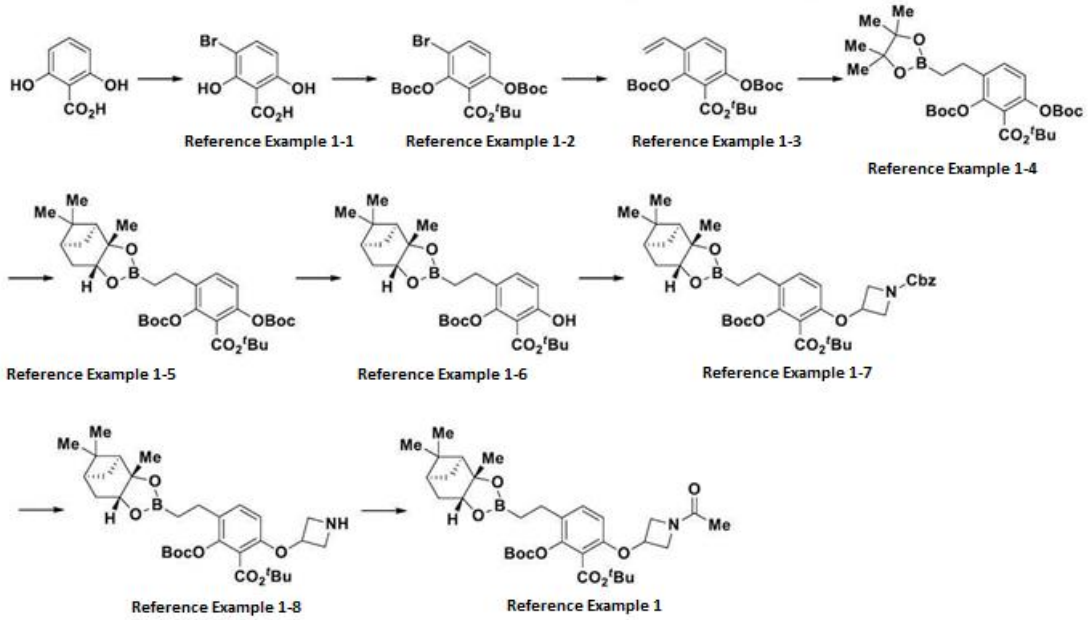
MEPM: meropenem

MIC: minimum inhibitory concentration

[0255]

Reference Example 1: tert-butyl [1-(3-hydroxyazetidin-1-yl)ethylidene]carbamate

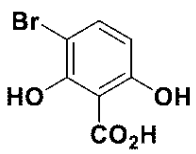
[Chemical Formula 685]



[0256]

Reference Example 1-1: 3-bromo-2,6-dihydroxybenzoic acid

[Chemical Formula 686]



N-bromosuccinimide (6.06 g, 34.1 mmol) was added in

small portions to a dichloromethane solution (59 mL) of 2,6-dihydrobenzoic acid (5 g, 32.4 mmol) and N,N-diisopropylethylamine (2.27 mL, 16.2 mmol) at -78°C. The reaction solution was warmed up to room temperature, and stirred for 20 hours at said temperature. The reaction solution was evaporated under reduced pressure. 1 mol/L hydrochloric acid (40 mL) was added to the resulting residue, and the mixture was stirred for 30 minutes at room temperature. The precipitated crystals were filtered out, washed with water, and dried to obtain the title compound (6.03g).

[0257]

^{1}H-NMR ($CDCl_3$) δ: 7.58 (1H, d, J = 9.2 Hz), 6.53 (1H, d, J = 8.5 Hz).

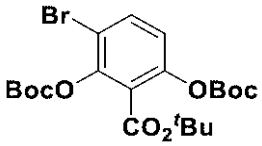
[0258]

LCMS: $[M+H]^+$/Rt = 233/0.412 min^A

[0259]

Reference Example 1-2: tert-butyl 3-bromo-2,6-bis[(tert-butoxycarbonyl)oxy]benzoate

[Chemical Formula 687]



Di-tert-butyl dicarbonate (65.2 g, 299 mmol) and DMAP (0.608 g, 4.98 mmol) were added to a THF (120 mL)/tert-butanol (60 mL) solution of the compound of Reference Example 1-1 (11.6 g, 49.8 mmol), and the reaction mixture was stirred for 18 hours at 60°C. The reaction solution was cooled to room temperature. The reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate = 99/1 to 95/5) to obtain the title compound (19.3 g).

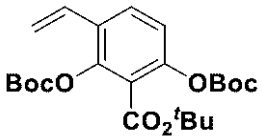
[0260]

^{1}H-NMR ($CDCl_3$) δ: 7.60 (1H, d, J = 8.5 Hz), 7.02 (1H, d, J = 8.5 Hz), 1.53 (9H, s), 1.51 (9H, s).

[0261]

Reference Example 1-3: tert-butyl 2,6-bis[(tert-butoxycarbonyl)oxy]-3-ethenylbenzoate

[Chemical Formula 688]



Tri-n-butylvinyltin (2.04 mL, 6.95 mmol) and bis(triphenylphosphine)palladium(II) chloride (0.488 g, 0.695 mmol) were added to a 1,4-dioxane (7 mL) solution of the compound of Reference Example 1-2 (1.7 g, 3.47 mmol) under a nitrogen atmosphere, and the reaction mixture was stirred for 10 hours at 110°C. After cooling the reaction solution to room temperature, the reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (1.26 g).

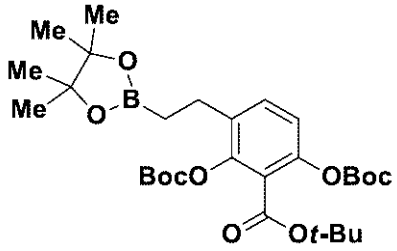
[0262]

^{1}H-NMR ($CDCl_3$) δ: 7.57 (1H, d, J = 9.2 Hz), 7.11 (1H, d, J = 8.5 Hz), 6.73 (1H, dd, J = 17.7, 11.3 Hz), 5.74 (1H, d, J = 17.7 Hz), 5.37 (1H, d, J = 10.4 Hz), 1.57 (9H, s), 1.54 (9H, s), 1.52 (9H, s).

[0263]

Reference Example 1-4: tert-butyl 2,6-bis[(tert-butoxycarbonyl)oxy]-3-[2-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl]benzoate

[Chemical Formula 689]



1,4-bis(diphenylphosphino)butane (0.547 g, 1.28 mmol), bis(1,5-cyclooctadiene)diiridium(I) dichloride (0.431 g,

0.641 mmol), and pinacolatodiboron (1.40 mL, 9.62 mmol) were added to a dichloromethane (32 mL) solution of the compound of Reference Example 1-3 (2.8 g, 6.41 mmol) under a nitrogen atmosphere, and the reaction mixture was stirred for 17 hours at room temperature. The reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (3.59 g).

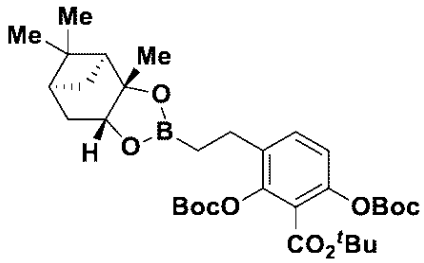
[0264]

^{1}H-NMR ($CDCl_3$) δ: 7.30 (1H, d, J = 8.5 Hz), 7.01 (1H, d, J = 8.5 Hz), 2.66-2.58 (2H, m), 1.53 (9H, s), 1.51 (9H, s), 1.51 (9H, s), 1.20 (12H, s), 1.10-1.02 (2H, m).

[0265]

Reference Example 1-5: tert-butyl 2,6-bis[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 690]



(1S,2S,3R,5S)-(+)-pinanediol (0.736 g, 4.32 mmol) was added to a THF (5 mL) solution of the compound of Reference Example 1-4 (0.976 g, 1.73 mmol), and the reaction mixture was stirred for 62 hours at room temperature. The reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate = 99/1 to 85/15) to obtain the title compound (0.90 g).

[0266]

^{1}H-NMR ($CDCl_3$)δ: 7.31 (1H, d, J = 8.5 Hz), 7.01 (1H, d, J = 7.9 Hz), 4.23 (1H, dd, J = 8.5, 1.8 Hz), 2.69-2.60 (2H, m),

2.35-2.24 (1H, m), 2.20-2.11 (1H, m), 2.04-1.97 (1H, m), 1.91-1.76 (2H, m), 1.54 (9H, s), 1.51 (18H, s), 1.34 (3H, s), 1.26 (3H, s), 1.14-1.07 (2H, m), 1.02 (1H, d, J = 11.0 Hz), 0.81 (3H, s).

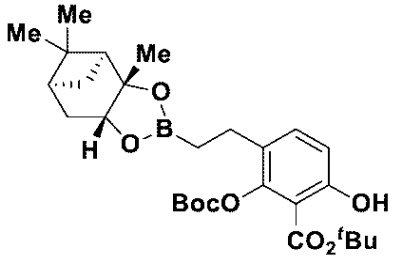
[0267]

LCMS: $[M-H]^+$/Rt = 615/3.160 min[B]

[0268]

Reference Example 1-6: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-hydroxy-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 691]



Pyrrolidine (0.121 mL, 1.46 mmol) was added to a THF (5 mL) solution of the compound of Reference Example 1-5 (0.899 g, 1.46 mmol), and the reaction mixture was stirred for 3 hours at room temperature. The reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate = 90/10 to 70/30) to obtain the title compound (0.68 g).

[0269]

^{1}H-NMR ($CDCl_3$)δ: 11.26 (1H, s), 7.33 (1H, d, J = 8.5 Hz), 6.82 (1H, d, J = 8.5 Hz), 4.24 (1H, dd, J = 8.8, 2.1 Hz), 2.63-2.54 (2H, m), 2.37-2.25 (1H, m), 2.23-2.11 (1H, m), 2.04-2.00 (1H, m), 1.93-1.78 (2H, m), 1.61 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.13-1.01 (3H, m), 0.83 (3H, s).

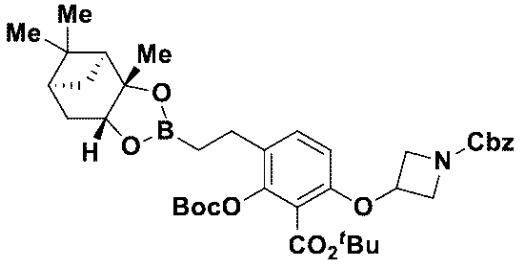
[0270]

LCMS: $[M-H]^+$/Rt = 515/3.175 min[B]

[0271]

Reference Example 1-7: benzyl 3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carboxylate

[Chemical Formula 692]



Under a nitrogen atmosphere, cesium carbonate (4.01 g) was added to a DMF (20.5 mL) solution of the compound of Reference Example 1-6 (2.117 g) and benzyl 3-iodoazetidine-1-carboxylic acid (1.95 g), and the reaction mixture was heated to 50°C. After 9 hours, the reaction mixture was cooled to room temperature. The reaction mixture was poured into water, extracted with a mixture solvent of ethyl acetate/hexane (1:1), and concentrated, and the residue was purified by using a silica gel column to obtain the title compound (2.46 g).

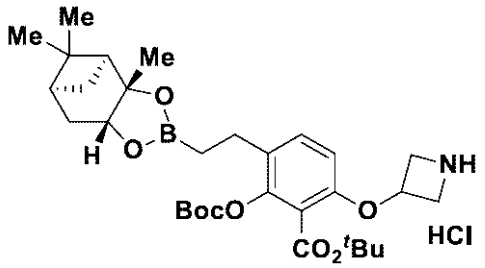
[0272]

^{1}H-NMR ($CDCl_3$)δ: 7.36-7.26 (5H, m), 7.18 (1H, d, J = 8.5 Hz), 6.36 (1H, d, J = 8.5 Hz), 5.08 (2H, s), 4.91-4.84 (1H, m), 4.37-4.27 (2H, m), 4.24-4.18 (1H, m), 4.09-4.03 (2H, m), 2.58 (2H, t, J = 8.2 Hz), 2.32-2.25 (1H, m), 2.18-2.08 (1H, m), 2.04-1.95 (1H, m), 1.89-1.84 (1H, m), 1.82-1.74 (1H, m), 1.53 (9H, s), 1.51 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.08 (2H, t, J = 8.2 Hz), 1.00 (1H, d, J = 11.0 Hz), 0.81 (3H, s).

[0273]

Reference Example 1-8: tert-butyl 6-[(azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate monohydrochloride

[Chemical Formula 693]



1 N hydrochloric acid (0.567 mL) and 50% water containing 10% palladium on carbon (0.149 g) were added to a methanol (16 mL) solution of the compound of Reference Example 1-7 (0.4 g), and the reaction mixture was stirred for 1 hour under hydrogen atmosphere. After celite filtration, the filtrate was concentrated to obtain the title compound (0.357 g).

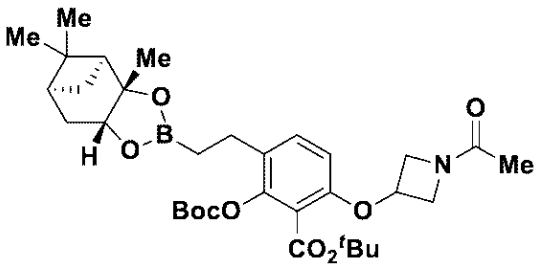
[0274]

^{1}H-NMR (CD_3OD) δ: 7.31 (1H, d, J = 8.5 Hz), 6.66 (1H, d, J = 8.5 Hz), 5.14 (1H, m), 4.55-4.42 (2H, m), 4.29-4.22 (1H, m), 4.13-4.05 (2H, m), 2.55 (2H, t, J = 8.2 Hz), 2.35-2.30 (1H, m), 2.17-2.13 (1H, m), 1.99-1.92 (1H, m), 1.87-1.80 (1H, m), 1.79-1.72 (1H, m), 1.56 (9H, s), 1.50 (9H, s), 1.33 (3H, s), 1.27 (3H, s), 1.04 (2H, t, J = 8.2 Hz), 0.98-0.96 (1H, m), 0.83 (3H, s).

[0275]

Reference Example 1: tert-butyl 6-[(1-acetylazetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 694]



Acetic anhydride (0.023 mL) and triethylamine (0.057 mL) were added to a THF (0.8 mL) solution of the compound

of Reference Example 1-8 (0.1 g) in an ice bath, and the reaction mixture was stirred overnight at room temperature. After concentration, the mixture was purified by silica gel column chromatography (ethyl acetate) to obtain the title compound (0.105 g).

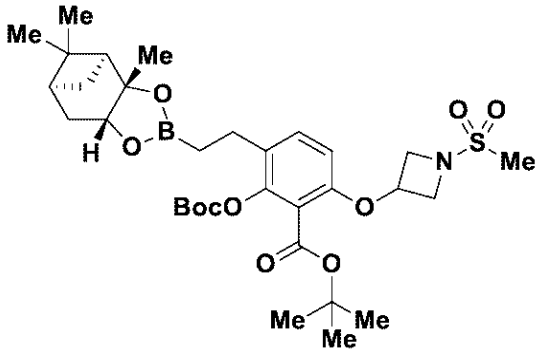
[0276]

^{1}H-NMR ($CDCl_3$) δ: 7.19 (1H, d, J = 8.5 Hz), 6.39 (1H, d, J = 8.5 Hz), 4.93-4.88 (1H, m), 4.46-4.30 (2H, m), 4.24-4.18 (1H, m), 4.16-4.00 (2H, m), 2.59 (2H, t, J = 8.7 Hz), 2.35-2.23 (1H, m), 2.20-2.09 (1H, m), 2.01-1.96 (1H, m), 1.91-1.82 (4H, m), 1.82-1.73 (1H, m), 1.54 (9H, s), 1.49 (9H, d, J = 15.8 Hz), 1.32 (3H, t, J = 7.0 Hz), 1.25 (3H,s), 1.10 (2H, t, J = 8.7 Hz), 1.03-0.97 (1H, m), 0.81 (3H, s).

[0277]

Reference Example 2: tert-butyl 6-[(1-methylsulfonylazetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 695]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 1 to obtain the title compound.

[0278]

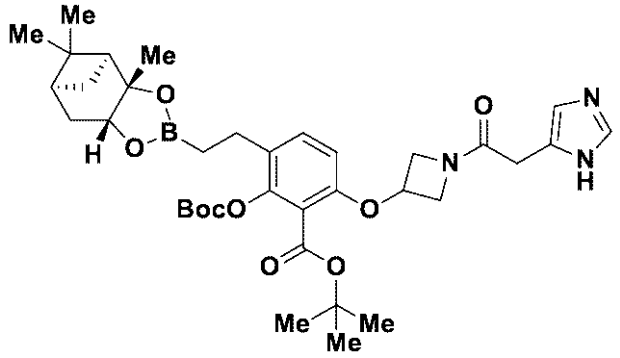
^{1}H-NMR ($CDCl_3$) δ: 7.20 (1H, d, J = 8.5 Hz), 6.41 (1H, d, J = 8.5 Hz), 4.93-4.87 (1H, m), 4.29-4.20 (3H, m), 4.00-3.97 (2H, m), 2.89 (3H, s), 2.61-2.57 (2H, m), 2.33-2.26 (1H, m),

2.15 (1H, ddd, J = 13.7, 6.1, 3.4 Hz), 2.00 (1H, t, J = 5.5 Hz), 1.87 (1H, td, J = 6.3, 3.9 Hz), 1.78 (1H, dt, J = 14.6, 2.7 Hz), 1.55 (9H, s), 1.51 (9H, s) 1.34 (3H, s), 1.26 (3H, s), 1.11-1.06 (2H, m), 1.00 (2H, d, J = 11.0 Hz), 0.81 (3H, s).

[0279]

Reference Example 3: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 696]



HATU was added to a DMF (0.905 mL) solution of the compound of Reference Example 1-8 (0.11 g), 4-imidazoleacetic acid hydrochloride (0.059 g), and triethylamine (0.076 mL) in an ice bath. The reaction mixture was slowly warmed up to room temperature, and stirred for 18 hours. The reaction mixture was poured into water, extracted with a mixture solvent of ethyl acetate/hexane (2:1), and concentrated, and the residue was purified by using a silica gel column to obtain the title compound (0.096 g).

[0280]

^{1}H-NMR ($CDCl_3$)δ: 8.19 (1H, s), 7.21 (1H, d, J = 8.5 Hz), 7.00 (1H, s), 6.39 (1H, d, J = 8.5 Hz), 4.90 (1H, m), 4.61-4.59 (1H, m), 4.31-4.27 (1H, m), 4.23-21 (1H, m), 4.7-4.05 (1H, m), 3.81-78 (1H, m), 3.54 (2H, s), 2.58 (2H, m), 2.30-2.26 (2H, m), 2.17-2.13 (1H, m), 2.02-1.98 (1H, m), 1.88-

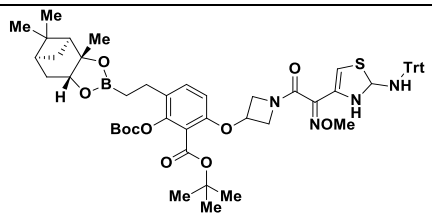
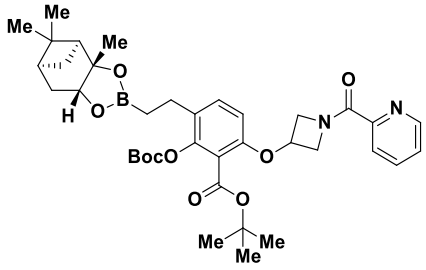
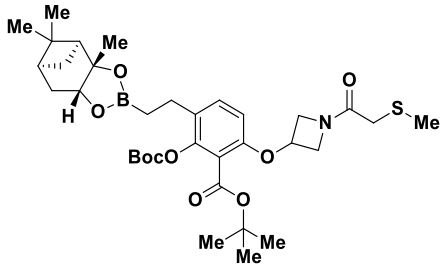
1.87 (1H, m), 1.80-1.77 (1H, m), 1.54 (9H, s), 1.51 (9H, s), 1.33 (3H, s), 1.25 (3H, s), 1.10-1.06 (2H, m), 1.22-1.10 (1H, s), 0.81 (3H, s).

[0281]

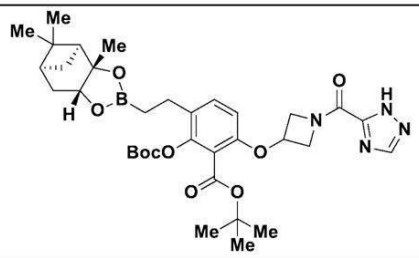
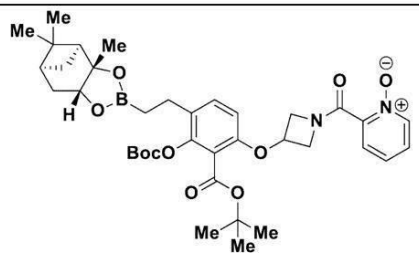
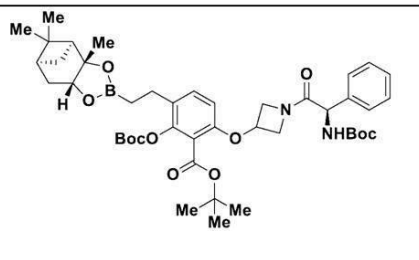
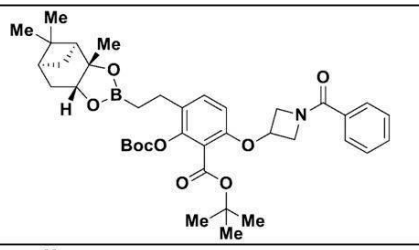
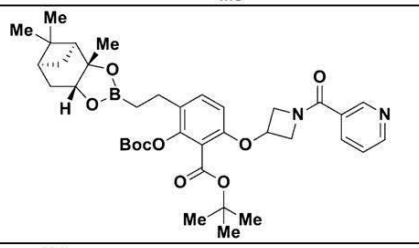
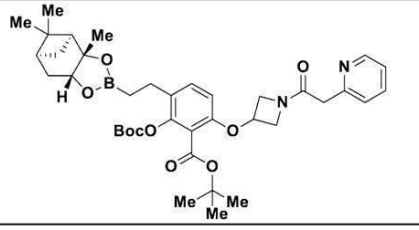
A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 3 to obtain each of Reference Example compounds 4 to 34 shown in Table 2.

[Table 2-1]

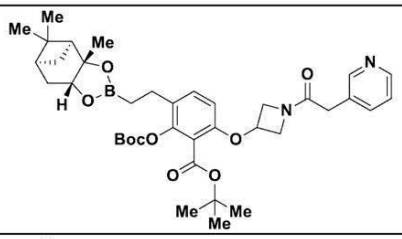
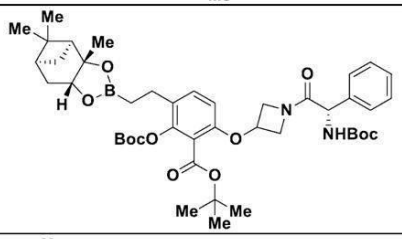
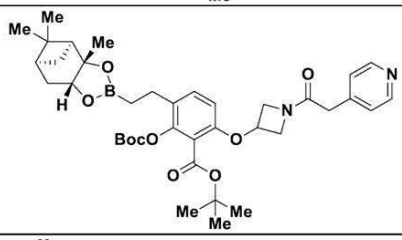
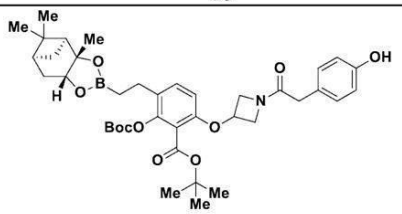
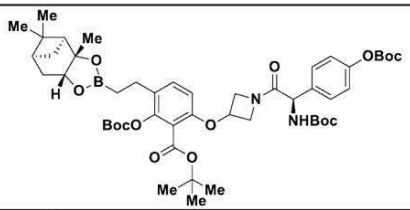
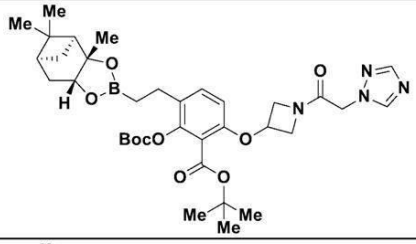
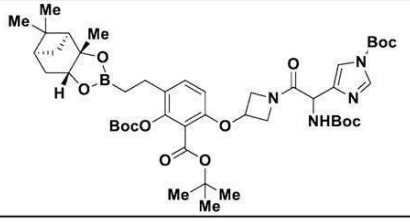
Table 2

Reference Example	Structural formula	NMR and/or LCMS
4		^{1}H-NMR ($CDCl_3$) δ: 7.31-7.23 (18H, m), 7.19 (1H, d, J = 8.5 Hz), 6.96 (1H, s), 6.56 (1H, s), 6.35 (1H, d, J = 8.5 Hz), 4.93 (1H, ddd, J = 11.3, 5.8, 3.7 Hz), 4.46 (1H, dd, J = 11.0, 6.7 Hz), 4.32 (1H, dd, J = 9.2, 6.7 Hz), 4.22 (1H, dd, J = 8.5, 1.8 Hz), 4.16-4.04 (3H, m), 4.01 (4H, t, J = 10.7 Hz), 2.59 (2H, t, J = 8.2 Hz), 2.33-2.26 (1H, m), 2.15 (1H, tt, J = 10.7, 3.5 Hz), 1.99 (3H, t, J = 5.8 Hz), 1.89-1.85 (1H, m), 1.78 (1H, dt, J = 14.6, 2.7 Hz), 1.65 (2H, t, J = 6.1 Hz), 1.55-1.46 (19H, m), 1.37-1.29 (4H, m), 1.27 (4H, d, J = 9.8 Hz), 1.07 (2H, dd, J = 15.3, 7.3 Hz), 1.01 (1H, t, J = 7.6 Hz), 0.81 (3H, s).
5		^{1}H-NMR ($CDCl_3$) δ: 8.54 (1H, d, *J* = 4.3 Hz), 8.10 (1H, d, *J* = 7.9 Hz), 7.79-7.77 (1H, m), 7.35-7.32 (1H, m), 7.21 (1H, d, *J* = 8.5 Hz), 6.44 (1H, d, *J* = 8.5 Hz), 5.09-5.06 (1H, m), 4.98-4.97 (1H, m), 4.70-4.67 (1H, m), 4.58-4.55 (1H, m), 4.30-4.19 (2H, m), 2.60 (2H, t, *J* = 8.2 Hz), 2.31-2.28 (1H, m), 2.18-2.13 (1H, m), 2.02-1.99 (1H, m), 1.87 (1H, br s), 1.81-1.77 (1H, m), 1.53 (9H, s), 1.51 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.10 (2H, t, *J* = 7.9 Hz), 1.01 (1H, d, *J* = 11.0 Hz), 0.81 (3H, s).
6		^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.6 Hz), 6.42 (1H, d, J = 8.6 Hz), 5.30 (2H, s), 5.00-4.90 (1H, m), 4.60-4.52 (1H, m), 4.46-4.36 (1H, m), 4.28-4.08 (4H, m), 3.07 (2H, s), 2.66-2.58 (2H, m), 2.39-2.24 (1H, m), 2.22-2.12 (1H, m), 2.07-1.99 (1H, m), 1.93-1.76 (2H, m), 1.57 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

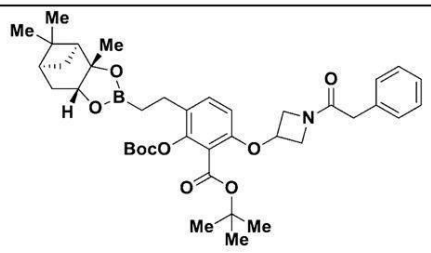
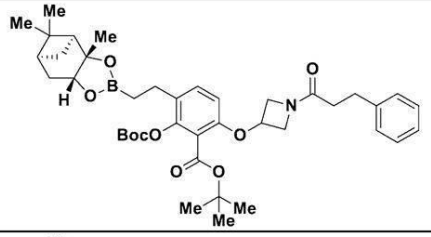
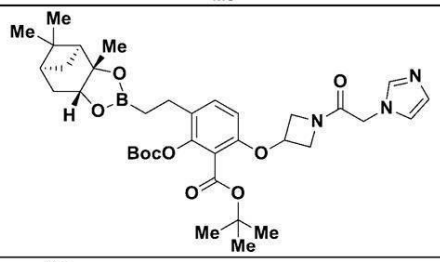
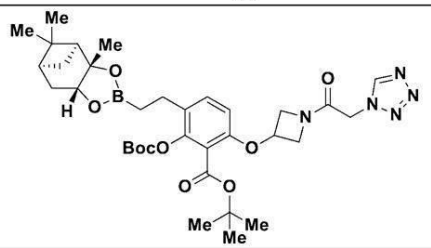
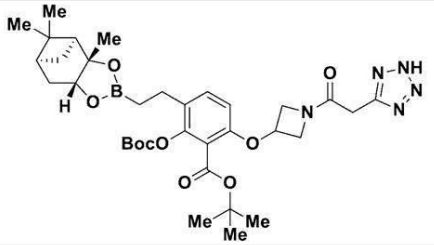
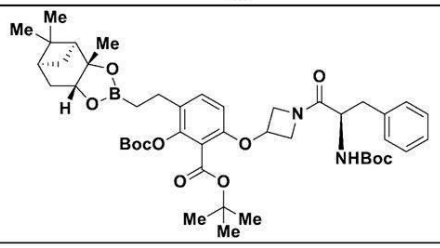
[Table 2-2]

7		^{1}H-NMR ($CDCl_3$) δ : 8.19 (1H, s), 7.24 (1H, d, J = 8.6 Hz), 6.46 (1H, d, J = 8.6 Hz), 5.18–5.00 (2H, m), 4.76–4.58 (2H, m), 4.14–4.09 (2H, m), 2.62 (2H, t, J = 8.2 Hz), 2.38–2.25 (1H, m), 2.23–2.09 (1H, m), 2.07–1.99 (1H, m), 1.93–1.75 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.34 (3H, s), 1.28 (3H, s), 1.12 (2H, t, J = 8.2 Hz), 1.07–1.00 (1H, m), 0.84 (3H, s).
8		^{1}H-NMR ($CDCl_3$) δ : 8.20–8.17 (1H, m), 7.55–7.51 (1H, m), 7.38–7.12 (4H, m), 6.39 (1H, d, J = 8.6 Hz), 5.13–4.96 (1H, m), 4.77–4.61 (2H, m), 4.28–4.23 (2H, m), 4.14–4.05 (1H, m), 2.72–2.55 (2H, m), 2.32–2.25 (1H, m), 2.23–2.10 (1H, m), 2.07–1.98 (1H, m), 1.95–1.74 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.35 (3H, s), 1.28 (3H, 2), 1.13–1.00 (3H, m), 0.83 (3H, s).
9		^{1}H-NMR ($CDCl_3$) δ : 7.43–7.28 (4H, m), 7.23–7.14 (1H, m), 6.40–6.27 (1H, m), 5.97–5.78 (1H, m), 5.22–5.10 (1H, m), 4.99–4.71 (1H, m), 4.65–4.37 (1H, m), 4.35–4.18 (2H, m), 4.18–4.04 (1H, m), 4.04–3.77 (1H, m), 2.66–2.54 (2H, m), 2.38–2.24 (1H, m), 2.2.05–1.98 (1H, m), 1.94–1.85 (1H, m), 1.84–1.74 (1H, m), 1.57 (9H, m), 1.54–1.48 (9H, m), 1.42–1.36 (9H, m), 1.35 (3H, s), 1.28 (3H, s), 1.14–0,94 (1H, m), 0.83 (3H, s).
10		^{1}H-NMR ($CDCl_3$) δ : 7.67–7.59 (2H, m), 7.50–7.36 (3H, m), 7.23–7.19 (1H, d, J = 8.6 Hz), 6.41 (1H, d, J = 8.6 Hz), 5.05–4.95 (1H, m), 4.64–4.50 (2H, m), 4.39–4.30 (3H, m), 2.73–2.55 (2H, m), 2.39–2.25 (1H, m), 2.25–2.09 (1H, m), 2.08–1.96 (1H, m), 1.95–1.75 (2H, m), 1.60–1.75 (18H, m), 1.37–1.23 (6H, m), 1.22–0.96 (3H, m), 0.86–0.80 (3H, m).
11		LCMS : $[M+H]^+$／Rt＝678／2. 75min^B
12		LCMS : $[M+H]^+$／Rt＝692／2. 62min^B

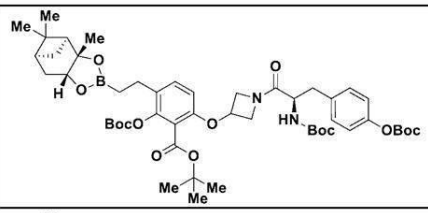
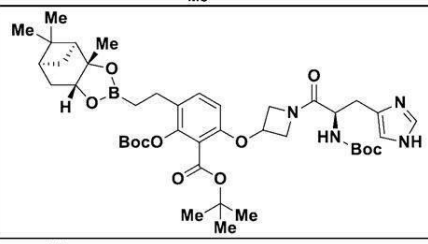
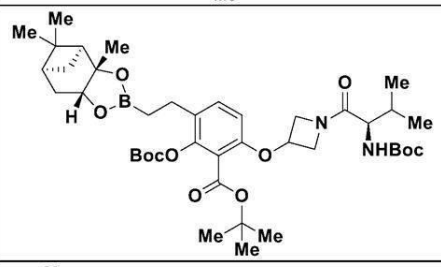
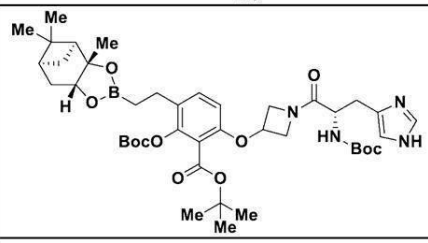
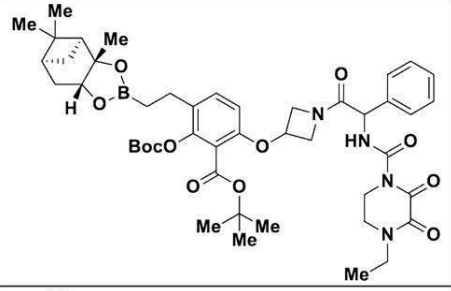
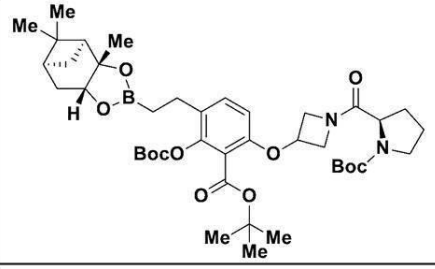
[Table 2-3]

13		LCMS: $[M+H]^+$／Rt=692／2. 53min^B
14		LCMS: $[M+H]^+$／Rt=828／3. 06min^B
15		LCMS: $[M+H]^+$／Rt=692／2. 79min^B
16		^{1}H-NMR ($CDCl_3$) δ: 7.32–7.26 (2H, m), 7.23–7.17 (1H, m), 7.16–7.00 (2H, m), 6.43–6.36 (1H, m), 4.95–4.86 (1H, m), 4.46–4.30 (2H, m), 4.29–4.20 (1H, m), 4.18–4.06 (2H, m), 3.55–3.40 (2H, m), 2.68–2.55 (2H, m), 2.39–2.24 (1H, m), 2.22–2.10 (1H, m), 2.08–1.98 (1H, m), 1.95–1.73 (2H, m), 1.62–1.49 (27H, m), 1.36 (3H, s), 1.28 (3H, m), 1.14–1.01 (3H, m), 0.83 (3H, s).
17		LCMS: $[M+H]^+$／Rt=922／3. 08min^B
18		LCMS: $[M+H]^+$／Rt=682／2. 63min^B
19		LCMS: $[M+H]^+$／Rt=852／3. 06min^B

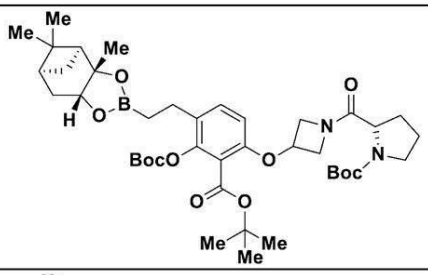
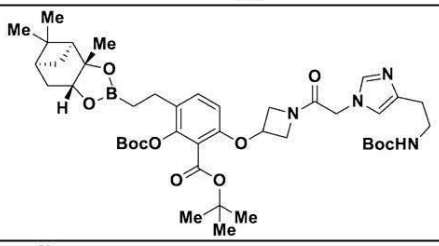
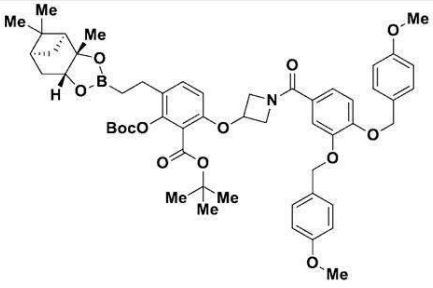
[Table 2-4]

20		^{1}H-NMR ($CDCl_3$) δ: 7.37–7.17 (6H, m), 6.42–6.34 (1H, m), 4.94–4.84 (1H, m), 4.44–4.32 (2H, m), 4.29–4.19 (1H, m), 4.18–4.02 (2H, m), 3.50 (2H, s), 2.68–2.54 (2H,m), 2.38–2.26 (1H, m), 2.24–2.10 (1H, m), 2.06–1.98 (1H, m), 1.95–1.73 (2H, m), 1.54 (9H, s), 1.54 (9H, s) 1.36 (3H, s), 1.28 (3H, m), 1.13–1.00 (3H, m), 0.83 (3H, s).
21		LCMS: $[M+H]^+$／Rt=705／2. 98min^B
22		LCMS: $[M+H]^+$／Rt=681／2. 22min^B
23		LCMS: $[M+H]^+$／Rt=682／2. 66min^B
24		LCMS: $[M+H]^+$／Rt=683／2. 62min^B
25		LCMS: $[M+H]^+$／Rt=820／3. 06min^B

[Table 2-5]

26		LCMS：$[M+H]^+$／Rt＝936／3．12min^B
27		LCMS：$[M+H]^+$／Rt＝810／2．20min^B
28		LCMS：$[M+H]^+$／Rt＝772／3．01min^B
29		LCMS：$[M+H]^+$／Rt＝810／2．20min^B
30		LCMS：$[M+H]^+$／Rt＝874／2．87min^B
31		LCMS：$[M+H]^+$／Rt＝770／3．01min^B

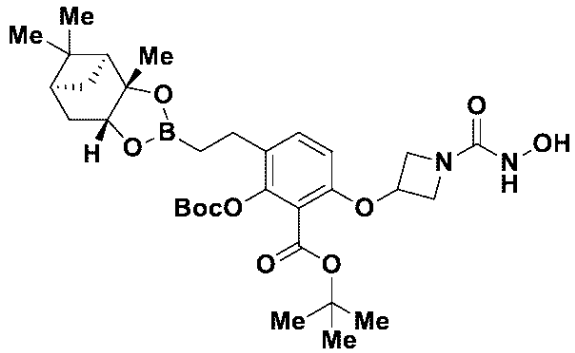
[Table 2-6]

32		LCMS: $[M+H]^+$／Rt=770／3. 01min[B]
33		LCMS: $[M+H]^+$／Rt=824／2. 20min[B]
34		^{1}H-NMR (CD_3OD) δ: 7.34 (2H, d, J= 8.5 Hz), 7.30–7.29 (3H, m), 7.22–7.20 (2H, m), 7.06 (1H, d, J= 8.5 Hz), 6.89 (2H, d, J= 8.5 Hz), 6.84 (2H, d, J = 8.5 Hz), 6.63 (1H, d, J= 8.5 Hz), 5.07 (2H, s), 5.06 (2H, s), 5.05–5.02 (1H, m), 4.52–4.49 (2H, m), 4.27 (1H, d, J= 7.3 Hz), 4.10–4.08 (2H, m), 3.77 (3H, s), 3.74 (3H, s), 2.57 (2H, t, J= 8.2 Hz), 2.34–2.31 (1H, m), 2.16–2.15 (1H, m), 1.97 (1H, t, J= 5.5 Hz), 1.84 (1H, br s), 1.78–1.75 (1H, m), 1.53 (9H, s), 1.51 (9H, s), 1.33 (3H, s), 1.26 (3H, s), 1.07 (2H, t, J= 7.9 Hz), 0.96–0.94 (1H, m), 0.84 (3H, s).

[0282]

Reference Example 35: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 697]



Triphosgene (14.92 mg) was added to a toluene solution of the compound of Reference Example 1-8 (76.4 mg) and DIPEA (0.066 mL) at 0°C. The reaction mixture was returned

to room temperature and stirred for 1.5 hours. The reaction mixture was concentrated. DMF (2.5 mL), DIPEA (0.5 mL), and hydroxylamine hydrochloride (51 mg) were added to the residue, and the reaction mixture was stirred for 3 hours at room temperature. A saturated aqueous sodium hydrogen carbonate solution was added, and the mixture was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over anhydrous sodium sulfate, filtered, and concentrated. The residue was subjected to silica gel column chromatography to obtain the title compound (56.5 mg) as a colorless solid.

[0283]

^{1}H-NMR ($CDCl_3$) δ: 7.12 (1H, d, J = 8.5 Hz), 7.04 (1H, s), 7.00 (1H, br s), 6.33 (1H, d, J = 8.5 Hz), 4.87-4.83 (1H, m), 4.34 (2H, dd, J = 9.8, 6.7 Hz), 4.17 (1H, dd, J = 8.5, 1.8 Hz), 4.06-4.01 (2H, m), 2.53 (2H, t, J = 8.5 Hz), 2.28-2.21 (1H, m), 2.13-2.07 (1H, m), 1.95 (1H, t, J = 5.5 Hz), 1.83-1.81 (1H, m), 1.75-1.72 (1H, m), 1.49 (9H, s), 1.46 (9H, s), 1.29 (3H, s), 1.21 (3H, s), 1.03 (2H, t, J = 8.5 Hz), 0.96 (1H, d, J = 10.4 Hz), 0.76 (3H, s).

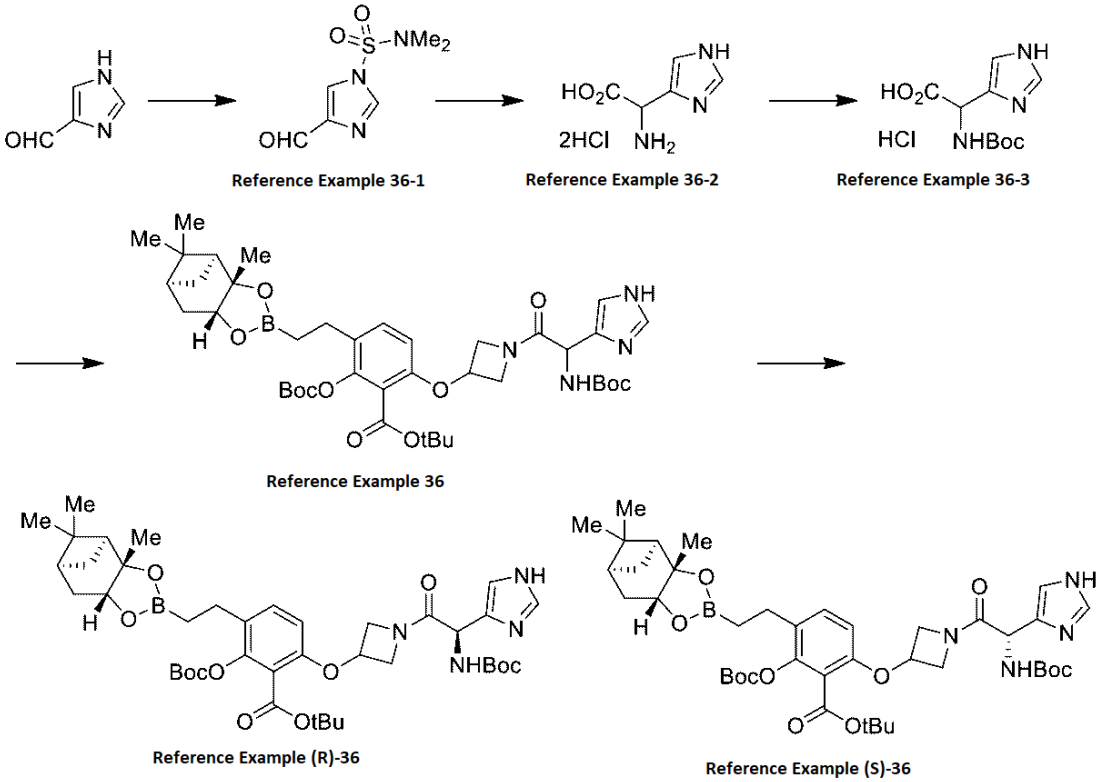
[0284]

Reference Example (R)-36: tert-butyl 6-({1-[(2R)-2-[(tert-butoxycarbonyl)amino]-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[0285]

Reference Example (S)-36: tert-butyl 6-({1-[(2R)-2-[(tert-butoxycarbonyl)amino]-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

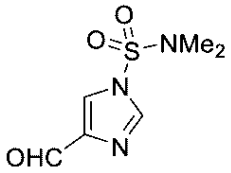
[Chemical Formula 698]



[0286]

Reference Example 36-1: 4-formyl-N,N-dimethyl-1H-imidazole-1-sulfonamide

[Chemical Formula 699]



Dimethylsulfamoyl chloride (91 mL, 859 mmol) was added dropwise to a chloroform solution (750 ml) of 1H-imidazole-4-carbaldehyde (75g, 78 mmol) and triethylamine (163 mL, 1.17 mol) over 50 minutes at room temperature. The reaction solution was stirred for 3 days and then water (900 mL) was added, and the mixture was extracted with chloroform (500 mL, 3 times). The organic phase was dried over sodium sulfate, filtered, and concentrated to obtain the title compound (161 g) as a white solid with a brownish tinge.

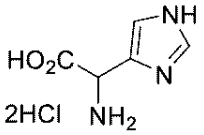
[0287]

^{1}H-NMR ($CDCl_3$) δ: 9.88 (1H, br s), 7.91 (1H, t, J = 7.3 Hz), 7.84 (1H, dd, J = 8.5, 1.2 Hz), 2.87 (6H, dd, J = 9.8, 5.5 Hz).

[0288]

Reference Example 36-2: amino(1H-imidazol-4-yl)acetic acid dihydrochloride

[Chemical Formula 700]



Sodium cyanide (46.7 g, 953 mmol) was added to an ethanol solution (227 mL) of the compound of Reference Example 36-1 (161 g, 794 mmol) and 28% aqueous ammonia (371 mL) while being cooled with ice (internal temperature of 14°C). The reaction solution was stirred for 4 hours at room temperature and then extracted with chloroform (500 mL, 4 times). The organic phase was dried over sodium sulfate, filtered, and concentrated. 6 N aqueous hydrochloric acid (850 mL) was added to the resulting solid residue, and the reaction mixture was refluxed for 4 hours. The reaction solution was cooled to room temperature and then concentrated under reduced pressure. The resulting solid residue was stirred and washed with a THF-ethanol mixture solvent (1:1, 750 mL) and filtered to obtain the title compound (160 g) as a yellow solid with a brownish tinge.

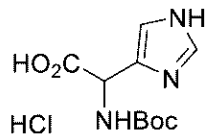
[0289]

^{1}H-NMR (D_2O) δ: 8.69 (1H, s), 7.54 (1H, s), 5.14 (1H, s).

[0290]

Reference Example 36-3: [(tert-butoxycarbonyl)amino](1H-imidazol-4-yl)acetic acid hydrochloride

[Chemical Formula 701]



An aqueous 3 N sodium hydroxide solution (374 mL) was

added dropwise to a methanol solution (194 mL) of the compound of Reference Example 36-2 (80 g, 374 mmol) over 45 minutes while cooling with ice. After stirring the reaction solution for 15 minutes while cooling with ice, di-tert-butyl dicarbonate was added over 15 minutes. The reaction solution was stirred for 45 minutes while cooling with ice and then warmed up to room temperature. To the reaction solution, N,N-dimethyl-4-aminopyridine (2.28 g, 18.7 mmol) and 2,2,2-trifluoroethanol (53.4 mL, 747 mmol) were added at room temperature, and the reaction solution was refluxed for 2 hours. After the reaction solution was allowed to cool down, 6 N aqueous hydrochloric acid (25 mL) was added while cooling with ice to adjust the pH of the solution to 6.0. After stirring for 1 hour while cooling with ice, the precipitated solid was filtered out, washed with acetone-water mixture solvent (1:1, 1 L), and dried and solidified under reduced pressure to obtain the title compound (40.0 g) as a white solid.

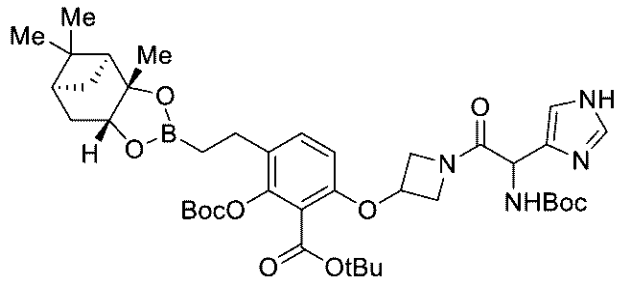
[0291]

^{1}H-NMR (D_2O) δ: 8.50 (1H, d, J = 1.2 Hz), 7.27 (1H, s), 5.04 (1H, s), 1.30 (9H, s).

[0292]

Reference Example 36: tert-butyl 6-({1-[2-({tert-butoxycarbonyl}amino)-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 702]



Triethylamine (1.54 ml, 11.1 mmol), 1-hydroxybenzotriazole (0.747 g, 5.53 mmol), and 1-(3-

dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (0.689 g , 3.59 mmol) were added to a DMF solution (9.21 mL) of the compound of Reference Example 36-3 (1.0 g, 4.15 mmol) while cooling with ice. After stirring for 1 hour while cooling with ice, N,N-dimethyl-4-aminopyridine (0.068 g, 0.553 mmol) and the compound of Reference Example 1-8 (1.68 g, 2.76 mmol) were added to the reaction solution. After stirring for 24 hours at room temperature, an aqueous sodium hydrogen carbonate solution was added to the reaction solution, and the mixture was extracted with chloroform. The organic phase was dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: chloroform/methanol) to obtain the title compound (1.09 g) as a while amorphous compound.

[0293]

LCMS: $[M+H]^+$/Rt = 795.44/0.845 min[E]

[0294]

The compound of Reference Example 36 (amount charged per injection: 19.6 mg) was dissolved in 0.300 mL of ethyl acetate. Isomers were obtained by optical resolution by chiral chromatography under the following conditions.

Column: CHIRALPAK IG 20 mmφ x 250 mm (Daicel Corporation)

Mobile phase: diethylamine/ethyl acetate (diethylamine: 0.1%)

Flow rate: 10 mL/min

Temperature: 40°C

Column retention times for both optical isomers were as follows.

(R)-36: 6.056 min

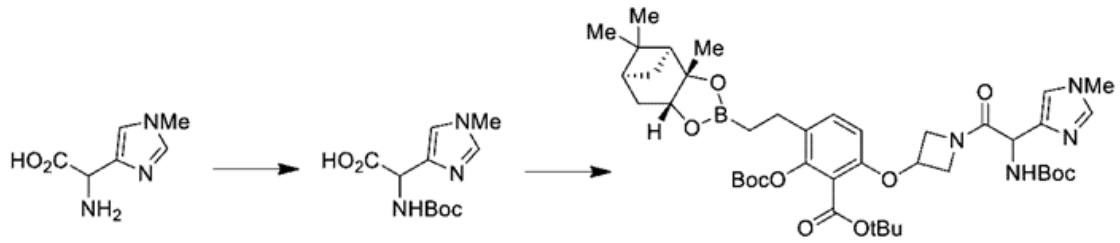
(S)-36: 4.225 min

[0295]

Reference Example 37: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](1-methyl-1H-imidazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-

methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 703]

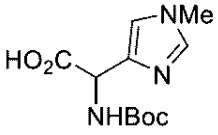


Reference Example 37-1 Reference Example 37

[0296]

Reference Example 37-1: [(tert-butoxycarbonyl)amino](1-methyl-1H-imidazol-4-yl) acetic acid

[Chemical Formula 704]



Sodium hydrogen carbonate (1.09 g, 13.0 mmol) and di-tert-butyl dicarbonate (1.30 mL, 5.62 mmol) were added to a methanol/water (1:1, 8.6 mL) solution of amino(1-methyl-1H-imidazol-4-yl) acetic acid (670 mg, 4.32 mmol), and the reaction mixture was stirred at room temperature. After 2 hours, the reaction solution was concentrated, and the residue was dissolved in ethanol (17 mL). Potassium hydrogen sulfate (2.35 g) was added at 0°C to quench the reaction. Solids were filtered out, the filtrate was concentrated, and the residue was purified by silica gel column chromatography (eluent: chloroform/methanol = 100/0 to 40/60) to obtain the title compound (400 mg) as a yellow solid.

[0297]

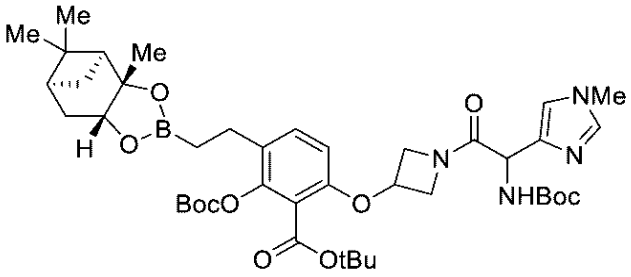
LCMS: $[M+H]^+$/Rt = 255.94/0.419 min[c]

[0298]

Reference Example 37: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](1-methyl-1H-imidazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-

methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 705]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (325 mg, 0.535 mmol) and the compound of Reference Example 37-1 (205 mg, 0.803 mmol) as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (130 mg).

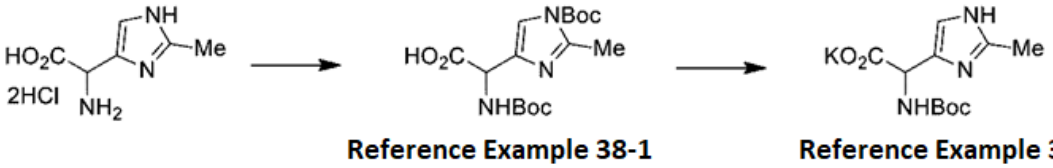
[0299]

LCMS: $[M+H]^+$/Rt = 809.58/1.246 min[C]

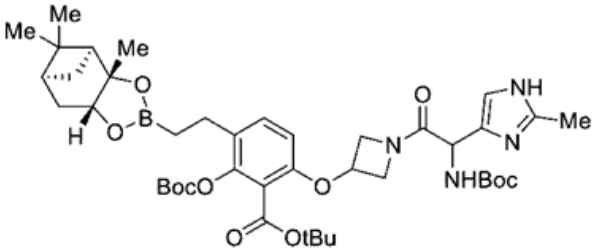
[0300]

Reference Example 38: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](2-methyl-1H-imidazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 706]



Reference Example 38-1 Reference Example 38-2

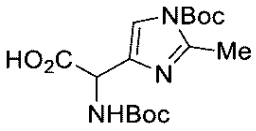


Reference Example 38

[0301]

Reference Example 38-1: [(tert-butoxycarbonyl)amino][1-(tert-butoxycarbonyl)-2-methyl-1H-imidazol-4-yl]acetic acid

[Chemical Formula 707]



Di-tert-butyl dicarbonate (1.64 g, 7.52 mmol) was added to a methanol solution (10 mL) of methyl 2-amino-2-(2-methyl-1H-imidazol-4-yl)acetate dihydrochloride (0.828 g, 3.42 mmol), N,N-dimethyl-4-aminopyridine (0.084 g, 0.684 mmol), and triethylamine (1.91 mL, 13.7 mmol) at room temperature, and the reaction mixture was stirred. After the completion of the reaction, a saturated aqueous sodium hydrogen carbonate solution was added, and the mixture was extracted with ethyl acetate and concentrated to obtain the title compound (0.59 g).

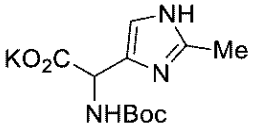
[0302]

^{1}H-NMR (CD_3OD) δ: 7.31 (1H, s), 4.91 (1H, s), 2.53 (3H, s), 1.60 (9H, s), 1.42 (9H, s).

[0303]

Reference Example 38-2: potassium [(tert-butoxycarbonyl)amino](2-methyl-1H-imidazol-4-yl)acetate

[Chemical Formula 708]



Potassium carbonate (0.331 g, 2.40 mmol) was added to a methanol solution (3.2 mL) of the compound of Reference Example 38-1 (0.59 g, 1.60 mmol). After stirring for 30 minutes at room temperature, the aqueous layer was washed with ethyl acetate and concentrated to obtain the title compound (0.47 g).

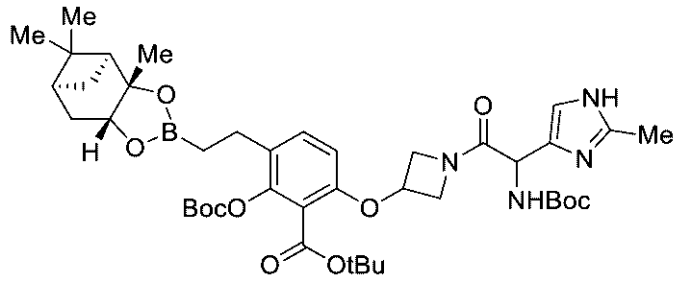
[0304]

^{1}H-NMR (CD_3OD) δ: 6.77 (1H, s), 4.98 (1H, s), 2.29 (3H, s), 1.43 (9H, s).

[0305]

Reference Example 38: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](2-methyl-1H-imidazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 709]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (0.328 g, 0.539 mmol) and the compound of Reference Example 38-2 (0.234 g, 0.799 mmol) as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (68.3 mg).

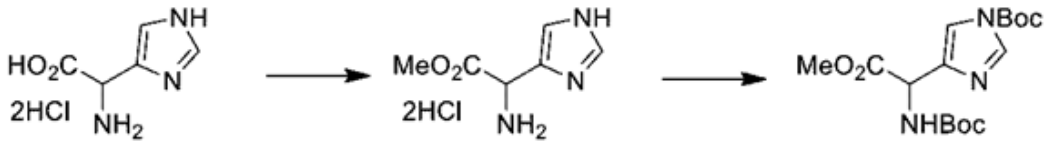
[0306]

LCMS: $[M+H]^+$/Rt = 809.50/1.162 min[C]

[0307]

Reference Example 39: tert-butyl 6-[(1-{2-[(tert-butoxycarbonyl)amino]-2-(1H-imidazol-4-yl)propanoyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

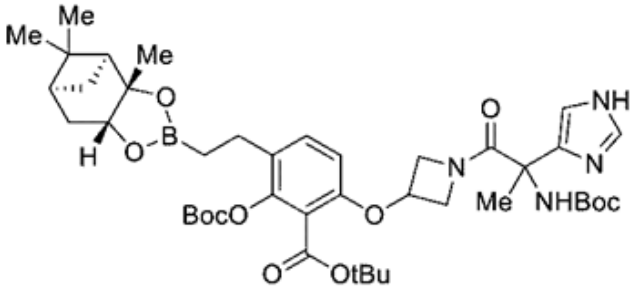
[Chemical Formula 710]



Reference Example 36-2 Reference Example 39-1 Reference Example 39-2



Reference Example 39-3 Reference Example 39-4

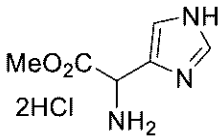


Reference Example 39

[0308]

Reference Example 39-1: methyl amino(1H-imidazol-4-yl)acetate dihydrochloride

[Chemical Formula 711]



Thionyl chloride (75 mL, 1.21 mol) was added dropwise to a methanol solution (265 mL) of the compound of Reference Example 36-2 (44 g, 206 mmol) while cooling with ice. The reaction solution was warmed up to room temperature and then stirred for 8 hours at 50°C. The reaction solution was concentrated under reduced pressure to obtain the title compound (46.9 g) as a light yellow oily substance.

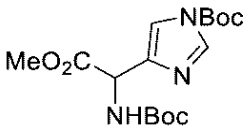
[0309]

LCMS: $[M+H]^+$/Rt = 155.93/0.142 min[C]

[0310]

Reference Example 39-2: tert-butyl 4-{1-[(tert-butoxycarbonyl)amino]-2-methoxy-2-oxoethyl}-1H-imidazole-1-carboxylate

[Chemical Formula 712]



N,N-dimethyl-4-aminopyridine (0.113 g, 0.928 mmol), triethylamine (0.863 mL, 6.19 mmol), and di-tert-butyl dicarbonate (1.08 mL, 4.64 mmol) were added to a chloroform solution (20 mL) of the compound of Reference Example 39-1 (0.70 g, 3.09 mmol) at room temperature, and the reaction mixture was stirred for 24 hours. The reaction solution was concentrated and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (1.10 g) as a colorless oily substance.

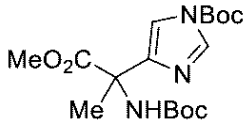
[0311]

^{1}H-NMR (CD_3OD) δ: 8.14 (1H, d, J = 1.2 Hz), 7.51 (1H, s), 5.27 (1H, s), 3.73 (3H, s), 1.63 (9H, s), 1.45 (9H, s).

[0312]

Reference Example 39-3: tert-butyl 4-{2-[(tert-butoxycarbonyl)amino]-1-methoxy-1-oxopropan-2-yl}-1H-imidazole-1-carboxylate

[Chemical Formula 713]



A lithium bis(trimethylsilyl)amide/THE solution (1.3 mol/L, 19.6 mL, 25.4 mmol) was added to a THF solution (43 mL) of the compound of Reference Example 39-2 (4.3 g, 12.1 mmol) at -78°C, and the reaction mixture was stirred for 30 minutes. Methyl iodide (0.832 mL, 13.3 mmol) was added to the reaction solution at -78°C. The reaction solution was warmed up to room temperature, and stirred for 4 hours.

Saturated saline was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (2.15 g) as a light yellow oily substance.

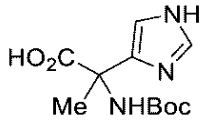
[0313]

^{1}H-NMR ($CDCl_3$) δ: 8.00 (1H, d, J = 1.2 Hz), 7.35 (1H, d, J = 1.2 Hz), 6.08 (1H, s), 3.73 (3H, s), 1.91 (3H, s), 1.61 (9H, s), 1.43 (9H, s).

[0314]

Reference Example 39-4: 2-[(tert-butoxycarbonyl)amino]-2-(1H-imidazol-4-yl)propanoic acid

[Chemical Formula 714]

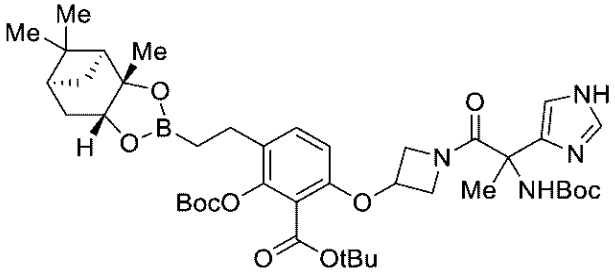


Lithium hydroxide monohydrate (0.513 g, 12.2 mmol) was added to a methanol solution (11.6 mL) of the compound of Reference Example 39-3 (2.15 g, 5.82 mmol) at room temperature, and the reaction mixture was stirred for 3 hours. 6 N aqueous hydrochloric acid (2.1 mL) was added, and the reaction mixture was stirred for 4 hours. Saturated saline was added to the reaction solution, and the solvent was evaporated under reduced pressure to obtain the title compound (1.49 g) as a crude product.

[0315]

Reference Example 39: tert-butyl 6-[(1-{2-[(tert-butoxycarbonyl)amino]-2-(1H-imidazol-4-yl)propanoyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 715]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (0.30 g, 0.493 mmol) and the compound of Reference Example 39-4 (0.176 g, 0.691 mmol) as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (153 mg).

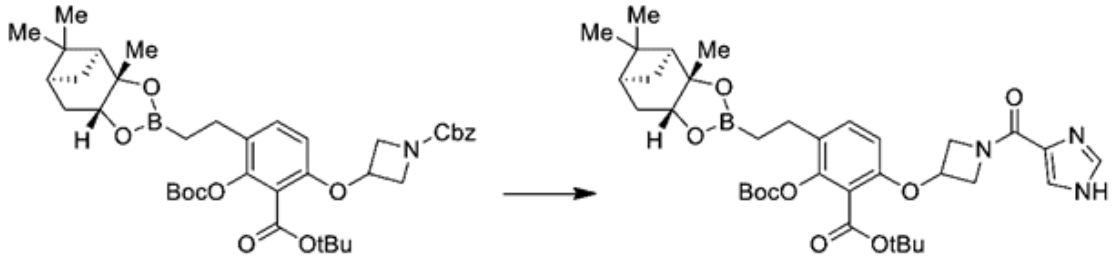
[0316]

LCMS: $[M+H]^+$/Rt = 809.17/1.139 min[C]

[0317]

Reference Example 40: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 716]



Reference Example 1-7 Reference Example 40

Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3 mL) of the compound of Reference Example 1-7 (200 mg, 0.283 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The

filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting residue was dissolved in DMF (3 mL), and triethylamine (0.118 mL, 0.850 mmol) and 1H-imidazole-5-carboxylic acid chloride (40.7 mg, 0.312 mmol) were added. The reaction mixture was stirred for 20 minutes at room temperature, then water was added, and the mixture was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: methylene chloride/methanol) to obtain the title compound (149 mg) as a light yellow solid.

[0318]

^{1}H-NMR ($CDCl_3$) δ: 7.77-7.55 (2H, m), 7.26-722 (1H, m), 7.46 (1H, d, J = 8.1 Hz), 5.12-4.90 (2H, m), 4.66-4.40 (2H, m), 4.30-4.15 (2H, m), 2.65-2.59 (2H, m), 2.36-2.26 (1H, m), 2.23-2.13 (1H, m), 2.05-2.00 (1H, m), 1.92-1.70 (2H, m), 1.59 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.15-1.01 (3H, m), 0.84 (3H, s).

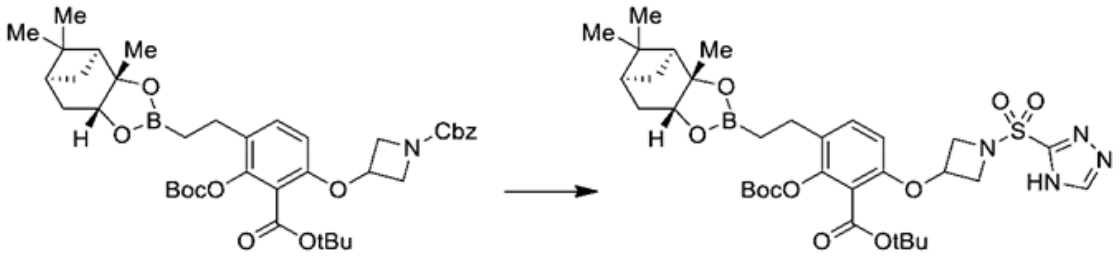
[0319]

LCMS: $[M+H]^+$/Rt = 666.7/2.49 min^B

[0320]

Reference Example 41: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 717]



Reference Example 1-7 Reference Example 41

Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3 mL) of the compound of Reference Example 1-7 (200 mg, 0.283 mmol), and the reaction mixture was stirred for 30 minutes at room temperature under a hydrogen atmosphere. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting residue was dissolved in methylene chloride (3 mL), and triethylamine (0.118 mL, 0.850 mmol) was added. A methylene chloride solution (3 mL) of 1H-1,2,4-triazole-3-sulfonyl chloride (47.5 mg, 0.283 mmol) was added while cooling with ice, and the reaction mixture was stirred for 5 minutes. Water was added to the reaction solution, which was extracted with methylene chloride. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (205 mg) as a colorless solid.

[0321]

^{1}H-NMR ($CDCl_3$) δ: 8.37 (1H,s), 7.20 (1H, d, J = 8.1 Hz), 6.26 (1H, d, J = 8.1 Hz), 4.43-4.37 (2H, m), 4.24 (1H, dd, J = 8.1 Hz, 2.7 Hz), 4.16-4.08 (3H, m), 2.62-2.56 (2H, m), 2.36-2.27 (1H, m), 2.21-2.12 (1H, m), 2.05-2.00 (1H, m), 1.92-1.76 (2H, m), 1.55 (9H, s), 1.52 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.12-0.99 (3H, m), 0.83 (3H, s).

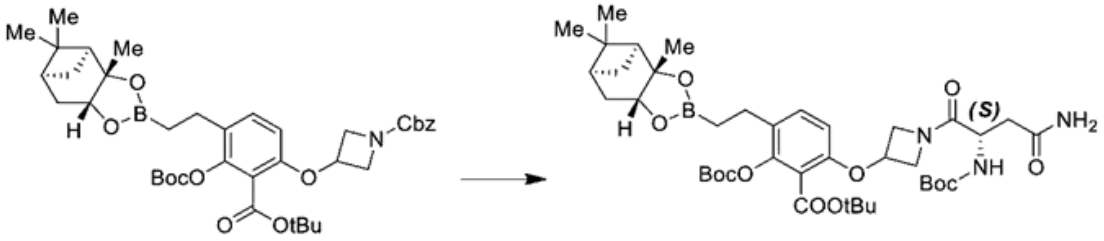
[0322]

LCMS: $[M+H]^+$/Rt = 703.6/2.75 min^B

[0323]

Reference Example 42: tert-butyl 6-({1-[N^2-(tert-butoxycarbonyl)-L-asparaginyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 718]



Reference Example 1-7 Example 42

Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3 mL) of the compound of Reference Example 1-7 (200 mg, 0.283 mmol), and the reaction mixture was stirred for 30 minutes at room temperature under a hydrogen atmosphere. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting residue was dissolved in THF (3 mL), and tert-butoxycarbonyl-L-asparagine (85.6 mg, 0.368 mmol), N,N'-dicyclohexylcarbodiimide (58.5 mg, 0.340 mmol), 1-hydroxybenzotriazole monohydrate (52.1 mg, 0.340 mmol), and N-methylmorpholine (34.3 µL, 0.312 mmol) were added, and the reaction mixture was stirred for 2 hours at room temperature. Water was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (198 mg) as a colorless solid.

[0324]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41-6.37 (1H, m), 6.03 (1H, br), 5.72-5.61 (1H, m), 5.48-5.39 (1H, m), 4.99-4.89 (1H, m), 4.75-4.51 (2H, m), 4.44-4.31 (2H, m), 4.27-4.23 (1H, m), 4.10-4.03 (1H, m), 2.73-2.56 (4H, m), 2.36-2.27 (1H, m), 2.20-2.14 (1H, m), 2.04-2.00 (1H, m), 1.92-1.77 (2H, m), 1.57 (9H, s), 1.53 (9H, s), 1.43 (9H, s),

1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.83 (3H, s).

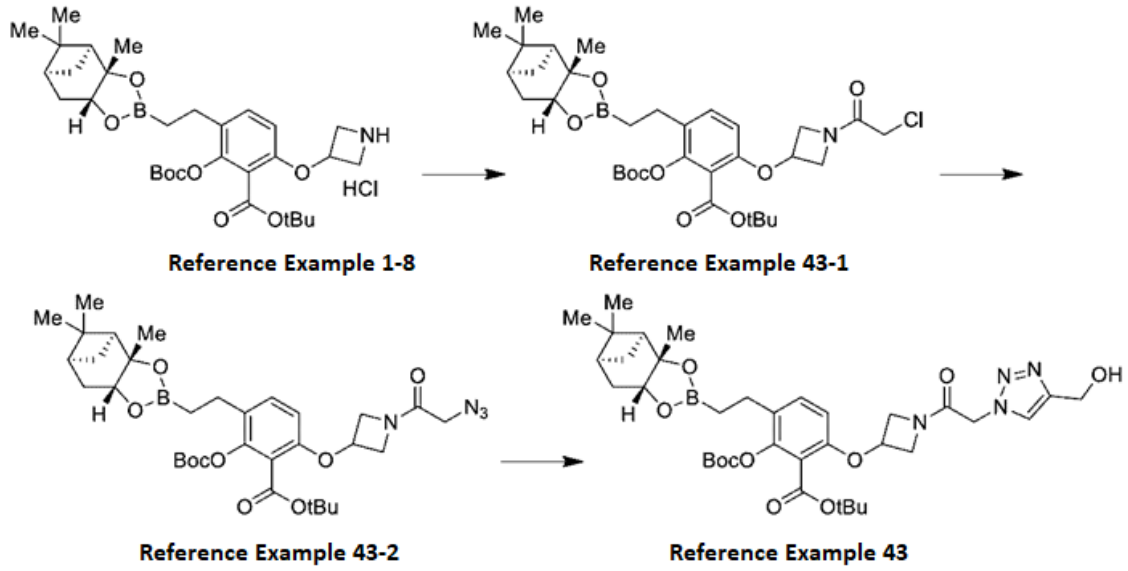
[0325]

LCMS: $[M+H]^+$/Rt = 786.8/2.79 min[B]

[0326]

Reference Example 43: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

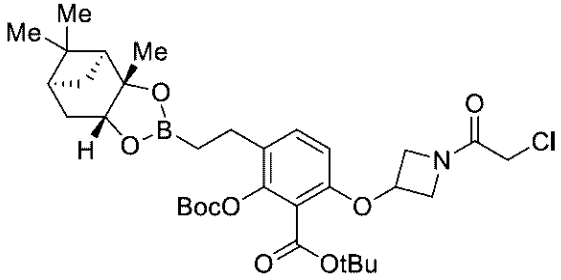
[Chemical Formula 719]



[0327]

Reference Example 43-1: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[1-(chloroacetyl)azetidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 720]



Under a nitrogen atmosphere, a dichloromethane (5.3 mL)

solution of the compound of Reference Example 1-8 (160 mg, 0.263 mmol) was cooled with ice to 0°C. Chloroacetyl chloride (30 μL, 0.377 mmol) and triethylamine (0.11 mL, 0.789 mmol) were added, and the reaction mixture was stirred for 1 hour at room temperature. Subsequently, the reaction solution was cooled with ice, a saturated aqueous sodium hydrogen carbonate solution was added, and the mixture was extracted with ethyl acetate. The organic phase was washed with a saturated aqueous ammonium chloride solution and saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 1/1) to obtain the title compound (140 mg).

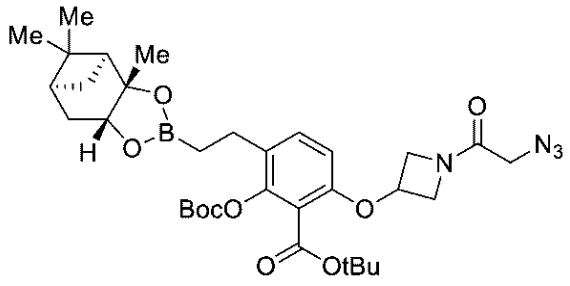
[0328]

^{1}H-NMR ($CDCl_3$) δ: 7.21 (1H, d, J = 8.6 Hz), 6.40 (1H, d, J = 8.6 Hz), 4.99-4.93 (1H, m), 4.64-4.58 (1H, m), 4.44-4.39 (1H, m), 4.32-4.27 (1H, m), 4.24-4.20 (1H, m), 4.15-4.09 (1H, m), 3.89 (2H, s), 2.60 (2H, t, J = 8.3 Hz), 2.34-2.26 (1H, m), 2.18-2.12 (1H, m), 2.02-1.98 (1H, m), 1.91-1.85 (1H, m), 1.82-1.75 (1H, m), 1.56-1.51 (18H, m), 1.34 (3H, s), 1.26 (3H, s), 1.11-1.07 (2H, m), 1.00 (1H, d, J = 10.9 Hz), 0.81 (3H, s).

[0329]

Reference Example 43-2: tert-butyl 6-{[1-(azidoacetyl)azetidin-3-yl]oxy}-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 721]



Sodium azide (69.0 mg, 1.06 mmol) was added to a DMSO (4.3 mL) solution of the compound of Reference Example 43-1 (140 mg, 0.216 mmol), and the reaction mixture was stirred for 1.5 hours at room temperature. Subsequently, water was added to the reaction solution, which was diluted with ethyl acetate, and the organic phase was separated. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 1/1) to obtain the title compound (129 mg).

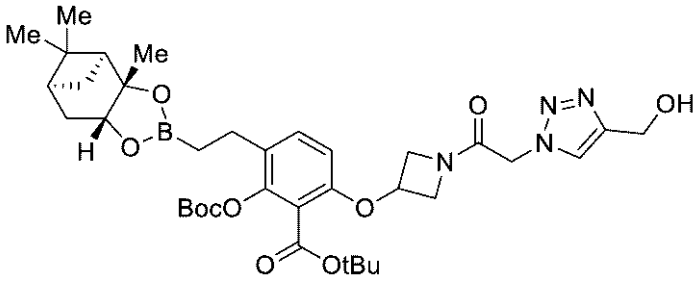
[0330]

^{1}H-NMR ($CDCl_3$) δ: 7.25-7.21 (1H, m), 6.41 (1H, d, J = 8.6 Hz), 5.01-4.93 (1H, m), 4.55-4.48 (1H, m), 4.48-4.40 (1H, m), 4.27-4.19 (2H, m), 4.17-4.11 (1H, m), 3.84-3.72 (2H, m), 2.61 (2H, t, J = 8.3 Hz), 2.36-2.28 (1H, m), 2.20-2.13 (1H, m), 2.04-1.99 (1H, m), 1.92-1.86 (1H, m), 1.83-1.77 (1H, m), 1.59-1.51 (18H, m), 1.36 (3H, s), 1.28 (3H, s), 1.13-1.09 (2H, m), 1.04-0.99 (1H, m), 0.83 (3H, s).

[0331]

Reference Example 43: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 722]



2-propyn-1-ol (47 µL, 0.788 mmol), copper iodide (24.4 mg, 0.128 mmol), and tris[(1-benzyl-1H-1,2,3-triazol-4-yl)methyl]amine (24.3 mg, 46.0 µmol) were added to an

acetonitrile (9.2 mL) solution of the compound of Reference Example 43-2 (300 mg, 0.458 mmol), and the reaction mixture was stirred for 2 hours at room temperature. Subsequently, a saturated aqueous potassium sodium tartrate solution was added to the reaction solution, and the mixture was extracted with chloroform. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: chloroform/methanol = 50/1 to 30/1) to obtain the title compound (271 mg).

[0332]

^{1}H-NMR ($CDCl_3$) δ: 7.75 (1H,s), 7.23 (1H, d, J = 8.6 Hz), 6.40 (1H, d, J = 8.6 Hz), 5.13-5.05 (1H, m), 5.02-4.93 (2H, m), 4.81 (2H, s), 4.56-4.50 (1H, m), 4.47-4.38 (1H, m), 4.27-4.22 (1H, m), 4.21-4.09 (2H, m), 2.66-2.59 (2H, m), 2.38-2.28 (2H, m), 2.22-2.14 (1H, m), 2.05-1.99 (1H, m), 1.93-1.87 (1H, m), 1.84-1.77 (1H, m), 1.57 (9H, s), 1.54 (9H, s), 1.36 (3H, d, J = 1.1 Hz), 1.28 (3H, s), 1.14-1.08 (2H, m), 1.06-1.01 (1H, m), 0.84 (3H, s).

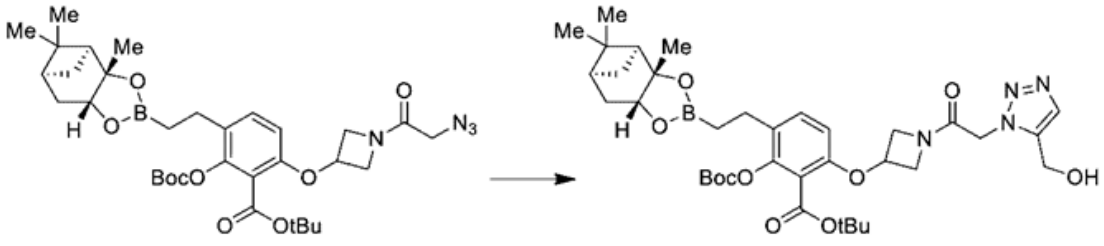
[0333]

LCMS: $[M+H]^+$/Rt = 711.42/3.75 min[D]

[0334]

Reference Example 44: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 723]



Reference Example 43-2 Reference Example 44

The compound of Reference Example 43-2 (74.9 mg, 0.114 mmol) and (chloro[(1,2,3,4,5-h)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(triphenylphosphine)ruthenium(II) (900 µg, 1.14 µmol) were added to a toluene (0.91 mL) solution of 2-propyn-1-ol (11.0 µL, 0.182 mmol), and the reaction mixture was stirred for 19 hours at 80°C. Subsequently, the reaction solution was cooled to room temperature, and stirred again for 4 hours at 80°C after adding 2-propyn-1-ol (11.0 µL, 0.182 mmol) and chloro[(1,2,3,4,5-h)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(triphenylphosphine)ruthenium(II) (900 µg, 1.14 µmol). Subsequently, the reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 1/1 to chloroform/methanol = 10/1) to obtain the title compound (45.3 mg).

[0335]

^{1}H-NMR ($CDCl_3$) δ: 7.62 (1H, s), 7.22 (1H, d, J = 8.6 Hz), 6.41 (1H, d, J = 8.6 Hz), 5.14-5.08 (1H, m), 5.02-4.93 (2H, m), 4.71-4.62 (3H, m), 4.42-4.36 (1H, m), 4.29-4.19 (3H, m), 2.60 (2H, t, J = 8.3 Hz), 2.36-2.26 (1H, m), 2.20-2.13 (1H, m), 2.03-1.99 (1H, m), 1.92-1.76 (3H, m), 1.56 (9H, s), 1.52 (9H, s), 1.35 (3H, s), 1.27 (3H, s), 1.13-1.07 (2H, m), 1.04-0.99 (1H, m), 0.82 (3H, s).

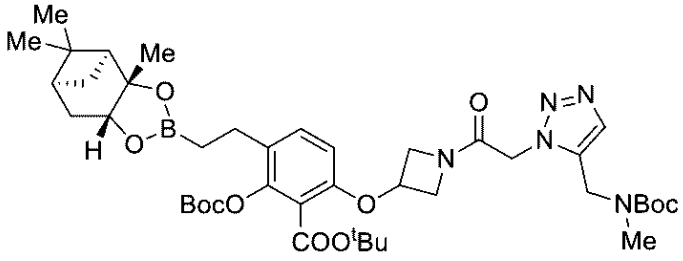
[0336]

LCMS: $[M+H]^+$/Rt = 711.60/3.75 min[D]

[0337]

Reference Example 45: tert-butyl 6-({1-[(5-{[(tert-butoxycarbonyl)(methyl)amino]methyl}-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 724]



A reaction, work-up, and purification were performed using the compound of Reference Example 43-2 as the starting material by the same method described in Reference Example 44 to obtain the title compound.

[0338]

^{1}H-NMR ($CDCl_3$) δ: 7.59 (1H,s), 7.21 (1H, d, J = 8.6 Hz), 6.38 (1H, d, J = 8.6 Hz), 5.23-5.07 (2H, m), 5.01-4.90 (1H, m), 4.62-4.36 (4H, m), 4.29-4.19 (2H, m), 4.13-4.05 (1H, m), 2.82 (3H, s), 2.59 (2H, t, J = 8.3 Hz), 2.34-2.26 (1H, m), 2.20-2.11 (1H, m), 2.04-1.96 (1H, m), 1.91-1.85 (1H, m), 1.82-1.75 (1H, m), 1.57-1.51 (18H, m), 1.43 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.12-1.07 (2H, m), 1.01 (1H, d, J = 10.9 Hz), 0.81 (3H, s).

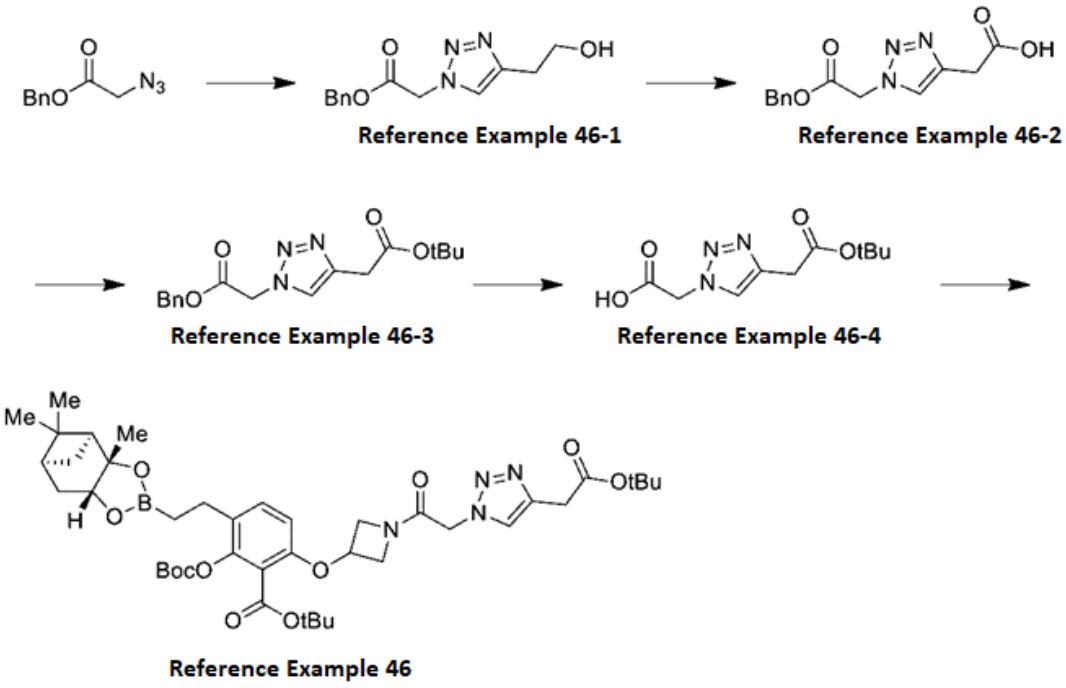
[0339]

LCMS: $[M+H]^+$/Rt = 824.80/4.16 min^D

[0340]

Reference Example 46: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-[(1-{[4-(2-tert-butoxy-2-oxoethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

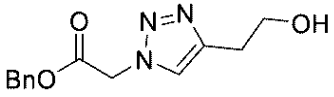
[Chemical Formula 725]



[0341]

Reference Example 46-1: benzyl [4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetate

[Chemical Formula 726]



Water (12 mL) was added to a tert-butyl alcohol (12 mL) solution of benzyl 2-azidoacetate (2.50 g, 13.0 mmol). Sodium L-ascorbate (527 mg, 2.66 mmol), 3-butyn-1-ol (1.5 mL, 19.8 mmol), and copper sulfate pentahydrate (347 mg, 1.39 mmol) were added, and the reaction mixture was stirred for 2 hours at room temperature. Subsequently, water was added to the reaction solution, which was extracted with chloroform. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: chloroform/methanol = 100/1 to 30/1) to obtain the title compound (3.13 g).

[0342]

^{1}H-NMR ($CDCl_3$) δ: 7.52-7.50 (1H, m), 7.38-7.31 (5H, m), 5.21 (2H, s), 5.16 (2H, s), 3.95 (2H, q, J = 6.1 Hz), 2.96 (2H, t, J = 5.4 Hz).

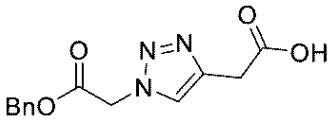
[0343]

LCMS: $[M+H]^+$/Rt = 262.09/1.88 min[D]

[0344]

Reference Example 46-2: {1-[2-(benzyloxy)-2-oxoethyl]-1H-1,2,3-triazol-4-yl}acetic acid

[Chemical Formula 727]



An aqueous 0.67M sodium dihydrogen phosphate solution (28 mL) was added to an acetonitrile (28 mL) solution of the compound of Reference Example 46-1 (1.02 g, 3.90 mmol). 2,2, 6,6-tetramethylpiperidine-1-oxyl (56.3 mg, 0.360 mmol), aqueous 5% hypochlorous acid solution (2.1 mL), and aqueous 80% chlorous acid solution (0.88 mL, 7.81 mmol) were added, and the reaction mixture was stirred for 23 hours at room temperature. Subsequently, an aqueous sodium thiosulfate solution was added to the reaction solution, which was then extracted with ethyl acetate. 1M hydrochloric acid was added to the aqueous layer, which was again extracted with chloroform. The organic phase was washed with saturated saline and 1M hydrochloric acid, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure to obtain the title compound (676 mg).

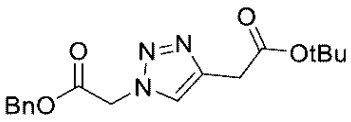
[0345]

^{1}H-NMR ($CDCl_3$) δ: 7.73 (1H, s), 7.37-7.31 (5H, m), 5.21 (2H, s), 5.18 (2H, s), 3.90 (2H, s).

[0346]

Reference Example 46-3: benzyl tert-butyl 2,2′-(1H-1,2,3-triazol-1,4-diyl)diacetate

[Chemical Formula 728]



Under a nitrogen atmosphere, a THF (15 mL) solution of the compound of Reference Example 46-2 (676 mg, 2.46 mmol) was cooled with ice. tert-butyl alcohol (10 mL) and N,N'-diisopropyl-O-t-butylisourea (1.8 mL, 0.789 mmol) were added, and the reaction mixture was stirred for 17 hours at room temperature. The reaction solution was evaporated under reduced pressure, and then the resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 2/1) to obtain the title compound (425 mg).

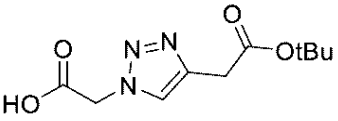
[0347]

^{1}H-NMR ($CDCl_3$) δ: 7.72 (1H, s), 7.39-7.31 (5H, m), 5.21 (2H, s), 5.16 (2H, s), 3.75 (2H, s), 1.45 (9H, s).

[0348]

Reference Example 46-4: [4-(2-tert-butoxy-2-oxoethyl)-1H-1,2,3-triazol-1-yl]acetic acid

[Chemical Formula 729]



10% palladium on carbon (88.7 mg) was added to an ethyl acetate (12 mL) solution of the compound of Reference Example 46-3 (397 mg, 1.20 mmol). Under a hydrogen atmosphere, the reaction mixture was stirred for 50 minutes at room temperature. Subsequently, the reaction solution was filtered through celite and then the filtrate was evaporated under reduced pressure to obtain the title compound (288 mg).

[0349]

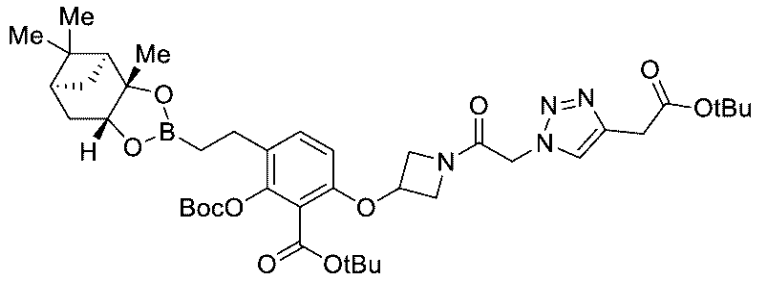
^{1}H-NMR (CD_3OD) δ: 7.91 (1H, s), 5.19 (2H, s), 3.70 (2H, s), 1.45 (9H, s).

[0350]

Reference Example 46: tert-butyl 2-[(tert-

butoxycarbonyl)oxy]-6-[(1-{[4-(2-tert-butoxy-2-oxoethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 730]



The compound of Reference Example 1-8 (503 mg, 0.828 mmol), triethylamine (0.350 mL, 2.51 mmol), 1-hydroxybenzotriazole (231 mg, 1.71 mmol), and 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (237 mg, 1.71 mmol) were added to a DMF solution (8.3 mL) of the compound of Reference Example 46-4 (277 mg, 1.15 mmol) while cooling with ice. After stirring for 1.5 hours at room temperature, water was added to the reaction solution, which was then extracted with a hexane/ethyl acetate (1:1) mixture solution. The organic phase was washed with a saturated aqueous sodium hydrogen carbonate solution, 1 N hydrochloric acid, and saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 1/2 to 1/3) to obtain the title compound (394 mg).

[0351]

^{1}H-NMR ($CDCl_3$) δ: 7.78 (1H,s), 7.22 (1H, d, J = 8.6 Hz), 6.38 (1H, d, J = 8.6 Hz), 5.10-4.90 (3H, m), 4.50-4.38 (2H, m), 4.27-4.10 (3H, m), 3.76 (2H, s), 2.61 (2H, t, J = 8.3 Hz), 2.36-2.28 (1H, m), 2.21-2.14 (1H, m), 2.06-2.00 (1H, m), 1.92-1.87 (1H, m), 1.84-1.76 (1H, m), 1.56 (9H, s), 1.54 (9H, s), 1.46 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.08 (2H, m), 1.03 (1H, d, J = 10.9 Hz), 0.84 (3H, s).

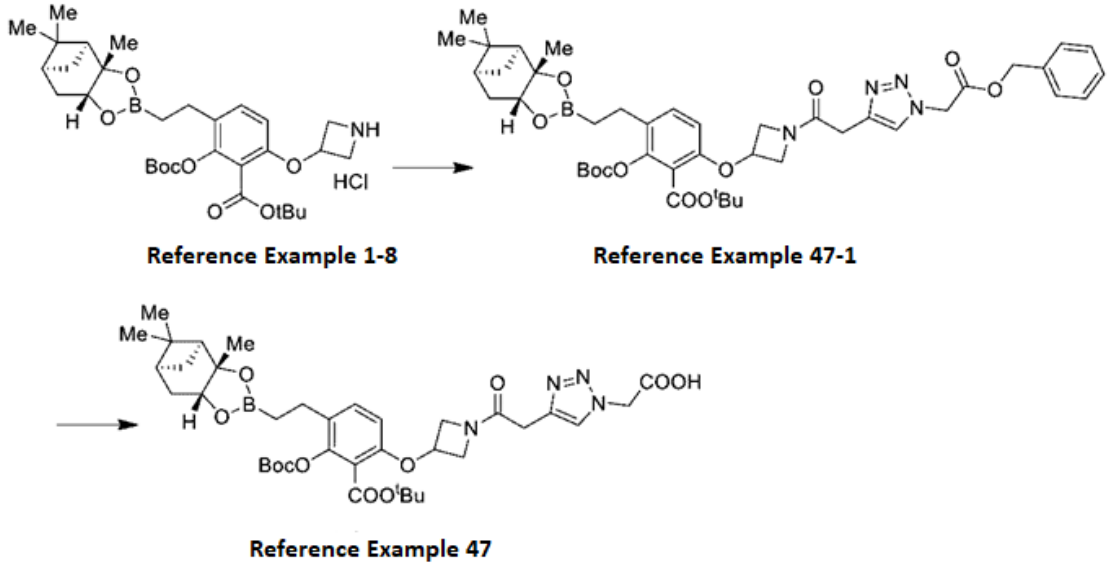
[0352]

LCMS: $[M+H]^+$/Rt = 795.55/4.19 min[D]

[0353]

Reference Example 47: [4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1H-1,2,3-triazol-1-yl]acetic acid

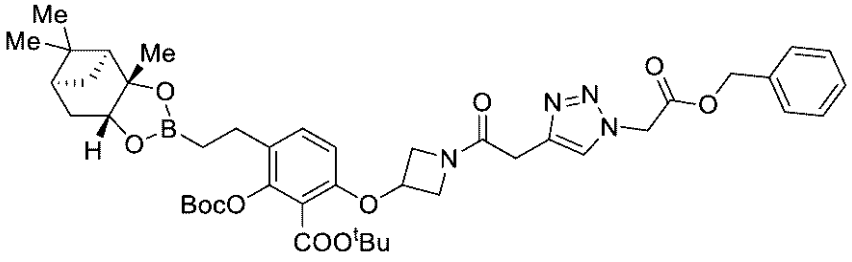
[Chemical Formula 731]



[0354]

Reference Example 47-1: tert-butyl 6-{[1-({1-[2-(benzyloxy)-2-oxoethyl]-1H-1,2,3-triazol-4-yl}acetyl)azetidin-3-yl]oxy}-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 732]



A reaction, work-up, and purification were performed

using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 36-4 to obtain the title compound.

[0355]

^{1}H-NMR ($CDCl_3$) δ: 7.77 (1H, s), 7.39-7.31 (5H, m), 7.22 (1H, d, J = 8.6 Hz), 6.40 (1H, d, J = 8.6 Hz), 5.22 (2H, s), 5.18 (2H, d, J = 1.7 Hz), 4.96-4.89 (1H, m), 4.66-4.61 (1H, m), 4.40-4.34 (1H, m), 4.29-4.22 (2H, m), 4.11-4.05 (1H, m), 3.72-3.58 (2H, m), 2.64-2.58 (2H, m), 2.36-2.28 (1H, m), 2.20-2.14 (1H, m), 2.04-2.00 (1H, m), 1.92-1.87 (1H, m), 1.83-1.77 (1H, m), 1.59-1.52 (18H, m), 1.36 (3H, s), 1.28 (3H, s), 1.13-1.09 (2H, m), 1.03 (1H, d, J = 10.9 Hz), 0.83 (3H, s).

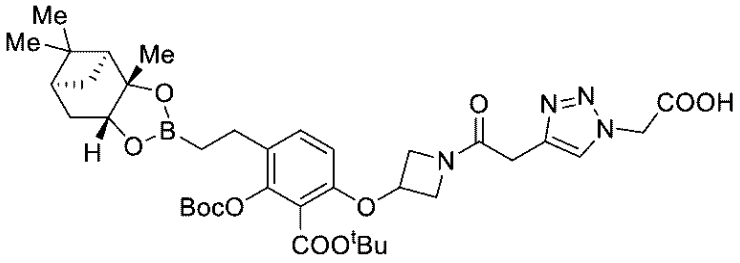
[0356]

LCMS: $[M+H]^+$/Rt = 829.46/4.22 min[D]

[0357]

Reference Example 47: [4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1H-1,2,3-triazol-1-yl]acetic acid

[Chemical Formula 733]



A suspension of 10% palladium on carbon (67.9 mg) in ethyl acetate was added to a methanol (4.1 mL) solution of the compound of Reference Example 47-1 (340 mg, 0.410 mmol). Subsequently, under a hydrogen atmosphere, the reaction mixture was stirred for 2 hours at room temperature. The reaction solution was filtered through celite, and the filtrate was evaporated under reduced pressure to obtain the title compound (271 mg).

[0358]

^{1}H-NMR ($CDCl_3$) δ: 7.78 (1H,s), 7.21 (1H, d, J = 8.6 Hz), 6.39 (1H, d, J = 8.0 Hz), 5.17-4.99 (2H, m), 4.98-4.88 (1H, m), 4.61-4.55 (1H, m), 4.41-4.31 (1H, m), 4.27-4.22 (1H, m), 4.14-4.01 (2H, m), 3.70-3.62 (2H, m), 2.60 (2H, t, J = 8.3 Hz), 2.37-2.13 (2H, m), 2.04-1.99 (1H, m), 1.92-1.86 (1H, m), 1.83-1.77 (1H, m), 1.55 (9H, s), 1.53 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.10 (2H, t, J = 8.3 Hz), 1.03 (1H, d, J = 10.9 Hz), 0.83 (3H, s).

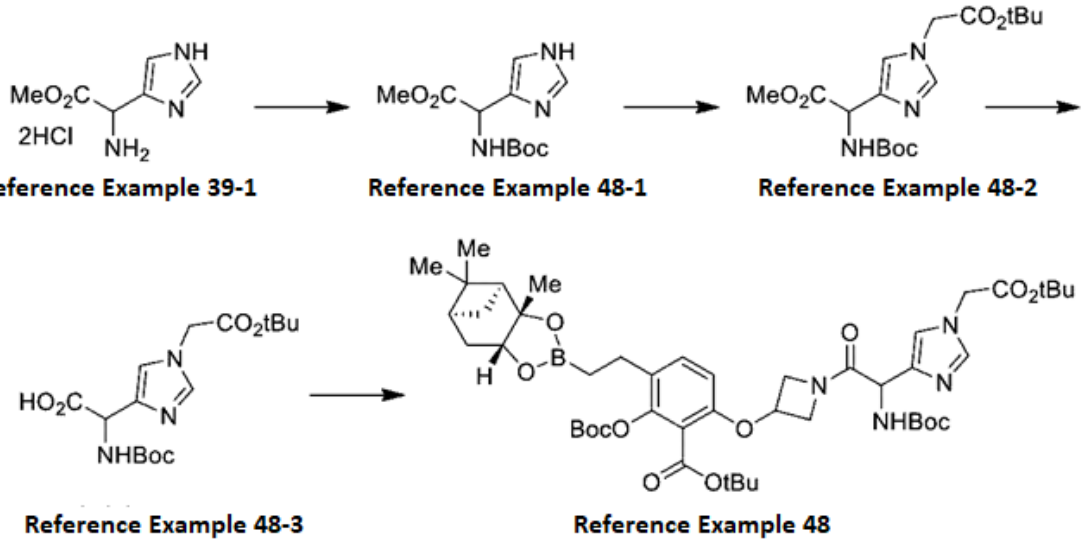
[0359]

LCMS: $[M+H]^+$/Rt = 739.28/3.84 min[D]

[0360]

Reference Example 48: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino][1-(2-tert-butoxy-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

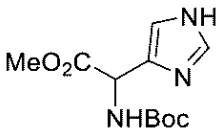
[Chemical Formula 734]



[0361]

Reference Example 48-1: methyl [(tert-butoxycarbonyl)amino](1H-imidazol-4-yl)acetate

[Chemical Formula 735]



Sodium hydrogen carbonate (1.03 g, 12.2 mmol) and di-tert-butyl dicarbonate (2.06 mL, 8.95 mmol) were added to a THF-water (3:1) mixture solution (18 mL) of the compound of Reference Example 39-1 (928 mg, 4.07 mmol). The reaction mixture was stirred for 20 hours at room temperature and then stirred for 2 days at 70°C. After allowing the reaction solution to cool, water (10 mL) was added, and the mixture was extracted with ethyl acetate. The organic phase was dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (eluent: methylene chloride/methanol) to obtain the title compound (368 mg) as a light yellow solid.

[0362]

^{1}H-NMR ($CDCl_3$) δ: 7.60 (1H, s), 7.06 (1H, s), 5.74 (1H, br), 5.40 (1H, d, J = 8.1 Hz), 3.76 (3H, s), 1.45(9H, s).

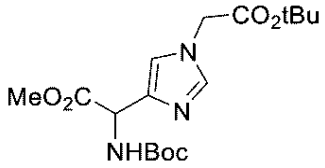
[0363]

LCMS: $[M+H]^+$/Rt = 256.2/0.93 min^B

[0364]

Reference Example 48-2: methyl [(tert-butoxycarbonyl)amino][1-(2-tert-butoxy-2-oxoethyl)-1H-imidazol-4-yl]acetate

[Chemical Formula 736]



Sodium hydride (23.4 mg, 60% dispersion in liquid paraffin, 0.586 mmol) was added to a DMF solution (2.1 mL) of the compound of Reference Example 48-1 (136 mg, 0.533 mmol) under a nitrogen atmosphere at 0°C, and the reaction mixture was stirred for 30 minutes at room temperature. tert-butyl bromoacetate (86.0 µL, 0.586 mmol) was added,

and the reaction mixture was stirred for 3 hours. Methanol (0.1 mL) and then saturated saline (20 mL) were added to the reaction solution, which was extracted with ethyl acetate. The organic phase was dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (155 mg) as a light yellow solid.

[0365]

^{1}H-NMR ($CDCl_3$) δ: 7.43 (1H, s), 6.98 (1H, s), 5.76 (1H, d, J = 8.1 Hz), 5.34 (1H, d, J = 8.1 Hz), 4.55 (2H, s), 3.75 (3H, s), 1.47 (9H, s), 1.40 (9H, s).

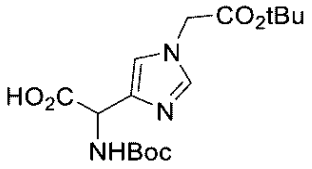
[0366]

LCMS: $[M+H]^+$/Rt = 370.7/1.59 min^B

[0367]

Reference Example 48-3: [(tert-butoxycarbonyl)amino][1-(2-tert-butoxy-2-oxoethyl)-1H-imidazol-4-yl]acetic acid

[Chemical Formula 737]



Triethylamine (0.291 mL, 2.10 mmol) was added to an aqueous solution (4.2 mL) of the compound of Reference Example 48-2 (155 mg, 0.420 mmol), and the reaction mixture was stirred for 1 hour. The reaction solution was concentrated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: methylene chloride/methanol) to obtain the title compound (84.9 mg) as a colorless solid.

[0368]

^{1}H-NMR ($CDCl_3$) δ: 7.82 (1H, s), 7.01 (1H, s), 5.97 (1H, s), 5.30 (1H, s), 4.62 (2H, s), 1.48 (9H, s), 1.44 (9H, s).

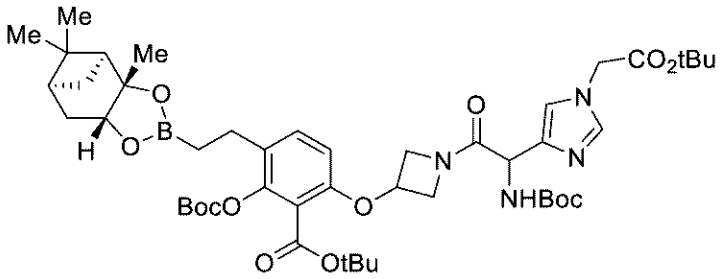
[0369]

LCMS: $[M+H]^+$/Rt = 356.2/1.35 min^B

[0370]

Reference Example 48: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino][1-(2-tert-butoxy-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 738]



Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3 mL) of the compound of Reference Example 1-7 (200 mg, 0.283 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting residue was dissolved in DMF (3 mL). Reference Example 48-3 (131 mg, 0.368 mmol), HATU (129 mg, 0.340 mmol), and triethylamine (0.118 mL, 0.850 mmol) were added, and the reaction mixture was stirred for 30 minutes at room temperature. Water was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate) to obtain the title compound (208 mg) as a colorless amorphous compound.

[0371]

^{1}H-NMR ($CDCl_3$) δ: 7.42 (1H, d, J = 2.7 Hz), 7.20 (1H, dd, J = 8.1 Hz, 5.4 Hz), 6.97 (1H, d, J = 5.4 Hz), 6.36 (1H, d, J = 5.4 Hz), 5.86-5.71 (1H, m), 5.26 (1H, d, J = 8.1 Hz),

4.98-4.82 (1H, m), 4.76-4.05 (7H, m), 2.63-2.57 (2H, m), 2.36-2.27 (1H, m), 2.20-2.13 (1H, m), 2.04-2.00 (1H, m), 1.92-1.77 (2H, m), 1.61 (9H, s), 1.53 (9H, s), 1.48-1.42 (18H, m), 1.36 (3H, s), 1.26 (3H, s), 1.13-1.01 (3H, m), 0.83 (3H,s).

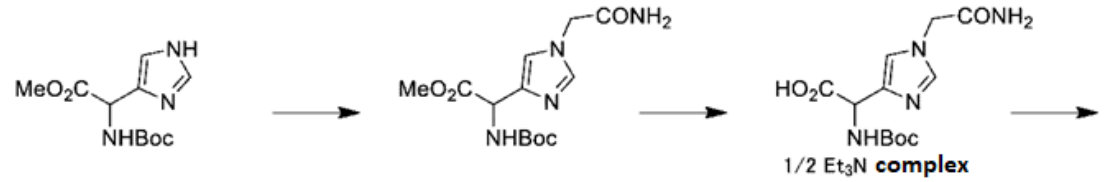
[0372]

LCMS: $[M+H]^+$/Rt = 910.2/2.97 min[B]

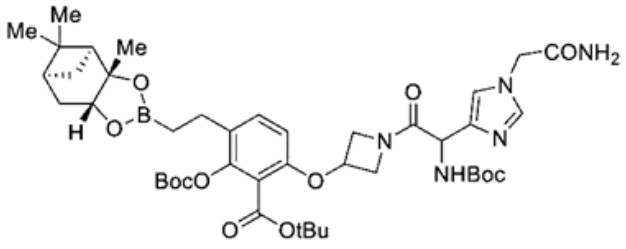
[0373]

Reference Example 49: tert-butyl 6-[(1-{[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl][(tert-butoxycarbonyl)amino]acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 739]



Reference Example 48-1 **Reference Example 49-1** **Reference Example 49-2**

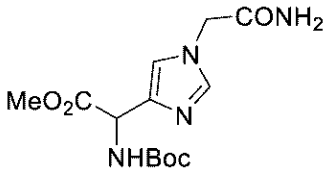


Reference Example 49

[0374]

Reference Example 49-1: methyl [1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl][(tert-butoxycarbonyl)amino]acetate

[Chemical Formula 740]



Sodium hydroxide (70.5 mg, 60% dispersion in liquid paraffin, 1.76 mmol) was added to a DMF solution (6.4 mL) of the compound of Reference Example 48-1 (409 mg, 1.60 mmol) under a nitrogen atmosphere at 0°C, and the reaction mixture was stirred for 30 minutes at room temperature. 2-bromoacetamide (243 mg, 1.76 mmol) was added, and the reaction mixture was stirred for 1.5 hours. Methanol (0.1 mL) was added to the reaction solution, and the mixture was purified by silica gel column chromatography (eluent: methylene chloride/methanol) to obtain a mixture (564 mg) of the title compound and a regioisomer thereof. The resulting mixture was further purified by silica gel column chromatography (amine silica gel, eluent: ethyl acetate/methanol). The resulting mixture (396 mg) of the title compound and a regioisomer thereof was triturated in methylene chloride, filtered, and dried and solidified under reduced pressure to obtain the title compound (198 mg) as a colorless solid.

[0375]

^{1}H-NMR (DMSO-d_6) δ: 7.51 (1H, s), 7.47-7.19 (3H, m), 7.10 (1H, s), 5.19 (1H, d, J = 8.1 Hz), 4.59 (2H, s), 3.62 (3H, s), 1.39 (9H, s).

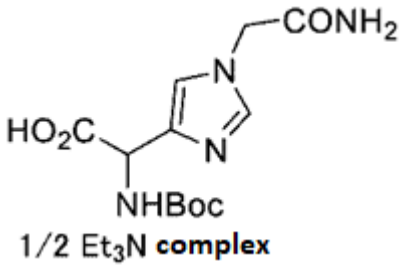
[0376]

LCMS: $[M+H]^+$/Rt = 313.2/0.66 min^B

[0377]

Reference Example 49-2: [1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl][(tert-butoxycarbonyl)amino]acetic acid·1/2(triethylamine) salt

[Chemical Formula 741]



Triethylamine (0.204 mL, 1.47 mmol) was added to an

aqueous solution (3.0 mL) of the compound of Reference Example 49-1 (92.0 mg, 0.295 mmol), and the reaction mixture was stirred for 30 minutes. The reaction solution was concentrated under reduced pressure to obtain the title compound (123 mg) as a colorless amorphous compound.

[0378]

^{1}H-NMR (CD_3OD) δ: 7.69 (1H, s), 7.08 (1H, s), 5.03 (1H, s), 4.72 (2H, s), 3.62 (3H, s), 3.18 (3H, q, J = 8.1 Hz), 1.42 (9H, s), 1.29 (4.5H, t, J = 8.1 Hz).

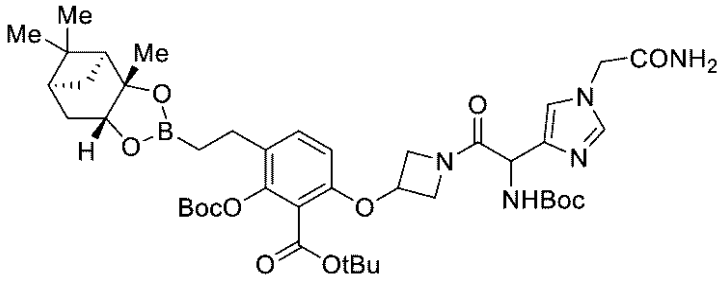
[0379]

LCMS: $[M+H]^+$/Rt = 299.4/0.50 min^B

[0380]

Reference Example 49: tert-butyl 6-[(1-{[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl][(tert-butoxycarbonyl)amino]acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 742]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 (200 mg, 0.283 mmol) and the compound of Reference Example 49-2 (109 mg, 0.312 mmol) as the starting materials by the same method described in Reference Example 42 to obtain the title compound (130 mg) as a colorless solid.

[0381]

^{1}H-NMR ($CDCl_3$) δ: 7.46 (1H, s), 7.21 (1H, dd, J = 8.1 Hz, 5.4 Hz), 6.97-6.95 (1H, m), 6.41-6.37 (1H, m), 5.88-5.59 (3H, m), 5.25-5.22 (1H, m), 5.00-4.87 (1H, m), 4.83-4.57 (3H, m), 4.48-4.33 (1H, m), 4.27-4.23 (1H, m), 4.16-4.05

(2H, m), 2.63-2.57 (2H, m), 2.36-2.27 (1H, m), 2.19-2.13 (1H, m), 2.04-2.00 (1H, m), 1.92-1.77 (2H, m), 1.62-1.53 (18H, m), 1.43 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.13-1.00 (3H, m), 0.83 (3H, s).

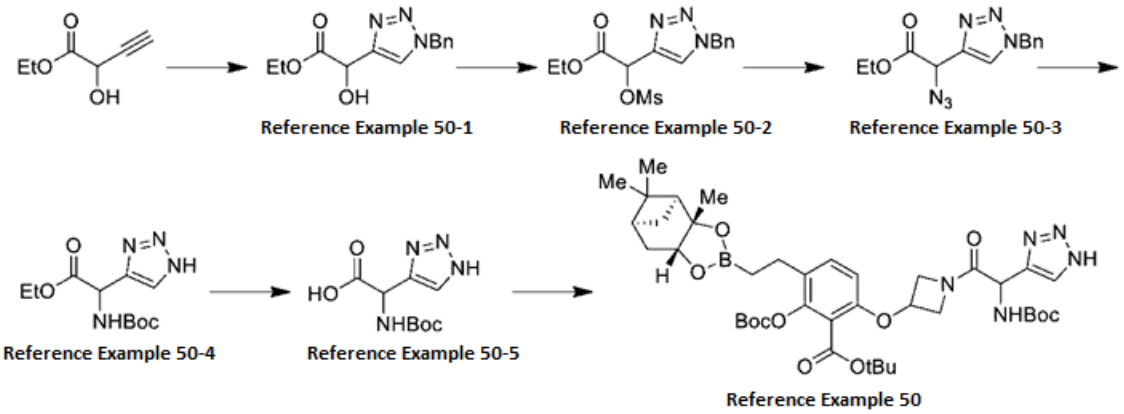
[0382]

LCMS: $[M+H]^+$/Rt = 853.0/2.49 min[B]

[0383]

Reference Example 50: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](1H-1,2,3-triazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

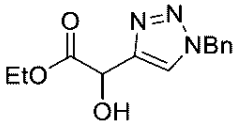
[Chemical Formula 743]



[0384]

Reference Example 50-1: ethyl (1-benzyl-1H-1,2,3-triazol-4-yl)(hydroxy)acetate

[Chemical Formula 744]



After adding benzylazide (0.10 mL), copper iodide (44.6 mg, 0.234 mmol), and tris[(1-benzyl-1H-1,2,3-triazol-4-yl)methyl]amine (41.4 mg, 78.0 μmol) to an acetonitrile (7.8 mL) solution of ethyl 2-hydroxy-3-butynoate (91 μL, 0.780 mmol) and stirring the reaction mixture for 5 hours at room temperature, a saturated aqueous potassium sodium tartrate solution was added to the reaction solution, and

the mixture was extracted with chloroform. The organic phase was washed with saturated saline, and then dried over anhydrous sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 1/2) to obtain the title compound (187 mg).

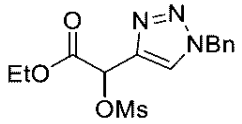
[0385]

^{1}H-NMR ($CDCl_3$) δ: 7.45 (1H, s), 7.38-7.33 (3H, m), 7.27-7.23 (2H, m), 5.50 (2H, s), 5.34 (1H, d, J = 5.7 Hz), 4.33-4.18 (2H, m), 3.44 (1H, d, J = 6.3 Hz), 1.24 (3H, t, J = 7.2 Hz).

[0386]

Reference Example 50-2: ethyl (1-benzyl-1H-1,2,3-triazol-4-yl)[(methanesulfonyl)oxy]acetate

[Chemical Formula 745]



Under a nitrogen atmosphere, triethylamine (0.12 mL, 0.856 mmol) and methanesulfonyl chloride (36 µL, 0.476 mmol) were added to a dichloromethane (1.9 mL) solution of the compound of Reference Example 50-1 (102 mg, 0.389 mmol), and the reaction mixture was stirred for 4 hours at 0°C. Subsequently, a saturated aqueous sodium hydrogen carbonate solution was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure to obtain the title compound (110 mg).

[0387]

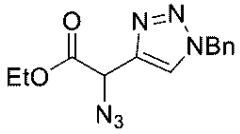
^{1}H-NMR ($CDCl_3$) δ: 7.59 (1H, s), 7.39-7.36 (3H, m), 7.28-7.25 (2H, m), 6.16 (1H, s), 5.57-5.47 (2H, m), 4.33-4.22 (2H, m), 3.14 (3H, s), 1.27-1.24 (3H, m).

[0388]

Reference Example 50-3: ethyl azide(1-benzyl-1H-1,2,3-

triazol-4-yl)acetate

[Chemical Formula 746]



Under a nitrogen atmosphere, a DMF (4.0 mL) solution of the compound of Reference Example 50-2 (156 mg, 0.406 mmol) was cooled with ice. Sodium azide (39.6 mg, 0.609 mmol) was added, and the reaction mixture was stirred for 3.5 hours while cooling with ice. Subsequently, a saturated sodium hydrogen carbonate solution was added, and the mixture was extracted with ethyl acetate. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography (eluent: hexane/ethyl acetate = 2/1 to 1/1) to obtain the title compound (88.7 mg).

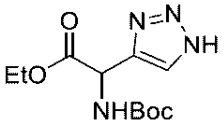
[0389]

^{1}H-NMR ($CDCl_3$) δ: 7.56 (1H, s), 7.40-7.37 (3H, m), 7.29-7.26 (2H, m), 5.55 (2H, s), 5.14 (1H, s), 4.34-4.19 (2H, m), 1.30-1.25 (3H, m).

[0390]

Reference Example 50-4: ethyl [(tert-butoxycarbonyl)amino](1H-1,2,3-triazol-4-yl)acetate

[Chemical Formula 747]



The compound of Reference Example 50-3 (101 mg, 0.349 mmol) and di-tert-butyl dicarbonate (114 mg, 0.524 mmol) were added to an ethanol (12 mL) solution of 10% palladium on carbon (10.4 mg), and then, under a hydrogen atmosphere, the reaction mixture was stirred for 2 hours at room temperature. Subsequently, 1M hydrochloric acid (0.35 mL) was added to the reaction solution, and the reaction mixture was further stirred for 44 hours at room

temperature. The reaction solution was filtered through celite, and the filtrate was evaporated under reduced pressure to obtain the title compound (98.9 mg).

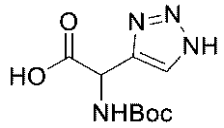
[0391]

^{1}H-NMR ($CDCl_3$) δ: 7.74 (1H, s), 5.81-5.49 (2H, m), 4.34-4.09 (2H, m), 1.44 (9H, s), 1.27-1.21 (3H, m).

[0392]

Reference Example 50-5: [(tert-butoxycarbonyl)amino](1H-1,2,3-triazol-4-yl)acetic acid

[Chemical Formula 748]



Lithium hydroxide monohydrate (14.1 mg, 0.336 mmol) was added to a THF/water (3:1) mixture solution (1.7 mL) of the compound of Reference Example 50-4 (45.4 mg, 0.168 mmol), and the reaction mixture was stirred for 3 hours at room temperature. Subsequently, 1M hydrochloric acid was added until the pH was 4, and the mixture was extracted with ethyl acetate, and then the aqueous layer was extracted again with chloroform. The organic phase was washed with saturated saline, and then dried over sodium sulfate and filtered, then the filtrate was evaporated under reduced pressure. The resulting residue was washed and purified by decantation with diethyl ether to obtain the title compound (12.7 mg).

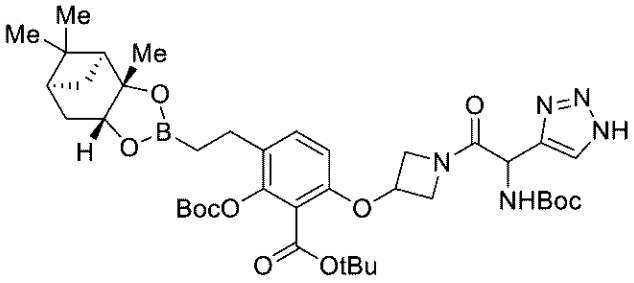
[0393]

^{1}H-NMR (CD_3OD) δ: 7.93-7.65 (1H, m), 5.51-5.32 (1H, m), 1.45 (9H, s).

[0394]

Reference Example 50: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](1H-1,2,3-triazol-4-yl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 749]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 and the compound of Reference Example 50-5 as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound.

[0395]

^{1}H-NMR ($CDCl_3$) δ: 7.71-7.62 (1H, m), 7.24-7.17 (1H, m), 6.39-6.32 (1H, m), 5.96-5.78 (1H, m), 5.52-5.37 (1H, m), 5.04-4.84 (1H, m), 4.62-3.93 (5H, m), 2.67-2.58 (2H, m), 2.51-2.27 (1H, m), 2.25-2.12 (1H, m), 2.04-1.99 (1H, m), 1.95-1.86 (1H, m), 1.83-1.74 (1H, m), 1.66-1.26 (33H, m), 1.14-1.08 (2H, m), 1.04-0.99 (1H, m), 0.83 (3H,s).

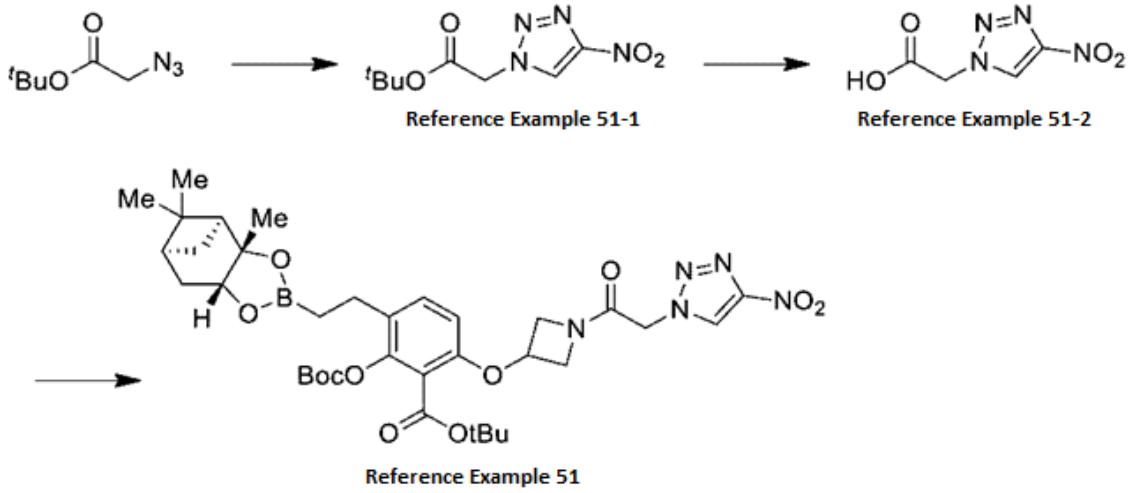
[0396]

LCMS: $[M+H]^+$/Rt = 796.42/2.30 min^D

[0397]

Reference Example 51: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

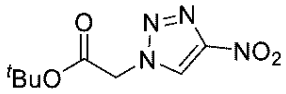
[Chemical Formula 750]



[0398]

Reference Example 51-1: tert-butyl (4-nitro-1H-1,2,3-triazol-1-yl)acetate

[Chemical Formula 751]



1-(dimethylamino)-2-nitroethylene (1.57 g, 13.5 mmol) was added to a 1,4-dioxane (8.2 mL) solution of tert-butyl 2-azidoacetate (1.29 g, 8.21 mmol), and the reaction mixture was stirred for 12 hours under microwave irradiation at 120°C. Subsequently, the reaction solution was evaporated under reduced pressure to obtain the title compound (226 mg).

[0399]

^{1}H-NMR ($CDCl_3$) δ: 8.45 (1H, s), 5.13 (2H, s), 1.50 (9H, s).

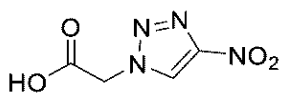
[0400]

LCMS: $[M+H]^+$/Rt = 229.13/2.48 min[D]

[0401]

Reference Example 51-2: (4-nitro-1H-1,2,3-triazol-1-yl)acetic acid

[Chemical Formula 752]



A 4 N hydrogen chloride·1,4-dioxane solution (14 mL) was added to the compound of Reference Example 51-1 (329 mg, 1.44 mmol), and the reaction mixture was stirred for 23 hours at room temperature. Subsequently, the reaction solution was evaporated under reduced pressure to obtain the title compound.

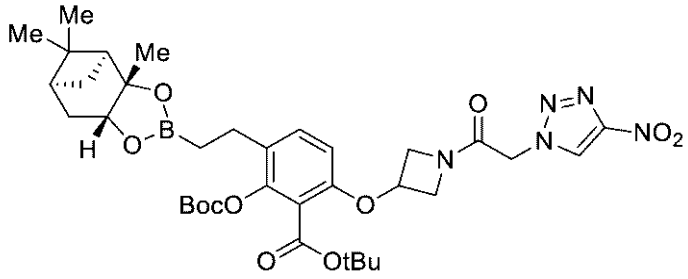
[0402]

^{1}H-NMR (CD_3OD) δ: 8.94 (1H, s), 5.35-5.30 (2H, m).

[0403]

Reference Example 51: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 753]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 and the compound of Reference Example 51-2 as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound.

[0404]

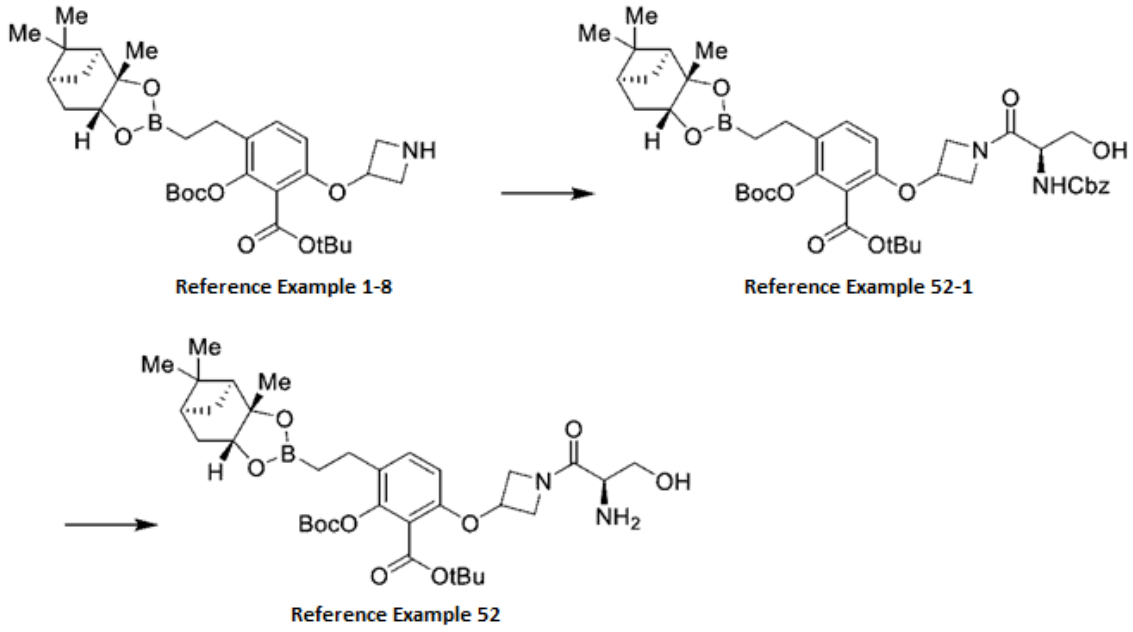
^{1}H-NMR ($CDCl_3$) δ: 8.57 (1H, s), 6.43 (1H, d, J = 8.6 Hz), 5.16-4.98 (3H, m), 4.65-4.57 (1H, m), 4.48-4.41 (1H, m), 4.36-4.29 (1H, m), 4.26-4.21 (1H, m), 4.20-4.13 (1H, m), 2.66-2.56 (2H, m), 2.33-2.28 (1H, m), 2.18-2.13 (1H, m), 2.05-1.97 (1H, m), 1.91-1.85 (1H, m), 1.82-1.75 (2H, m), 1.55 (9H, s), 1.52 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.12-1.07 (2H, m), 1.03-0.98 (1H, m), 0.82 (3H, s).

[0405]

Reference Example 52: tert-butyl 2-[(tert-

butoxycarbonyl)oxy]-6-[(1-D-serylazetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

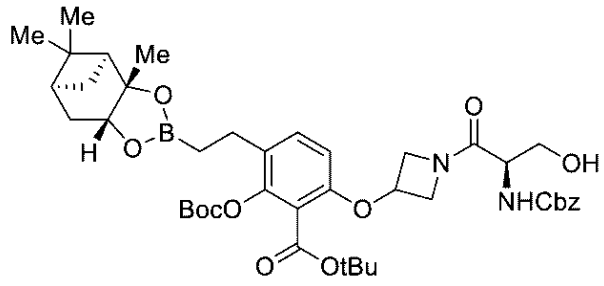
[Chemical Formula 754]



[0406]

Reference Example 52-1: tert-butyl 6-[(1-{N-[(benzyloxy)carbonyl]-D-seryl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 755]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (114.4 mg, 0.188 mmol) and N-carbobenzoxy-D-serine (91.8 mg, 0.384 mmol) as the starting materials by the same method described in Reference Example 3 to obtain the title

compound (71.4 mg).

[0407]

^{1}H-NMR (CD_3OD) δ: 7.39-7.26 (6H, m), 6.67 (1H, d, J = 8.5 Hz), 5.12-5.05 (3H, m), 4.39-4.33 (1H, m), 4.29 (2H, d, J = 8.5 Hz), 4.00-3.94 (1H, m), 3.74-3.67 (2H, m), 3.34 (2H, s), 2.58 (2H, t, J = 7.9 Hz), 2.39-2.32 (1H, m), 2.21-2.16 (1H, m), 1.99 (1H, t, J = 5.5 Hz), 1.89-1.87 (1H, m), 1.79 (1H, d, J = 15.3 Hz), 1.55 (9H, d, J = 7.9 Hz), 1.52 (9H, s), 1.35 (3H, s), 1.29 (3H, s), 1.08 (2H, t, J = 8.2 Hz), 0.99 (1H,d, J = 10.4 Hz), 0.86 (3H, s).

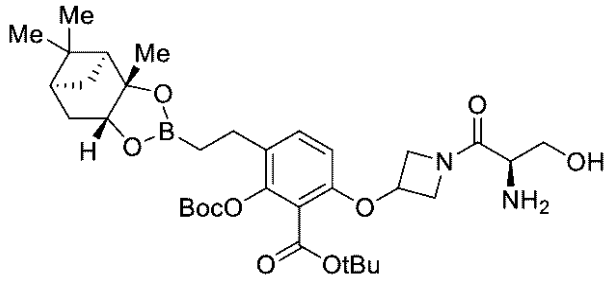
[0408]

LCMS: $[M+H]^+$/Rt = 793.48/1.381 min[A]

[0409]

Reference Example 52: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-[(1-D-serylazetidin-3-yl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 756]



Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3.0 mL) of the compound of Reference Example 52-1 (200 mg, 0.252 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated to obtain the title compound (198 mg).

[0410]

^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.44-6.40 (1H, m), 5.01-4.94 (1H, m), 4.71-4.06 (5H, m), 3.74-3.49 (3H, m),

2.64-2.58 (2H, m), 2.45-2.00 (6H, m), 1.93-1.77 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

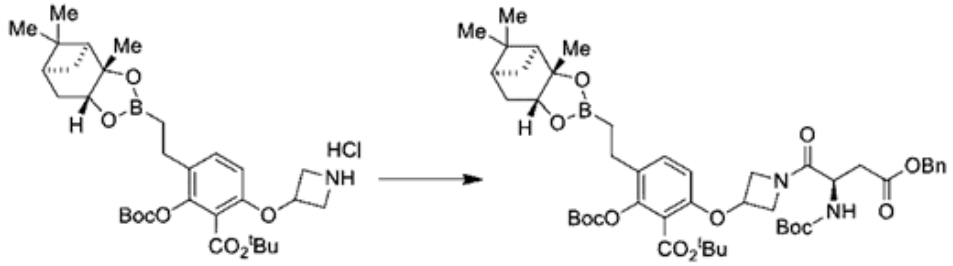
[0411]

LCMS: $[M+H]^+$/Rt = 659.7/2.31 min[B]

[0412]

Reference Example 53: tert-butyl 6-({1-[N^2-(tert-butoxycarbonyl)-N-methyl-D-asparaginyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

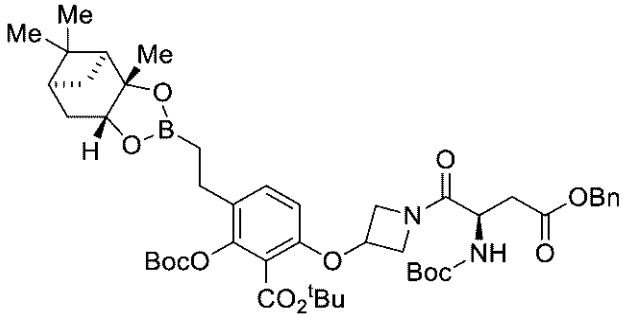
[Chemical Formula 757]



[0413]

Reference Example 53-1: tert-butyl 6-[(1-{(2R)-4-(benzyloxy)-2-[(tert-butoxycarbonyl)amino]-4-oxobutanoyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 758]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 and benzyl (R)-3-[(tert-butoxycarbonyl)amino]-4-oxobutanoate as the starting materials by the same method described in Reference Example 3 to obtain the title compound (1.84 g).

[0414]

^{1}H-NMR ($CDCl_3$) δ: 7.40-7.31 (5H, m), 7.21 (1H, d, J = 8.6 Hz), 6.40-6.30 (1H, m), 5.37-5.24 (1H, m), 5.16-5.07 (2H, m), 4.97-4.54 (3H, m), 4.42-4.27 (2H, m), 4.27-4.22 (1H, m), 4.08-4.00 (1H, m), 2.84-2.73 (2H, m), 2.65-2.57 (2H, m), 2.37-2.27 (1H, m), 2.24-2.13 (1H, m), 2.04-2.00 (1H, m), 1.93-1.87 (1H, m), 1.84-1.77 (1H, m), 1.56 (9H, s), 1.53 (9H, s), 1.44-1.40 (9H, m), 1.36 (3H, s), 1.28 (3H, s), 1.15-1.08 (2H, m), 1.06-1.01 (1H, m), 0.84 (3H, s).

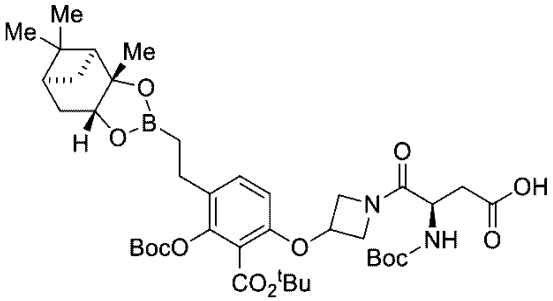
[0415]

LCMS: $[M+H]^+$/Rt = 877.72/4.54 min^D

[0416]

Reference Example 53-2: (3R)-3-[(tert-butoxycarbonyl)amino]-4-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-4-oxobutanoic acid

[Chemical Formula 759]



A suspension of 10% palladium on carbon (150 mg) in ethyl acetate was added to an ethyl acetate (17 mL) solution of the compound of Example 53-1 (1.50 g, 1.71 mmol). Subsequently, under a hydrogen atmosphere, the reaction mixture was stirred for 3 hours at room temperature. The reaction solution was filtered through celite, and the filtrate was evaporated under reduced pressure to obtain the title compound (1.34 g).

[0417]

^{1}H-NMR (CD_3OD) δ: 7.32 (1H, d, J = 8.0 Hz), 6.69 (1H, d, J = 8.6 Hz), 5.15-5.08 (1H, m), 4.63-4.59 (1H, m), 4.55-4.27 (4H, m), 3.99-3.92 (1H, m), 2.82-2.69 (1H, m), 2.61-2.51 (3H, m), 2.40-2.31 (1H, m), 2.23-2.14 (1H, m), 2.02-1.97 (2H, m), 1.92-1.86 (1H, m), 1.83-1.76 (1H, m), 1.57 (9H, s), 1.52 (9H, s), 1.47-1.40 (9H, m), 1.36 (3H, s), 1.30 (3H, s), 1.11-1.05 (2H, m), 1.02-0.96 (1H, m), 0.86 (3H, s).

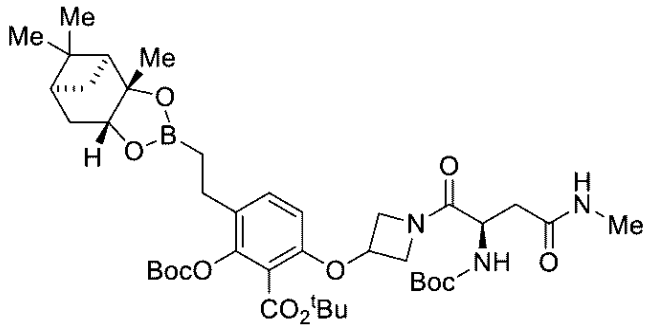
[0418]

LCMS: $[M+H]^+$/Rt = 787.62/4.14 min[D]

[0419]

Reference Example 53: tert-butyl 6-({1-[N^2-(tert-butoxycarbonyl)-N-methyl-D-asparaginyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 760]



A reaction, work-up, and purification were performed using the compound of Reference Example 53-2 and methylamine hydrochloride as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (270 mg).

[0420]

^{1}H-NMR (CD_3OD) δ: 7.32 (1H, d, J = 8.6 Hz), 6.68 (1H, d, J = 8.6 Hz), 5.14-5.07 (1H, m), 4.61-4.27 (5H, m), 4.00-3.91 (1H, m), 2.74-2.54 (6H, m), 2.49-2.41 (1H, m), 2.41-2.32 (1H, m), 2.23-2.14 (1H, m), 2.01-1.97 (1H, m), 1.92-1.86 (1H, m), 1.83-1.76 (1H, m), 1.57 (9H, s), 1.52 (9H, s), 1.46-1.40 (9H, m), 1.36 (3H, s), 1.30 (3H, s), 1.11-1.04 (2H, m), 1.01-0.95 (1H, m), 0.86 (3H, s).

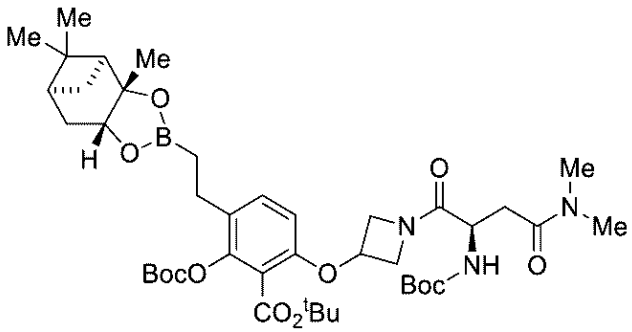
[0421]

LCMS: $[M+H]^+$/Rt = 800.73/4.09 min[D]

[0422]

Reference Example 54: tert-butyl 6-({1-[N^2-(tert-butoxycarbonyl)-N,N-dimethyl-D-asparaginyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 761]



A reaction, work-up, and purification were performed using the compound of Reference Example 53-2 and dimethylamine hydrochloride as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (251 mg).

[0423]

^{1}H-NMR ($CDCl_3$) δ: 7.18 (1H, d, J = 8.6 Hz), 6.36 (1H, d, J = 8.6 Hz), 5.82-5.50 (1H, m), 4.94-4.86 (1H, m), 4.85-4.72 (1H, m), 4.64-4.53 (1H, m), 4.43-4.31 (2H, m), 4.26-4.19 (1H, m), 4.08-3.99 (1H, m), 2.99-2.84 (8H, m), 2.62-2.54 (2H, m), 2.34-2.25 (1H, m), 2.18-2.12 (1H, m), 2.02-1.98 (1H, m), 1.90-1.85 (1H, m), 1.83-1.75 (1H, m), 1.54 (9H, s), 1.51 (9H, s), 1.40 (9H, s), 1.33 (3H, s), 1.26 (3H, s), 1.12-1.06 (2H, m), 1.03-0.99 (1H, m), 0.81 (3H, s).

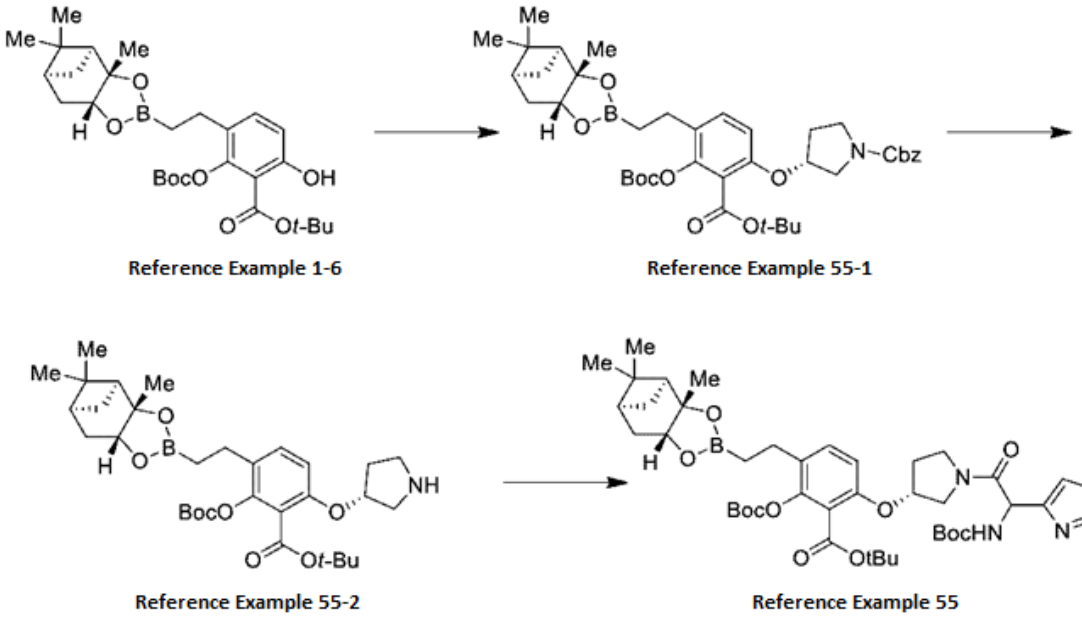
[0424]

LCMS: $[M+H]^+$/Rt = 814.69/4.15 min[D]

[0425]

Reference Example 55: tert-butyl 6-{[(3R)-1-{[(tert-butoxycarbonyl)amino](1H-imidazol-4-yl)acetyl}pyrrolidin-3-yl]oxy}-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 762]



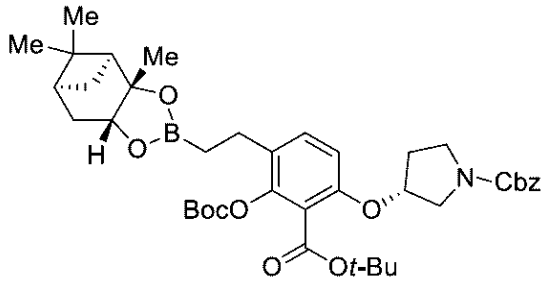
Reference Example 1-6 | Reference Example 55-1

Reference Example 55-2 | Reference Example 55

[0426]

Reference Example 55-1: benzyl (3R)-3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]pyrrolidine-1-carboxylate

[Chemical Formula 763]



Cyanomethylenetri-n-butylphosphorane (0.762 mL, 2.90 mmol) was added dropwise to a toluene solution (5 mL) of the compound of Reference Example 1-6 (500 mg, 0.968 mmol) and (S)-1-Cbz-3-pyrrolidinol (321 mg). The reaction solution was warmed up to 100°C, and stirred for 3 hours. The reaction solution was evaporated under reduced pressure, and the resulting residue was purified by silica gel column chromatography (eluent: hexane/ethyl acetate = 90/10 to

65/35) to obtain the title compound (681 mg).

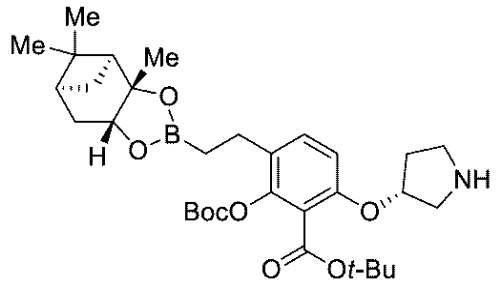
[0427]

^{1}H-NMR ($CDCl_3$) δ: 7.29-7.25 (5H, m), 7.14 (1H, dd, J = 8.5, 3.0 Hz), 6.60 (1H, dd, J = 12.2, 8.5 Hz), 5.08-5.03 (2H, m), 4.82 (1H, s), 4.18-4.16 (1H, m), 3.69-3.45 (4H, m), 2.55-2.53 (2H, m), 2.26-2.23 (1H, m), 2.14-2.10 (2H, m), 1.96-1.94 (2H, m), 1.84-1.81 (1H, m), 1.76-1.72 (1H, m), 1.45-1.44 (18H, m), 1.29 (3H, s), 1.21 (3H, s), 1.05-1.03 (2H, m), 0.97 (1H, d, J = 10.4 Hz), 0.76 (3H, s).

[0428]

Reference Example 55-2: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[(3R)-pyrrolidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 764]



10% palladium on carbon (340 mg) was added to a methanol (5 mL) solution of the compound of Reference Example 55-1 (681 mg, 0.945 mmol), and the reaction mixture was stirred for 5 hours under a hydrogen atmosphere at room temperature. The reaction solution was filtered through celite, and the filtrate was evaporated under reduced pressure. The resulting residue was purified by silica gel column chromatography (eluent: chloroform/methanol = 95/5 to 80/20) to obtain the title compound (333 mg).

[0429]

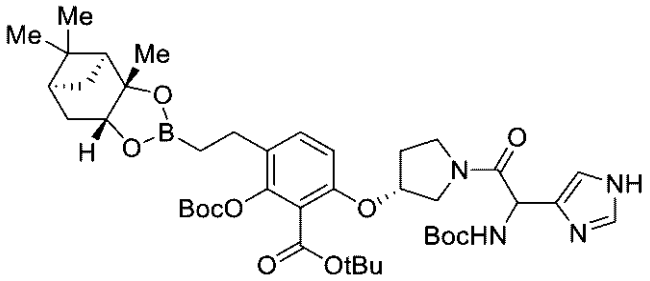
LCMS: $[M+H]^+$/Rt = 586/0.990 min^A

[0430]

Reference Example 55: tert-butyl 6-{[(3R)-1-{[(tert-butoxycarbonyl)amino](1H-imidazol-4-yl)acetyl}pyrrolidin-3-yl]oxy}-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-

3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 765]



A reaction, work-up, and purification were performed using the compound of Reference Example 55-2 (86 mg, 0.138 mmol) as the starting material by the same method described in Reference Example 36-4 to obtain the title compound (90.7 mg).

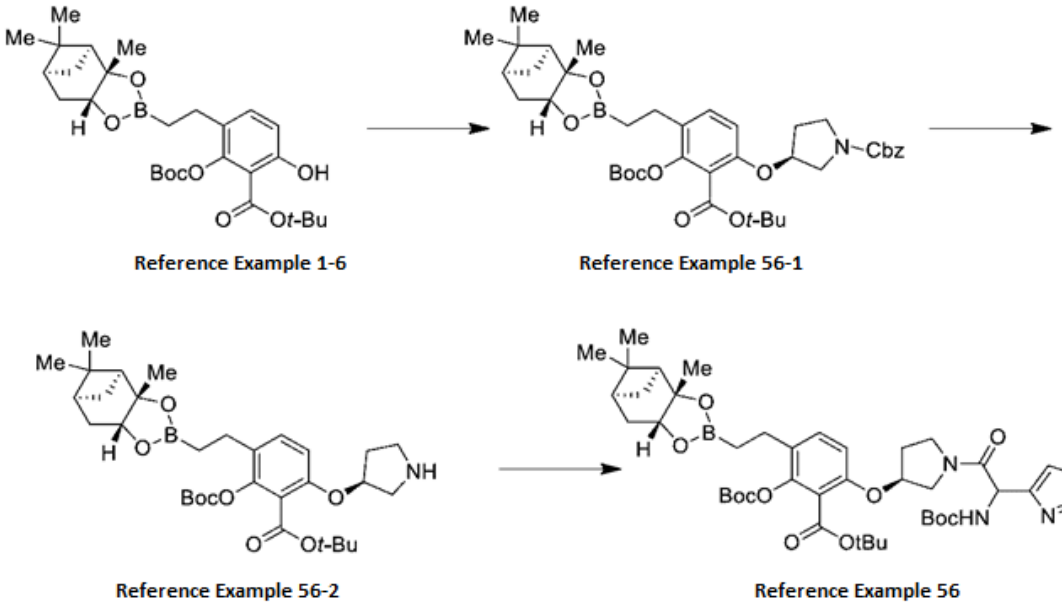
[0431]

LCMS: $[M+H]^+$/Rt = 809.53/0.874 min[E]

[0432]

Reference Example 56: tert-butyl 4-(1-[(tert-butoxycarbonyl)amino]-2-{(3S)-3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]pyrrolidin-1-yl}-2-oxoethyl)-1H-imidazole-1-carboxylate

[Chemical Formula 766]



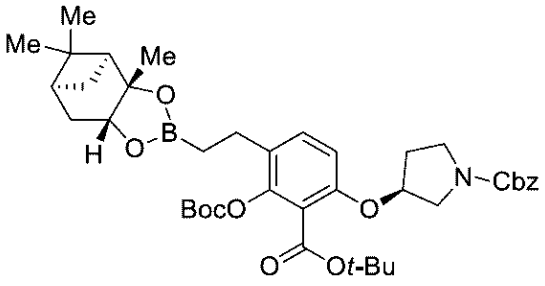
Reference Example 1-6 | Reference Example 56-1

Reference Example 56-2 | Reference Example 56

[0433]

Reference Example 56-1: benzyl (3S)-3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]pyrrolidine-1-carboxylate

[Chemical Formula 767]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-6 and (R)-1-Cbz-3-pyrrolidinol as the starting materials by the same method described in Reference Example 55-1 to obtain the title compound.

[0434]

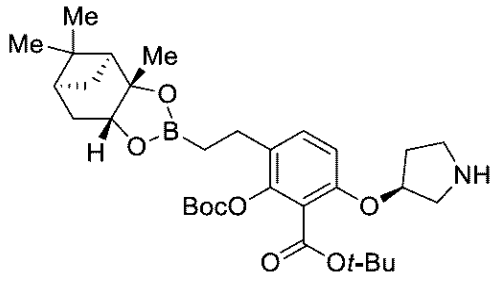
^{1}H-NMR ($CDCl_3$) δ: 7.30-7.21 (5H, m), 7.17-7.11 (1H, m), 6.60 (1H, dd, J = 12.8, 8.5 Hz), 5.10-5.01 (2H, m), 4.83-4.80 (1H, m), 4.18-4.16 (1H, m), 3.69-3.45 (4H, m), 2.55-

2.53 (2H, m), 2.28-2.21 (1H, m), 2.14-2.10 (2H, m), 1.95 (2H, t, J = 5.5 Hz), 1.83-1.80 (1H, m), 1.76-1.72 (1H, m), 1.45-1.44 (18H, m), 1.29 (3H, s), 1.21 (3H, s), 1.05-1.03 (2H, m), 0.97 (1H, d, J = 11.0 Hz), 0.76 (3H, s).

[0435]

Reference Example 56-2: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[(3S)-pyrrolidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 768]



A reaction, work-up, and purification were performed using the compound of Reference Example 56-1 as the starting material by the same method described in Reference Example 55-2 to obtain the title compound.

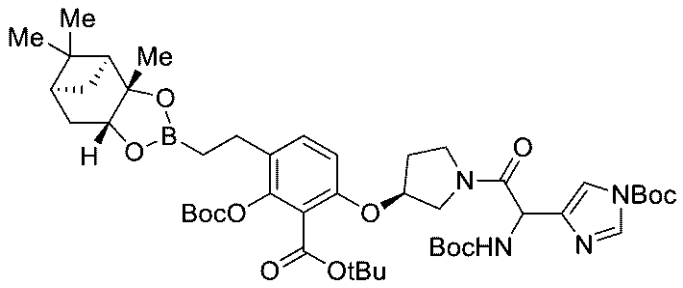
[0436]

LCMS: $[M+H]^+$/Rt = 586/0.993 min[A]

[0437]

Reference Example 56: tert-butyl 4-(1-[(tert-butoxycarbonyl)amino]-2-{(3S)-3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]pyrrolidin-1-yl}-2-oxoethyl)-1H-imidazole-1-carboxylate

[Chemical Formula 769]



A reaction, work-up, and purification were performed using the compound of Reference Example 56-2 (54 mg, 0.093 mmol) and [(tert-butoxycarbonyl)amino][1-(tert-butoxycarbonyl)-1H-imidazol-4-yl]acetic acid (38 mg, 0.11 mmol) as the starting materials by the same method described in Reference Example 55 to obtain the title compound (47 mg).

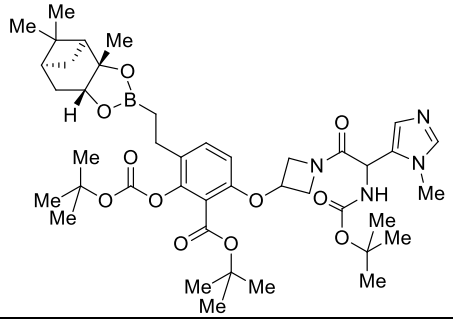
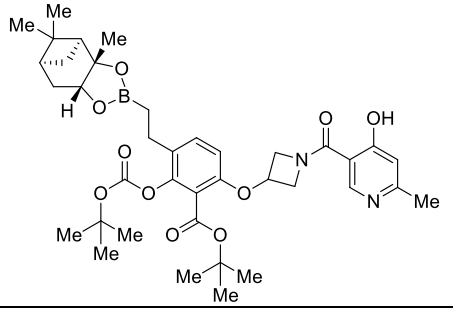
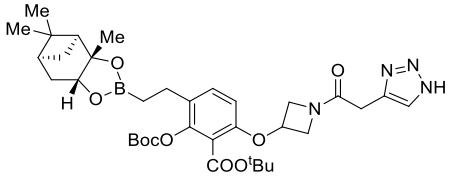
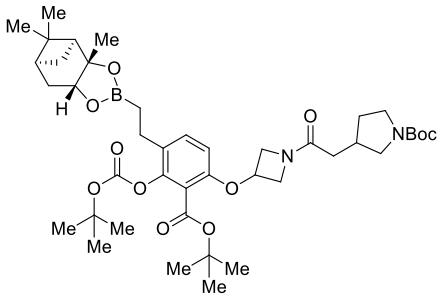
[0438]

LCMS: $[M+H]^+$/Rt = 909.53/1.356 min[E]

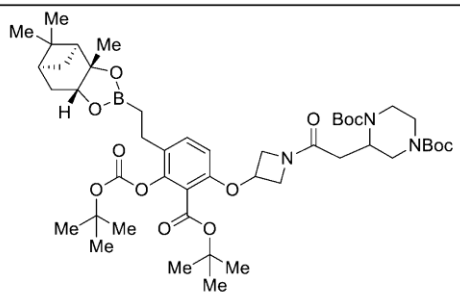
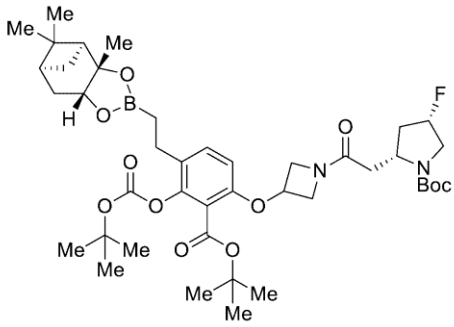
[0439]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 and carboxylic acid corresponding to each of the following Reference Examples as the starting materials by the same method described in Reference Example 36-4 to obtain each of Reference Example compounds 57 to 62 shown in Tables 2-7 and 2-8.

[Table 2-7]

Reference Example	Structural formula	NMR and/or LCMS
57		LCMS:$[M+H]^+$/Rt=809.49/0.973min[C]
58		LCMS:$[M+H]^+$/Rt = 707.43/1.187min[A]
59		LCMS:$[M+H]^+$/Rt = 681.60/3.75 min[D] ^{1}H-NMR ($CDCl_3$) δ: 7.66 (1H, s), 7.20 (1H, d, J = 8.0 Hz), 6.38 (1H, d, J = 8.6 Hz), 4.99-4.87 (1H, m), 4.55-4.49 (1H, m), 4.40-4.34 (1H, m), 4.28-4.20 (2H, m), 4.12-4.06 (1H, m), 3.62-3.58 (2H, m), 2.63-2.54 (2H, m), 2.33-2.24 (1H, m), 2.21-2.10 (1H, m), 2.03-1.96 (1H, m), 1.90-1.84 (1H, m), 1.81-1.74 (1H, m), 1.53-1.51 (18H, m), 1.34 (3H, s), 1.26 (3H, s), 1.11-1.07 (2H, m), 1.02-0.98 (1H, m), 0.81 (3H, s).
60		^{1}H-NMR ($CDCl_3$) δ: 7.20 (2H, d, J = 8.5 Hz), 6.39 (1H, d, J = 8.5 Hz), 4.93-4.90 (1H, m), 4.42-4.31 (2H, m), 4.22 (1H, dd, J = 9.2, 1.8 Hz), 4.13-4.02 (2H, m), 3.59-3.55 (1H, m), 3.44-3.38 (1H, m), 3.29-3.25 (1H, m), 2.92-2.87 (1H, m), 2.59 (3H, t, J = 8.2 Hz), 2.35-2.23 (1H, m), 2.19-2.12 (3H, m), 2.09-2.02 (2H, m), 1.88-1.85 (1H, m), 1.78 (1H, d, J = 14.6 Hz), 1.54 (9H, s), 1.52 (18H, s), 1.43 (3H, s), 1.34 (3H, s), 1.09 (2H, t, J = 8.5 Hz), 1.01 (1H, d, J = 11.0 Hz), 0.82 (3H, s).

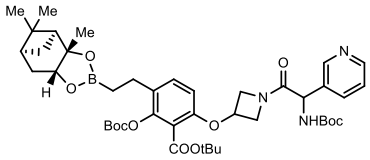
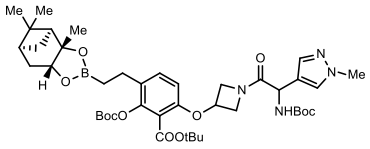
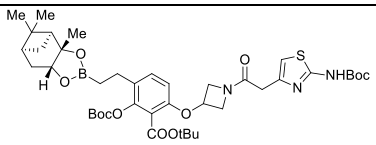
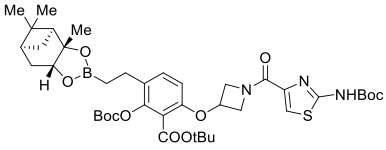
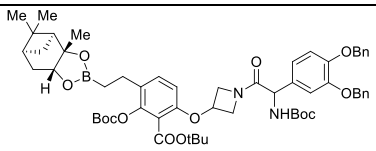
[Table 2-8]

61		^{1}H-NMR ($CDCl_3$) δ: 7.21 (1H, d, J = 8.5 Hz), 6.40 (1H, d, J = 8.5 Hz), 4.94–4.90 (1H, m), 4.70–4.30 (4H, m), 4.25 (1H, dd, J = 8.9, 2.1 Hz), 4.13–3.80 (6H, m), 3.01–2.75 (3H, m), 2.61 (2H, t, J = 8.2 Hz), 2.35–2.28 (1H, m), 2.20–2.14 (1H, m), 2.04–2.00 (1H, m), 1.92–1.87 (1H, m), 1.83–1.78 (1H, m), 1.56 (9H, s), 1.53 (9H, s), 1.47 (18H, s), 1.36 (3H, s), 1.27 (3H, s), 1.13 (2H, dt, J = 17.5, 6.3 Hz), 1.03 (1H, d, J = 11.0 Hz), 0.84 (3H, s).
62		LCMS:$[M+H]^+$/Rt = 801.41/1.463min[C] ^{1}H-NMR (CD_3OD) δ: 7.31 (1H, d, J = 8.5 Hz), 6.69 (1H, dd, J = 8.5, 2.4 Hz), 5.30 (1H, s), 5.17 (1H, s), 5.08 (1H, s), 4.61 (1H, t, J = 7.6 Hz), 4.37 (1H, dd, J = 11.3, 6.4 Hz), 4.31–4.26 (3H, m), 4.18–4.14 (1H, m), 3.94 (1H, d, J = 11.6 Hz), 3.63 (1H, s), 3.55 (1H, s), 2.58 (2H, t, J = 7.9 Hz), 2.38–2.31 (2H, m), 2.20–2.15 (2H, m), 1.98 (1H, t, J = 5.5 Hz), 1.89–1.85 (1H, m), 1.78 (1H, d, J = 14.6 Hz), 1.56 (9H, s), 1.52 (9H, s), 1.47 (9H, s), 1.35 (3H, s), 1.29 (3H, s), 1.07 (2H, t, J = 8.2 Hz), 0.97 (1H, dd, J = 11.0, 1.8 Hz), 0.85 (3H, s).

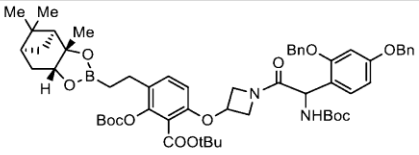
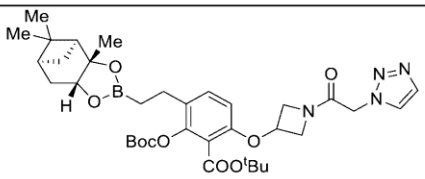
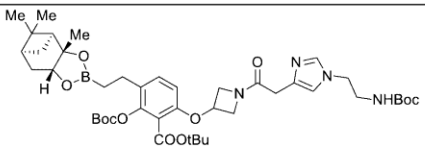
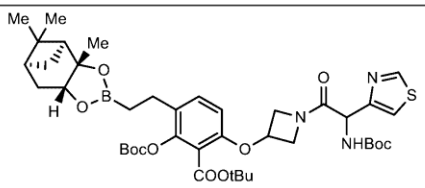
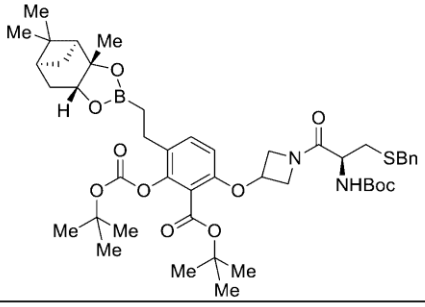
[0440]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 3 to obtain each of Reference Example compounds 63 to 105 shown in Tables 2-9 to 2-16.

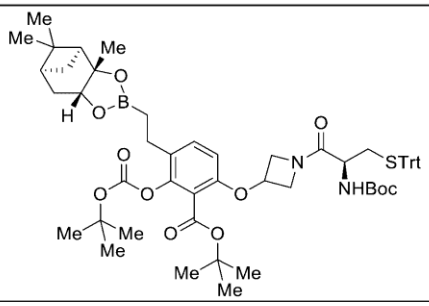
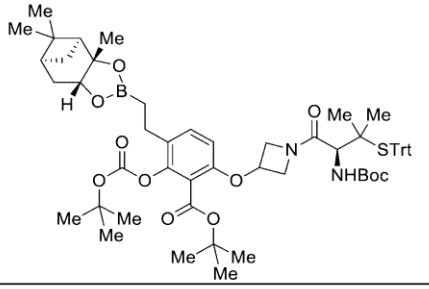
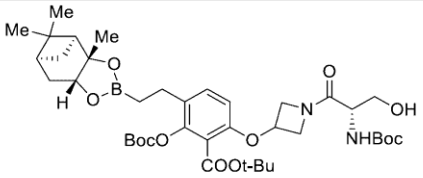
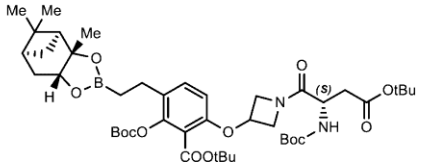
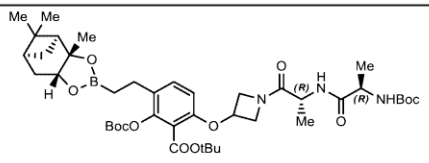
[Table 2-9]

Reference Example	Structural formula	NMR and/or LCMS
63		LCMS:$[M+H]^+$/Rt=807.2/2.91min[B] ^{1}H-NMR ($CDCl_3$) δ: 8.63-8.57 (2H, m), 7.73-7.66 (1H, m), 7.34-7.29 (1H, m), 7.20 (1H, dd, J = 8.1 Hz, 5.4 Hz), 6.34 (1H, t, J = 8.1 Hz), 6.00-5.83 (1H, m), 5.24-5.17 (1H, m), 4.98-4.78 (1H, m), 4.64-4.42 (1H, m), 4.33-4.06 (3H, m), 4.04-3.82 (1H, m), 2.64-2.56 (2H, m), 2.36-2.27 (1H, m), 2.21-2.12 (1H, m), 2.05-2.00 (1H, m), 1.91-1.77 (2H, m), 1.56-1.40 (27H, m), 1.36 (3H, s), 1.26 (3H, s), 1.13-1.00 (3H, m), 0.83 (3H, s).
64		LCMS:$[M+H]^+$/Rt=810.0/2.93min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.46-7.36 (2H, m), 7.22-7.18 (1H, m), 6.36-6.33 (1H, m), 5.67-5.50 (1H, m), 5.19-5.15 (1H, m), 5.05-4.93 (1H, m), 4.85-4.63 (1H, m), 4.48-4.22 (3H, m), 4.16-3.95 (1H, m), 3.88-3.66 (3H, m), 2.63-2.57 (2H, m), 2.36-2.27 (1H, m), 2.19-2.14 (1H, m), 2.05-2.00 (1H, m), 1.93-1.76 (2H, m), 1.56-1.41 (27H, m), 1.35 (3H, s), 1.28 (3H, s), 1.13-1.00 (3H, m), 0.83 (3H, s).
65		LCMS:$[M+H]^+$/Rt=813.0/2.97 min[B] ^{1}H-NMR ($CDCl_3$) δ: 8.15 (1H, br), 7.21 (1H, d, J = 8.1 Hz), 6.71 (1H, s), 6.41 (1H, d, J = 8.1 Hz), 5.00-4.88 (1H, m), 4.54-4.49 (1H, m), 4.42-4.35 (1H, m), 4.31-4.23 (2H, m), 4.14-4.08 (1H, m), 3.49 (2H, s), 2.65-2.56 (2H, m), 2.36-2.26 (1H, m), 2.19-2.12 (1H, m), 2.06-2.00 (1H, m), 1.92-1.77 (2H, m), 1.61-1.44 (27H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.00 (3H, m), 0.83 (3H, s)
66		LCMS:$[M+H]^+$/Rt=798.8/3.05min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.82 (1H, br), 7.72 (1H, s), 7.23 (1H, d, J = 8.1 Hz), 6.45 (1H, d, J = 8.1 Hz), 4.97-4.84 (2H, m), 4.56-4.52 (2H, m), 4.26-4.19 (2H, m), 2.65-2.59 (2H, m), 2.36-2.28 (1H, m), 2.22-2.14 (1H, m), 2.04-2.00 (1H, m), 1.91-1.76 (2H, m), 1.60-1.49 (27H, m), 1.36 (3H, s), 1.28 (3H, s), 1.15-1.01 (3H, m), 0.84 (3H, s).
67		LCMS:$[M+H]^+$/Rt=1017.7/3.24min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.47-7.18 (11H, m), 6.92-6.87 (3H, m), 6.36-6.26 (1H, m), 5.86-5.69 (1H, m), 5.19-3.76 (11H, m), 2.63-2.57 (2H, m), 2.36-2.27 (1H, m), 2.18-2.13 (1H, m), 2.05-2.00 (1H, m), 1.89-177 (2H, m), 1.57-1.39 (27H, m), 1.35 (3H, s), 1.26 (3H, s), 1.14-1.00 (3H, m), 0.83 (3H, s).

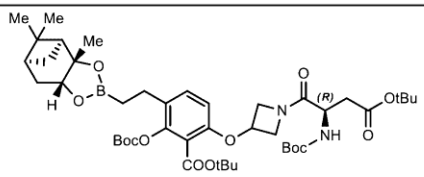
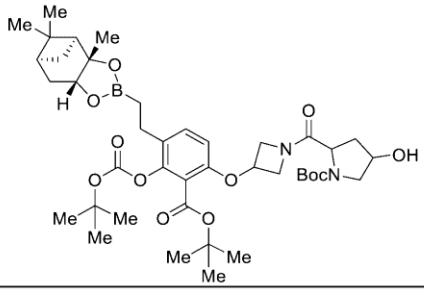
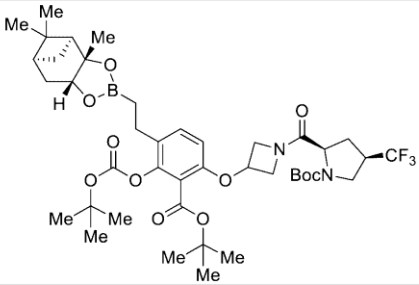
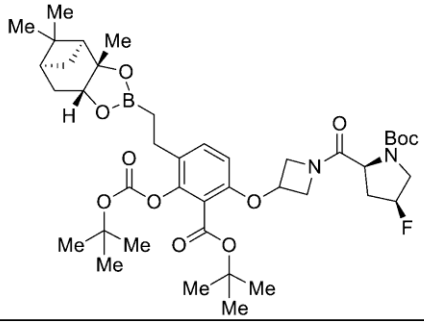
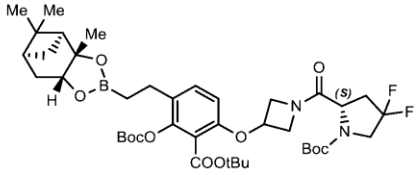
[Table 2-10]

68		LCMS:$[M+H]^+$/Rt=1017.9/3.36min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.41–7.15 (12H, m), 6.61–6.53 (2H, m), 6.24–6.11 (1H, m), 5.66–5.49 (2H, m), 5.11–5.00 (4H, m), 4.81–3.72 (5H, m), 2.64–2.54 (2H, m), 2.36–2.28 (1H, m), 2.20–2.16 (1H, m), 2.09–2.00 (1H, m), 1.89–1.78 (2H, m), 1.68–1.23 (33H, m), 1.14–1.02 (3H, m), 0.83 (3H, s).
69		LCMS:$[M+H]^+$/Rt= 681.39/3.96min[D] ^{1}H-NMR ($CDCl_3$) δ: 7.78 (1H, d, J = 1.1 Hz), 7.73 (1H, d, J = 1.1 Hz), 7.23–7.18 (1H, m), 6.37 (1H, d, J = 8.6 Hz), 5.09 (1H, d, J = 16.0 Hz), 5.01–4.91 (2H, m), 4.53–4.45 (1H, m), 4.45–4.37 (1H, m), 4.26–4.21 (1H, m), 4.19–4.07 (2H, m), 2.63–2.56 (2H, m), 2.34–2.25 (1H, m), 2.20–2.12 (1H, m), 2.03–1.98 (1H, m), 1.92–1.85 (1H, m), 1.83–1.75 (1H, m), 1.54 (9H, s), 1.52 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.12–1.07 (2H, m), 1.01 (1H, d, J = 11.5 Hz), 0.82 (3H, s).
70		LCMS:$[M+H]^+$/Rt=824.0/2.51min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.39 (1H, s), 7.22 (1H, d, J = 8.1 Hz), 6.90 (1H, s), 6.41 (1H, d, J = 8.1 Hz), 4.93–4.61 (3H, m), 4.41–4.35 (1H, m), 4.27–4.23 (2H, m), 4.06–4.00 (2H, m), 3.52–3.37 (4H, m), 2.64–2.56 (2H, m), 2.36–2.27 (1H, m), 2.19–2.13 (1H, m), 2.05–2.00 (1H, m), 1.93–1.66 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.44 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.00 (3H, m), 0.86 (3H, s).
71		LCMS:$[M+H]^+$/Rt=812.9/2.93min[B] ^{1}H-NMR ($CDCl_3$) δ: 8.77–8.76 (1H, m), 7.36–7.33 (1H, m), 7.22 (1H, d, J = 8.1 Hz), 6.39 (1H, d, J = 8.1 Hz), 5.98–5.92 (1H, m), 5.54–5.48 (1H, m), 5.01–4.87 (1H, m), 4.74–4.68 (1H, m), 4.48–4.03 (4H, m), 2.64–2.58 (2H, m), 2.36–2.27 (2H, m), 2.04–2.00 (1H, m), 1.92–1.76 (2H, m), 1.57–1.52 (18H, m), 1.44 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.13–1.01 (3H, m), 0.83 (3H, s).
72		LCMS:$[M+H]^+$/Rt=865.61/1.332min[E]

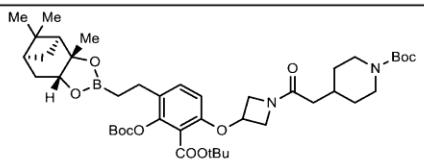
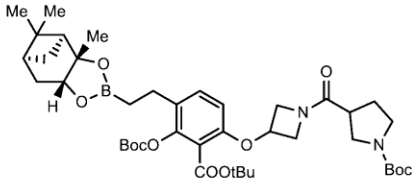
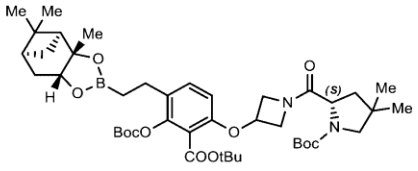
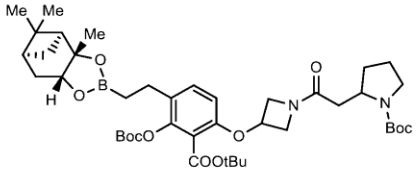
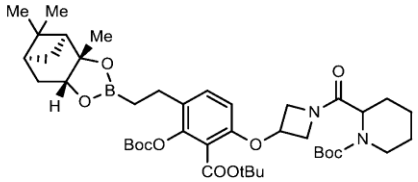
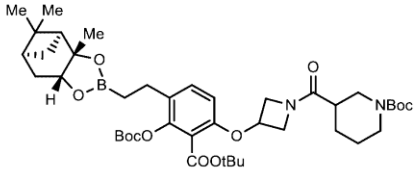
[Table 2-11]

73		^{1}H-NMR (400 MHz, $CDCl_3$) δ: 7.39-7.37 (6H, m), 7.27-7.12 (10H, m), 6.49 (1H, d, J = 8.5 Hz), 5.16-5.13 (1H, m), 4.92-4.90 (1H, m), 4.83-4.79 (2H, m), 4.24-4.20 (3H, m), 4.13-4.07 (1H, m), 2.64-2.56 (4H, m), 2.35-2.26 (1H, m), 2.19-2.13 (1H, m), 2.02-1.99 (1H, m), 1.90-1.86 (1H, m), 1.81-1.77 (1H, m), 1.54 (9H, s), 1.51 (9H, s), 1.41 (9H, s), 1.34 (3H, s), 1.26 (3H, s), 1.11-1.00 (2H, m), 0.82 (3H, s).
74		LCMS:$[M+H]^+$/Rt=1045/1.347min[C]
75		LCMS:$[M+H]^+$/Rt=759.20/4.09min[D] ^{1}H-NMR ($CDCl_3$) δ: 7.22-7.17 (1H, m), 6.40-6.36 (1H, m), 5.58-5.41 (1H, m), 4.98-4.89 (1H, m), 4.76-4.53 (1H, m), 4.44-4.19 (3H, m), 4.13-4.02 (1H, m), 3.91-3.80 (1H, m), 3.73-3.64 (1H, m), 2.62-2.55 (2H, m), 2.35-2.25 (1H, m), 2.19-2.11 (1H, m), 2.03-1.97 (1H, m), 1.92-1.84 (1H, m), 1.82-1.75 (1H, m), 1.54 (9H, s), 1.51 (9H, s), 1.44-1.40 (9H, m), 1.34 (3H, s), 1.26 (3H, s), 1.12-1.06 (2H, m), 1.03-0.99 (1H, m), 0.81 (3H, s).
76		LCMS:$[M+H]^+$/Rt=843.8/3.14min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 4.93 (1H, br), 4.79-4.67 (1H, m), 4.61-4.48 (1H, m), 4.40-4.31 (2H, m), 4.25 (1H, dd, J = 8.1 Hz, 2.7 Hz), 4.14-4.05 (1H, m), 2.67-2.58 (4H, m), 2.36-2.27 (1H, m), 2.22-2.13 (1H, m), 2.04-2.00 (1H, m), 1.93-1.77 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.46-1.42 (18H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
77		LCMS:$[M+H]^+$/Rt=814.7/2.89min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.77 (1H, br), 6.41 (1H, d, J = 8.1 Hz), 5.70-4.90 (2H, m), 4.75-4.04 (7H, m), 2.65-2.59 (2H, m), 2.36-2.28 (1H, m), 2.20-2.14 (1H, m), 2.04-2.00 (1H, m), 1.91-1.78 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36-1.23 (12H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

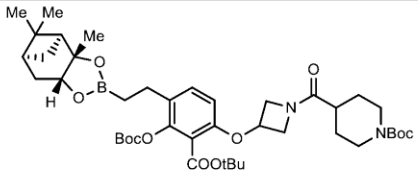
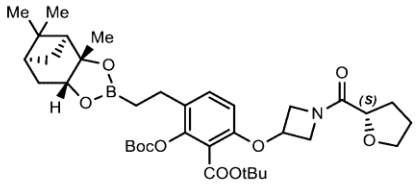
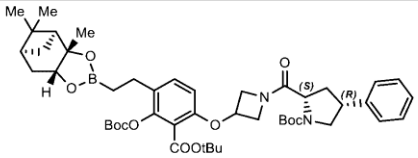
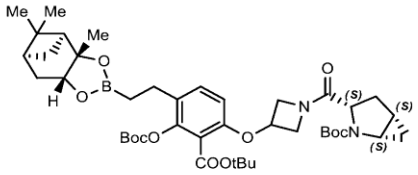
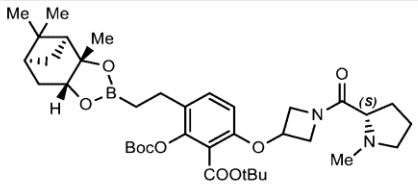
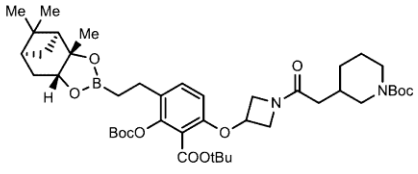
[Table 2-12]

78		LCMS:[M+H]$^+$/Rt=843.7/3.21min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 5.32–5.29 (1H, m), 5.00–4.84 (1H, m), 4.79–4.64 (1H, m), 4.59–4.48 (1H, m), 4.40–4.30 (2H, m), 4.27–4.23 (1H, m), 4.14–4.05 (1H, m), 2.67–2.56 (4H, m), 2.36–2.26 (1H, m), 2.22–2.13 (1H, m), 2.05–2.00 (1H, m), 1.92–1.77 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.45–1.40 (18H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
79		LCMS:[M+H]$^+$/Rt=785.7/1.40min^C
80		LCMS:[M-Boc+H]$^+$/Rt=737.5/1.47min^C
81		LCMS:[M+H]$^+$/Rt = 787.7/1.40min^C
82		LCMS:[M+H]$^+$/Rt=805.7/3.07min^B ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.01–4.43 (3H, m), 4.37–4.30 (1H, m), 4.27–4.00 (3H, m), 3.85–3.75 (2H, m), 2.65–2.48 (4H, m), 2.36–2.27 (1H, m), 2.20–2.14 (1H, m), 2.05–2.00 (1H, m), 1.92–1.77 (2H, m), 1.59–1.45 (27H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).

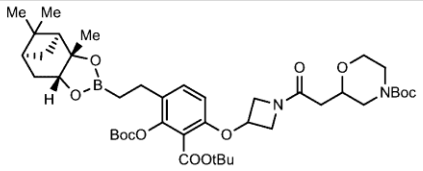
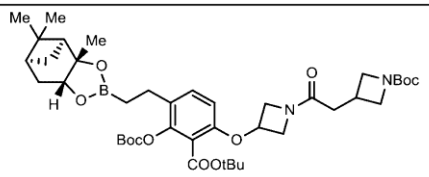
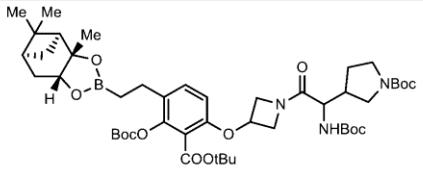
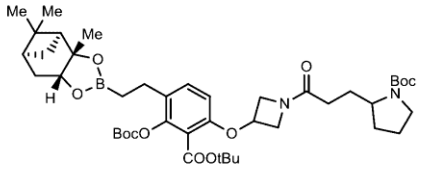
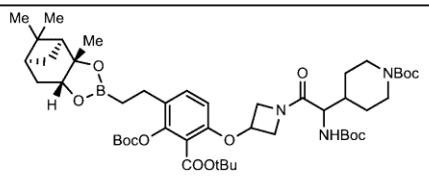
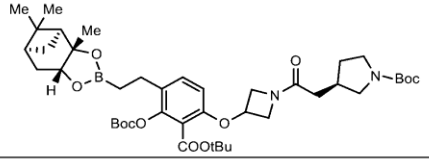
[Table 2-13]

83		LCMS:[M+H]$^+$/Rt=797.3/3.07min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 4.97–4.89 (1H, m), 4.45–4.32 (2H, m), 4.27–4.23 (1H, m), 4.16–4.05 (2H, m), 2.96–2.71 (4H, m), 2.65–2.56 (2H, m), 2.36–2.27 (1H, m), 2.22–2.13 (1H, m), 2.05–2.01 (5H, m), 1.92–1.67 (5H, m), 1.56 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
84		LCMS:[M+H]$^+$/Rt=769.8/3.03min^B ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 4.99–4.93 (1H, m), 4.45–4.46 (1H, m), 4.40–4.34 (1H, m), 4.27–4.05 (3H, m), 3.60–3.26 (4H, m), 2.95–2.80 (1H, m), 2.65–2.59 (2H, m), 2.36–2.26 (1H, m), 2.22–2.13 (1H, m), 2.05–2.00 (3H, m), 1.90–1.76 (2H, m), 1.57 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
85		LCMS:[M+H]$^+$/Rt=797.8/3.18min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.00–4.82 (1H, m), 4.48–4.08 (7H, m), 3.40–3.12 (1H, m), 2.64–2.58 (2H, m), 2.36–2.27 (1H, m), 2.22–2.13 (1H, m), 2.05–1.76 (5H, m), 1.60–1.56 (15H, m), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
86		LCMS:[M+H]$^+$/Rt=783.9/3.09min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 4.96–4.86 (1H, m), 4.37–4.00 (6H, m), 3.37–3.26 (2H, m), 2.80–2.58 (4H, m), 2.36–2.26 (1H, m), 2.20–2.13 (1H, m), 2.09–1.77 (7H, m), 1.56 (9H, s), 1.54 (9H, s), 1.46 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.83 (3H, s).
87		LCMS:[M+H]$^+$/Rt=783.8/3.22min^B ^{1}H-NMR ($CDCl_3$) δ: 7.21 (1H, d, J = 8.1 Hz), 6.39–6.33 (1H, m), 4.94–4.68 (2H, m), 4.55–3.89 (7H, m), 2.64–2.56 (2H, m), 2.36–2.27 (1H, m), 2.20–2.13 (1H, m), 2.05–2.00 (1H, m), 1.93–1.77 (2H, m), 1.70–1.23 (39H, m), 1.13–1.01 (3H, m), 0.83 (3H, s).
88		LCMS:[M+H]$^+$/Rt=783.9/3.11min^B ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 5.00–4.92 (1H, m), 4.51–4.04 (8H, m), 2.85–2.56 (3H, m), 2.36–2.14 (3H, m), 2.05–2.00 (1H, m), 1.93–1.77 (3H, m), 1.74–1.44 (30H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).

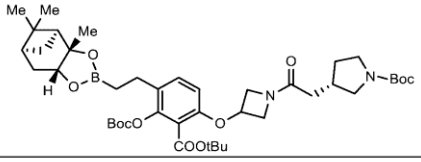
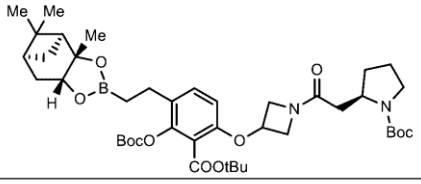
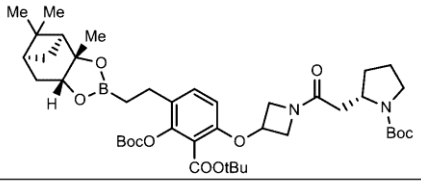
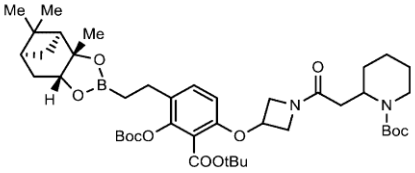
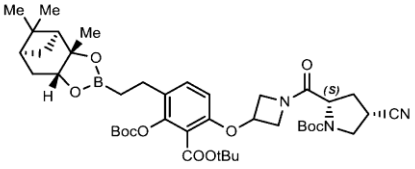
[Table 2-14]

89		LCMS:[M+H]$^+$/Rt=783.6/3.05min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 4.99-4.92 (1H, m), 4.51-4.45 (1H, m), 4.39-4.32 (1H, m), 4.27-4.04 (5H, m), 2.80-2.53 (3H, m), 2.36-2.25 (2H, m), 2.20-2.13 (1H, m), 2.05-2.00 (1H, m), 1.92-1.77 (2H, m), 1.71-1.51 (23H, m), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
90		LCMS:[M+H]$^+$/Rt=670.7/2.88min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 4.97-4.90 (1H, m), 4.76-4.63 (1H, m), 4.47-4.22 (4H, m), 4.14-4.05 (1H, m), 3.92-3.81 (2H, m), 2.64-2.58 (2H, m), 2.36-2.27 (1H, m), 2.21-2.11 (3H, m), 2.05-2.00 (1H, m), 1.95-1.79 (4H, m), 1.62-1.54 (18H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
91		LCMS:[M+H]$^+$/Rt=845.8/3.14min^B ^{1}H-NMR ($CDCl_3$) δ: 7.32-7.20 (6H, m), 6.42 (1H, d, J = 8.1 Hz), 5.05-4.86 (1H, m), 4.64-3.91 (7H, m), 3.49-3.26 (2H, m), 2.64-2.58 (2H, m), 2.36-2.27 (1H, m), 2.22-2.13 (2H, m), 2.08-2.00 (2H, m), 1.96-1.78 (2H, m), 1.56-1.45 (27H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.83 (3H, s).
92		LCMS:[M+H]$^+$/Rt=781.7/3.07min^B ^{1}H-NMR ($CDCl_3$) δ: 7.21 (1H, d, J = 8.1 Hz), 6.39 (1H, d, J = 8.1 Hz), 4.97-4.86 (1H, m), 4.78-4.33 (3H, m), 4.26-3.98 (3H, m), 3.50-3.42 (1H, m), 2.64-2.58 (2H, m), 2.41-2.27 (1H, m), 2.22-2.13 (1H, m), 2.05-2.00 (2H, m), 1.96-1.77 (2H, m), 1.56-1.41 (29H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (4H, m), 0.96-0.69 (4H, m).
93		LCMS:[M+H]$^+$/Rt=684.0/2.18min^B ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 5.00-4.92 (1H, m), 4.67-4.57 (1H, m), 4.47-4.36 (1H, m), 4.27-4.23 (2H, m), 4.15-4.05 (1H, m), 3.25-2.94 (1H, m), 2.64-2.58 (2H, m), 2.47-2.27 (5H, m), 2.21-2.14 (2H, m), 2.05-2.00 (1H, m), 1.97-1.66 (6H, m), 1.56 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
94		LCMS:[M+H]$^+$/Rt=797.9/3.23min^B ^{1}H-NMR ($CDCl_3$) δ: 7.21 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 4.97-4.89 (1H, m), 4.47-4.33 (2H, m), 4.26-4.23 (1H, m), 4.16-4.03 (4H, m), 3.87-3.77 (2H, m), 2.65-2.58 (2H, m), 2.36-2.28 (1H, m), 2.21-2.12 (1H, m), 2.08-1.78 (10H, m), 1.60-1.44 (27H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

[Table 2-15]

95		LCMS:$[M+H]^+$/Rt=799.9/3.01min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 4.95–4.88 (1H, m), 4.56–4.32 (2H, m), 4.26–3.81 (6H, m), 3.57–3.48 (1H, m), 2.93–2.80 (1H, m), 2.71–2.58 (3H, m), 2.36–2.26 (2H, m), 2.22–2.10 (2H, m), 2.04–2.00 (2H, m), 1.93–1.77 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.46 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.83 (3H, s).
96		LCMS:$[M+H]^+$/Rt=769.9/2.98min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 4.98–4.91 (1H, m), 4.47–4.41 (1H, m), 4.37–4.31 (1H, m), 4.27–4.23 (1H, m), 4.18–4.02 (4H, m), 3.61–3.55 (2H, m), 2.98–2.85 (1H, m), 2.65–2.59 (2H, m), 2.42 (2H, d, J = 8.1 Hz), 2.22–2.13 (1H, m), 2.05–2.00 (1H, m), 1.92–1.76 (2H, m), 1.57 (9H, s), 1.54 (9H, s), 1.43 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
97		LCMS:$[M+H]^+$/Rt=898.9/3.14min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.24–5.07 (1H, m), 5.02–4.90 (1H, m), 4.55–4.00 (6H, m), 3.62–2.92 (5H, m), 2.65–2.59 (2H, m), 2.49–2.23 (2H, m), 2.22–2.12 (1H, m), 2.05–2.00 (1H, m), 1.95–1.78 (3H, m), 1.58–1.42 (36H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
98		LCMS:$[M+H]^+$/Rt=798.0/3.10min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 4.96–4.89 (1H, m), 4.49–4.32 (2H, m), 4.27–4.23 (1H, m), 4.16–4.02 (3H, m), 3.89–3.75 (1H, m), 3.33–3.26 (1H, m), 2.65–2.58 (2H, m), 2.36–2.28 (1H, m), 2.22–2.07 (3H, m), 2.05–2.00 (2H, m), 1.97–1.78 (7H, m), 1.56 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
99		LCMS:$[M+H]^+$/Rt=912.7/3.1min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.13–5.09 (1H, m), 5.00–4.91 (1H, m), 4.75–4.69 (1H, m), 4.54–3.99 (8H, m), 2.70–2.59 (4H, m), 2.36–2.28 (1H, m), 2.23–2.13 (1H, m), 2.05–2.00 (1H, m), 1.94–1.87 (1H, m), 1.84–1.62 (4H, m), 1.60–1.53 (18H, m), 1.45–1.42 (18H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
100		LCMS:$[M+H]^+$/Rt=783.7/2.99min[B]

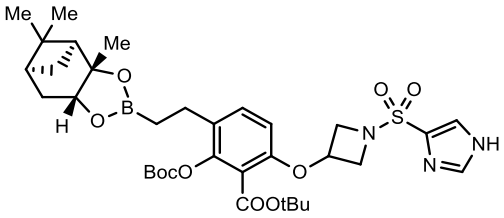
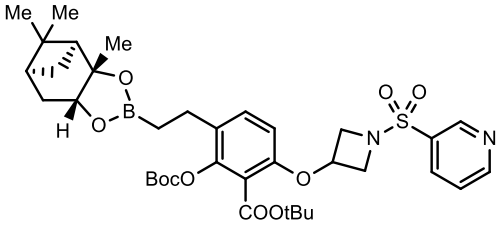
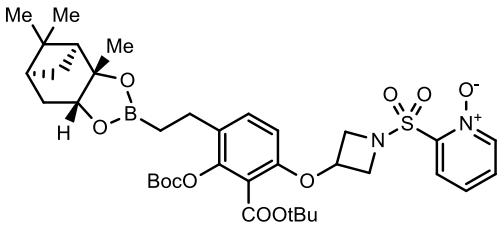
[Table 2-16]

101		LCMS:$[M+H]^+$/Rt=783.6/3.01min^B
102		LCMS:$[M+H]^+$/Rt=783.9/3.08min^B
103		LCMS:$[M+H]^+$/Rt=783.8/3.08min^B
104		LCMS:$[M+H]^+$/Rt=797.9/3.17min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.42 (1 H, d, J = 8.1 Hz), 4.97–4.89 (1H, m), 4.68–4.40 (2H, m), 4.36–3.94 (5H, m), 2.87–2.69 (1H, m), 2.63–2.53 (2H, m), 2.47–2.13 (4H, m), 2.04–2.00 (1H, m), 1.93–1. 77 (2H, m), 1.68–1.54 (24H, m), 1.46–1.45 (9H, m), 1. 36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).
105		LCMS:$[M+H]^+$/Rt=794.6/2.90min^B ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1 H, d, J = 8.1 Hz), 5.00–4.85 (1H, m), 4.61–3.92 (7H, m), 3.67–3.56 (1H, m), 3.05–2.98 (1H, m), 2.64–2.46 (3H, m), 2.41–2.13 (3H, m), 2.05–2.00 (1H, m), 1.92–1. 77 (2H, m), 1.59–1.54 (18H, m), 1.45 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14–1.01 (3H, m), 0.84 (3H, s).

[0441]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 as the starting material by the same method described in Reference Example 41 to obtain each of Reference Example compounds 106 to 108 shown in Table 2-17.

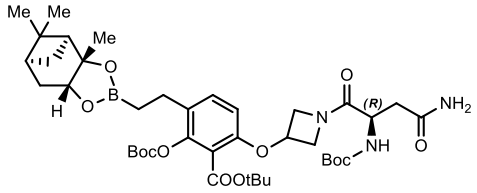
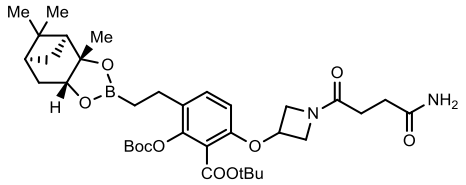
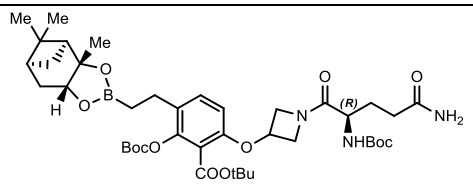
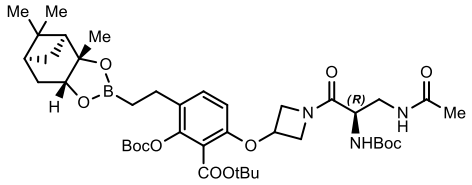
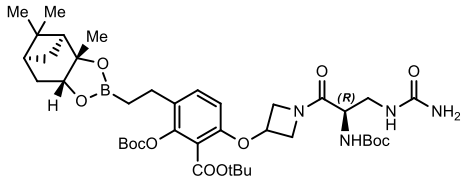
[Table 2-17]

Reference Example	Structural formula	NMR and/or LCMS
106		LCMS:$[M+H]^+$/Rt=702.8/2.72min[B] ^{1}H-NMR ($CDCl_3$) δ: 10.51 (1H, br), 7.62 (1H, s), 7.56 (1H, s), 7.18 (1H, d, J = 8.1 Hz), 6.30 (1H, d, J = 8.1 Hz), 4.76-4.71 (1H, m), 4.33-4.22 (3H, m), 4.01-3.96 (2H, m), 2.62-2.56 (2H, m), 2.36-2.27 (1H, m), 2.19-2.13 (1H, m), 2.04-2.00 (1H, m), 1.92-1.76 (2H, m), 1.53 (9H, s), 1.52 (9H, s), 1.35 (3H, s), 1.26 (3H, s), 1.11-1.00 (3H, m), 0.83 (3H, s).
107		LCMS:$[M+H]^+$/Rt=714.0/2.96min[B] ^{1}H-NMR ($CDCl_3$) δ: 9.07 (1H, d, J = 2.7 Hz), 8.88 (1H, dd, J = 5.4 Hz, 2.7 Hz), 8.15-8.11 (1H, m), 7.53 (1H, dd, J = 8.1 Hz, 5.4 Hz), 7.18 (1H, d, J = 8.1 Hz), 6.37 (1H, d, J = 8.1 Hz), 4.86-4.82 (1H, m), 4.27-4.21 (3H, m), 3.87-3.82 (2H, m), 2.62-2.56 (2H, m), 2.35-2.27 (1H, m), 2.19-2.12 (1H, m), 2.03-1.99 (1H, m), 1.91-1.76 (2H, m), 1.52 (9H, s), 1.49 (9H, s), 1.35 (3H, s), 1.26 (3H, s), 1.11-0.99 (3H, m), 0.83 (3H, s).
108		LCMS:$[M+H]^+$/Rt=729.8/2.84min[B] ^{1}H-NMR ($CDCl_3$) δ: 8.23 (1H, d, J = 8.1 Hz), 7.99 (1H, dd, J = 8.1 Hz, 2.7 Hz), 7.46-7.31 (2H, m), 7.20 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 4.99-4.90 (1H, m), 4.60-4.54 (2H, m), 4.42-4.36 (2H, m), 4.24 (1H, dd, J = 8.1 Hz, 2.7 Hz), 2.64-2.56 (2H, m), 2.36-2.27 (1H, m), 2.22-2.13 (1H, m), 2.05-2.00 (1H, m), 1.92-1.76 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.35 (3H, s), 1.28 (3H, s), 1.13-1.00 (3H, m), 0.83 (3H, s).

[0442]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 as the starting material by the same method described in Reference Example 42 to obtain each of Reference Example compounds 109 to 113 shown in Table 2-18.

[Table 2-18]

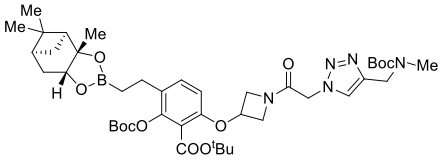
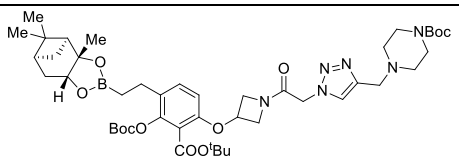
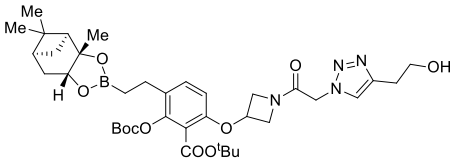
Reference Example	Structural formula	NMR and/or LCMS
109		LCMS:[M+H]+/Rt=786.9/2.77minB 1H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41-6.37 (1H, m), 6.02 (1H, br), 5.71-5.61 (1H, m), 5.48-5.39 (1H, m), 4.95-4.89 (1H, m), 4.75-4.50 (2H, m), 4.42-4.32 (2H, m), 4.27-4.23 (1H, m), 4.10-4.03 (1H, m), 2.73-2.54 (4H, m), 2.36-2.27 (1H, m), 2.20-2.13 (1H, m), 2.04-2.00 (1H, m), 1.92-1.77 (2H, m), 1.57 (9H, s), 1.53 (9H, s), 1.43 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.83 (3H, s).
110		LCMS:[M+H]+/Rt=671.6/2.59minB 1H-NMR ($CDCl_3$) δ: 7.32 (1H, d, J = 8.1 Hz), 6.70 (1H, d, J = 8.2 Hz), 5.12-5.06 (1H, m), 4.68-4.62 (1H, m), 4.40-4.17 (3H, m), 3.96-3.90 (1H, m), 2.60-2.49 (4H, m), 2.45-2.31 (3H, m), 2.23-2.11 (1H, m), 2.01-1.97 (1H, m), 1.90-1.66 (2H, m), 1.56 (9H, s), 1.52 (9H, s), 1.35 (3H, s), 1.29 (3H, s), 1.20-0.96 (3H, m), 0.86 (3H, s).
111		LCMS:[M+H]+/Rt=800.8/2.72minB 1H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.43-6.39 (1H, m), 5.01-4.91 (1H, m), 4.69-4.02 (6H, m), 2.64-2.58 (2H, m), 2.36-1.76 (9H, m), 1.61-1.53 (18H, m), 1.43-1.42 (9H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
112		LCMS:[M+H]+/Rt=800.7/2.81minB 1H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 6.23-6.16 (1H, m), 5.56-5.40 (1H, m), 5.00-4.92 (1H, m), 4.75-4.65 (1H, m), 4.56-4.23 (4H, m), 4.12-4.03 (1H, m), 3.67-3.27 (2H, m), 2.64-2.58 (2H, m), 2.37-2.27 (1H, m), 2.22-2.12 (1H, m), 2.04-1.98 (4H, m), 1.93-1.77 (2H, m), 1.60-1.54 (18H, m), 1.44 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
113		LCMS:[M+H]+/Rt=801.7/2.70minB 1H-NMR ($CDCl_3$) δ: 7.26-7.21 (1H, m), 6.43 (1H, d, J = 8.1 Hz), 6.25 (1H, br), 5.30-4.95 (2H, m), 4.75-4.52 (3H, m), 4.44-4.05 (5H, m), 3.74-3.15 (2H, m), 2.63-2.57 (2H, m), 2.37-2.28 (1H, m), 2.23-2.13 (1H, m), 2.05-2.01 (1H, m), 1.93-1.77 (2H, m), 1.57 (9H, s), 1.52 (9H, s), 1.44 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.13-1.01 (3H, m), 0.84 (3H, s).

[0443]

A reaction, work-up, and purification were performed using the compound of Reference Example 43-2 as the starting material by the same method described in Reference

Example 43 to obtain each of Reference Example compounds 114 to 116 shown in Table 2-19.

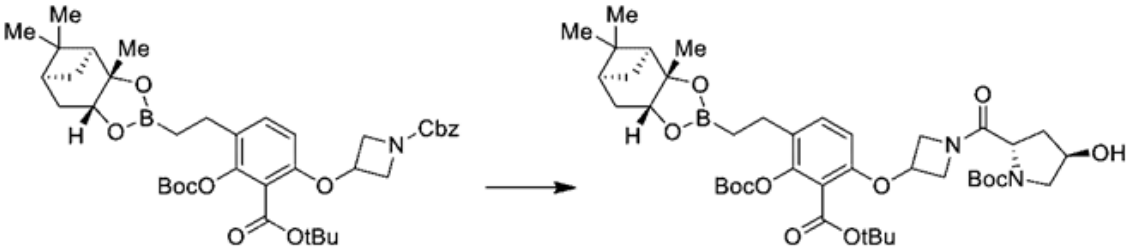
[Table 2-19]

Reference Example	Structural formula	NMR and/or LCMS
114		LCMS:$[M+H]^+$/Rt = 824.58/4.36 min^D ^{1}H-NMR ($CDCl_3$) δ: 7.76-7.65 (1H, m), 7.24 (1H, d, J = 8.6 Hz), 6.41 (1H, d, J = 8.6 Hz), 5.11-5.04 (1H, m), 5.02-4.96 (1H, m), 4.95-4.89 (1H, m), 4.60-4.48 (3H, m), 4.47-4.40 (1H, m), 4.31-4.20 (2H, m), 4.19-4.11 (1H, m), 2.92 (3H, s), 2.63 (2H, t, J = 8.3 Hz), 2.38-2.29 (1H, m), 2.23-2.14 (1H, m), 2.07-2.01 (1H, m), 1.94-1.88 (1H, m), 1.86-1.78 (1H, m), 1.58 (9H, s), 1.55 (9H, s), 1.48 (9H, s), 1.37 (3H, s), 1.30 (3H, s), 1.13 (2H, t, J = 8.3 Hz), 1.04 (1H, d, J = 10.9 Hz), 0.85 (3H, s).
115		LCMS:$[M+H]^+$/Rt = 879.59/3.24 min^D ^{1}H-NMR ($CDCl_3$) δ: 7.72 (1H, s), 7.40-7.17 (1H, m), 6.48-6.36 (1H, m), 5.12-4.87 (3H, m), 4.62-4.51 (1H, m), 4.49-4.36 (1H, m), 4.30-4.21 (2H, m), 4.19-4.09 (1H, m), 3.74-3.65 (2H, m), 3.51-3.37 (4H, m), 2.67-2.56 (2H, m), 2.54-2.41 (4H, m), 2.36-2.26 (1H, m), 2.21-2.12 (1H, m), 2.06-1.99 (1H, m), 1.94-1.75 (2H, m), 1.62-1.42 (27H, m), 1.38-1.35 (3H, m), 1.30-1.27 (3H, m), 1.14-1.08 (2H, m), 1.06-1.00 (1H, m), 0.86-0.82 (3H, m).
116		LCMS:$[M+H]^+$/Rt = 725.50/3.77 min^D ^{1}H-NMR ($CDCl_3$) δ: 7.62 (1H, s), 7.22 (1H, d, J = 8.6 Hz), 6.38 (1H, d, J = 8.6 Hz), 5.10-4.90 (3H, m), 4.53-4.39 (2H, m), 4.28-4.22 (1H, m), 4.16-4.04 (2H, m), 3.98-3.82 (2H, m), 2.96 (2H, t, J = 5.7 Hz), 2.65-2.56 (3H, m), 2.37-2.26 (1H, m), 2.21-2.12 (1H, m), 2.04-2.00 (1H, m), 1.94-1.88 (1H, m), 1.86-1.74 (1H, m), 1.57 (9H, s), 1.54 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.13-1.08 (2H, m), 1.03 (1H, d, J = 10.9 Hz), 0.84 (3H, s).

[0444]

Reference Example 117: tert-butyl (4R)-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}-4-hydroxypyrrolidine-1-carboxylate

[Chemical Formula 770]



Reference Example 1-7 Reference Example 117

Palladium on carbon (20 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3 mL) of the compound of Reference Example 1-7 (200 mg, 0.283 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methanol, and the combined filtrate was concentrated. The resulting residue was dissolved in DMF (2 mL) (this is referred to as "solution A"). Meanwhile, 4-(4,6-dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholinium chloride (94.1 mg, 0.340 mmol) was added to a DMF-methanol (2:1) mixture solution (3 mL) of trans-N-(tert-butoxycarbonyl)-4-hydroxy-L-proline (98.3 mg, 0.425 mmol), and the reaction mixture was stirred for 20 minutes at room temperature. The aforementioned solution A was then added, and the reaction mixture was stirred for 30 minutes at room temperature. Water was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (methylene chloride/methanol) to obtain the title compound (222 mg).

[0445]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 4.99-4.89 (1H, m), 4.58-3.99 (7H, m), 3.69-3.42 (2H, m), 2.65-2.58 (2H, m), 2.36-2.26 (1H, m), 2.22-2.07 (3H, m), 2.05-2.00 (1H, m), 1.93-1.73 (2H, m), 1.56 (9H, s),

1.54 (9H, s), 1.45-1.44 (9H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

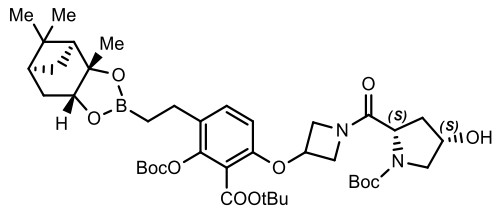
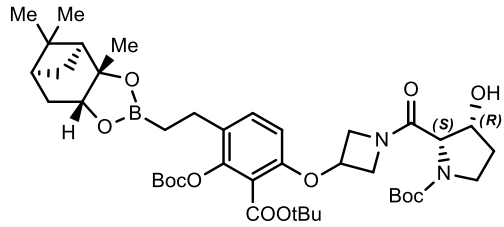
[0446]

LCMS: $[M+H]^+$/Rt = 785.8/2.79 min[B]

[0447]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 as the starting material by the same method described in Reference Example 117 to obtain each of Reference Example compounds 118 to 119 shown in Table 2-20.

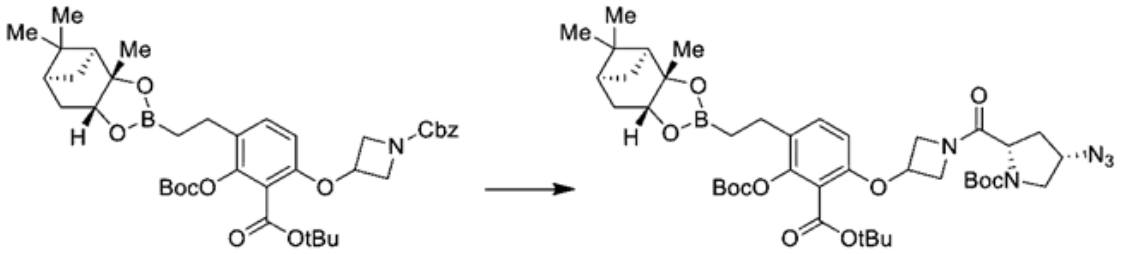
[Table 2-20]

Reference Example	Structural formula	NMR and/or LCMS
118		LCMS:$[M+H]^+$/Rt=785.8/2.94min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 5.14-4.94 (2H, m), 4.57-4.03 (6H, m), 3.65-3.42 (2H, m), 2.65-2.59 (2H, m), 2.36-2.14 (3H, m), 2.04-1.76 (4H, m), 1.61-1.42 (27H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
119		LCMS:$[M+H]^+$/Rt=785.8/2.87min[B] ^{1}H-NMR ($CDCl_3$) δ: 8.65 (1H, br), 7.22 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 5.00-4.88 (1H, m), 4.59-4.05 (7H, m), 3.62-3.43 (2H, m), 2.64-2.56 (2H, m), 2.36-2.26 (1H, m), 2.19-2.00 (4H, m), 1.92-1.77 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

[0448]

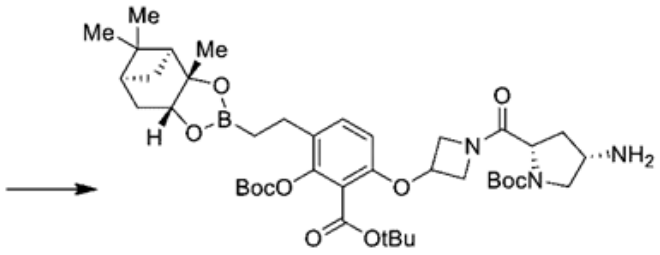
Reference Example 120: tert-butyl (2S,4S)-4-amino-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 771]



Reference Example 1-7

Reference Example 120-1

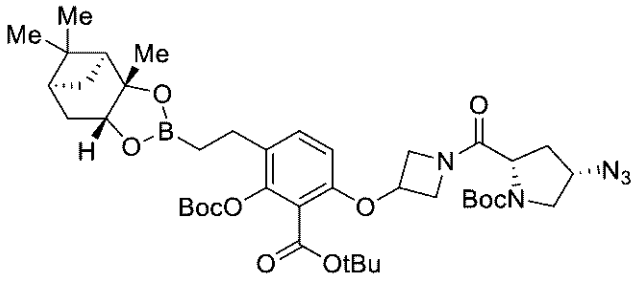


Reference Example 120

[0449]

Reference Example 120-1: tert-butyl (2S,4S)-4-azido-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 772]



Palladium on carbon (40 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (6 mL) of the compound of Reference Example 1-7 (400 mg, 0.567 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting

residue was dissolved in DMF (6 mL). cis-4-azido-(tert-butoxycarbonyl)-L-proline (160 mg, 0.624 mmol), HATU (259 mg, 0.680 mmol), and triethylamine (236 µL, 1.70 mmol) were added, and the reaction mixture was stirred for 30 minutes at room temperature. Water was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate) to obtain the title compound (392 mg) as a colorless amorphous compound.

[0450]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 5.00-4.89 (1H, m), 4.82-4.01 (7H, m), 3.86-3.76 (1H, m), 3.39-3.32 (1H, m), 2.64-2.58 (2H, m), 2.48-2.28 (2H, m), 2.22-2.14 (1H, m), 2.04-2.00 (1H, m), 1.93-1.77 (3H, m), 1.56 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

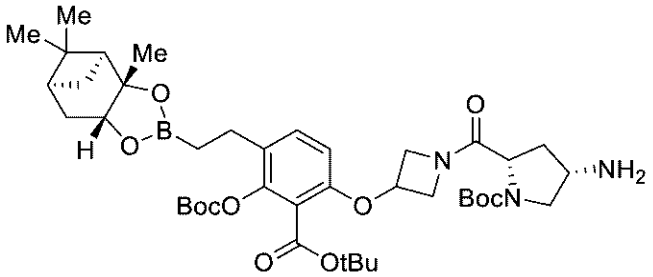
[0451]

LCMS: $[M+H]^+$/Rt = 810.8/3.02 min^B

[0452]

Reference Example 120: tert-butyl (2S,4S)-4-amino-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 773]



Palladium on carbon (40 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (5 mL) of the compound of Reference Example 120-1 (392 mg, 0.484

mmol), and the reaction mixture was stirred for 3 hours under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methanol, and the combined filtrate was concentrated. The residue was dissolved in acetonitrile (10 mL) and further filtered through cellulose. The filtered substance was washed with acetonitrile and the combined filtrate was concentrated to obtain the title compound (355 mg) as a brown solid.

[0453]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.00-4.89 (2H, m), 4.52-4.02 (5H, m), 3.68-3.49 (2H, m), 3.33-3.29 (1H, m), 2.64-2.61 (2H, m), 2.36-2.26 (2H, m), 2.20-2.14 (1H, m), 2.04-2.01 (1H, m), 1.93-1.73 (3H, m), 1.61 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H,s).

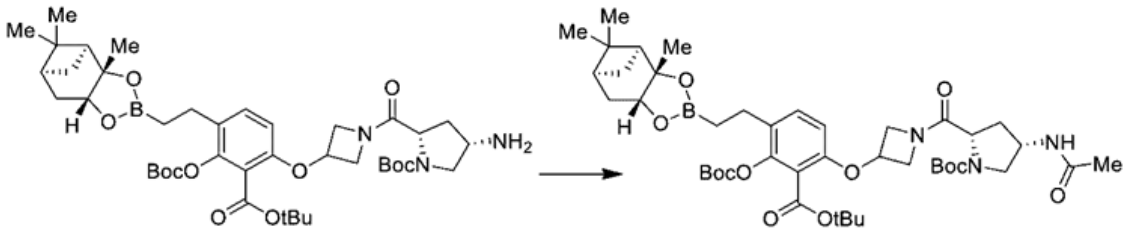
[0454]

LCMS: $[M+H]^+$/Rt = 785.0/2.28 min^B

[0455]

Reference Example 121: tert-butyl (2S,4S)-4-acetamido-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 774]



Triethylamine (101 µL, 0.727 mmol) and acetyl chloride (19 µL, 0.267 mmol) were added to a THF solution (2.4 mL) of the compound of Reference Example 120 (190 mg, 0.242 mmol), and the reaction mixture was stirred for 30 minutes. Water was added to the reaction solution, which was

extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (methylene chloride/methanol) to obtain the title compound (204 mg) as a colorless amorphous compound.

[0456]

^{1}H-NMR ($CDCl_3$) δ: 8.38-8.23 (1H, m), 7.23 (1H, d, J = 8.1 Hz), 6.43 (1H, d, J = 8.1 Hz), 5.12-4.93 (2H, m), 4.72-4.63 (1H, m), 4.53-4.46 (1H, m), 4.32-4.02 (4H, m), 3.61-3.45 (2H, m), 2.65-2.59 (2H, m), 2.37-2.27 (2H, m), 2.21-2.14 (1H, m), 2.04-2.00 (1H, m), 1.98-1.78 (6H, m), 1.57 (9H, s), 1.54 (9H, s), 1.46-1.43 (9H, m), 1.36 (3H, s), 1.26 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

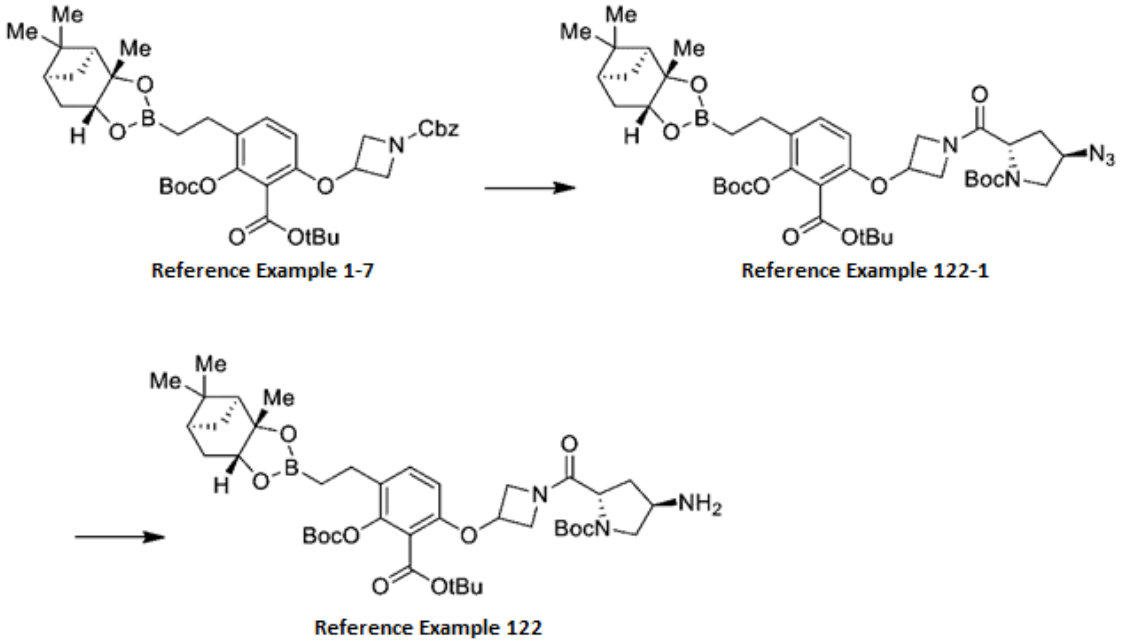
[0457]

LCMS: $[M+H]^+$/Rt = 827.0/2.86 min[B]

[0458]

Reference Example 122: tert-butyl (2S,4R)-4-amino-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

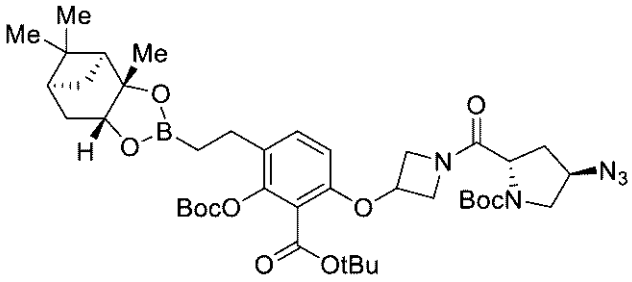
[Chemical Formula 775]



[0459]

Reference Example 122-1: tert-butyl (2S,4R)-4-azido-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 776]



Palladium on carbon (40 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (6 mL) of the compound of Reference Example 1-7 (400 mg, 0.567 mmol), and the reaction mixture was stirred for 30 minutes under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methylene chloride, and the combined filtrate was concentrated. The resulting

residue was dissolved in DMF (6 mL). (2S,4R)-4-azido-1-(tert-butoxycarbonyl)pyrrolidine-2-carboxylic acid (189 mg, 0.737 mmol), HATU (259 mg, 0.680 mmol), and triethylamine (236 µL, 1.70 mmol) were added, and the reaction mixture was stirred for 30 minutes at room temperature. Water was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate) to obtain the title compound (397 mg) as a colorless amorphous compound.

[0460]

^{1}H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 5.00-4.00 (8H, m), 3.75-3.45 (2H, m), 2.74-2.58 (2H, m), 2.36-2.12 (4H, m), 2.05-2.00 (1H, m), 1.92-1.77 (2H, m), 1.60-1.54 (18H, m), 1.46-1.44 (9H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01(3H, m), 0.84 (3H, s).

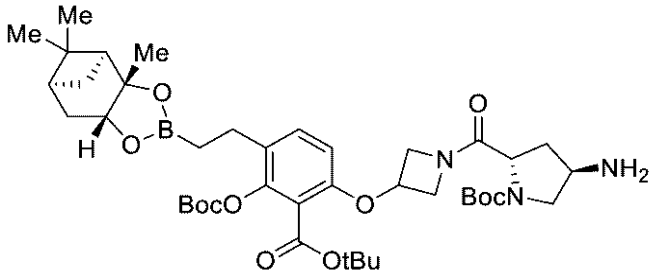
[0461]

LCMS: $[M+H]^+$/Rt = 810.7/3.05 min^B

[0462]

Reference Example 122: tert-butyl (2S,4R)-4-amino-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 777]



A reaction, work-up, and purification were performed using the compound of Reference Example 122-1 (397 mg, 0.490 mmol) as the starting material by the same method

described in Reference Example 120 to obtain the title compound (368 mg) as a colorless amorphous compound.

[0463]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 5.50-3.50 (9H, m), 3.26-3.07 (1H, m), 2.74-2.58 (2H, m), 2.36-2.28 (1H, m), 2.22-2.00 (3H, m), 1.92-1.77 (3H, m), 1.60-1.54 (18H, m), 1.45 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.17-1.01 (3H, m), 0.84 (3H, s).

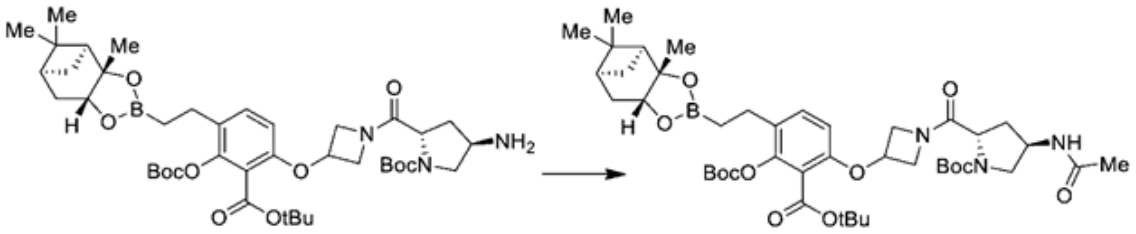
[0464]

LCMS: $[M+H]^+$/Rt = 784.8/2.27 min^B

[0465]

Reference Example 123: tert-butyl (2S,4R)-4-acetamido-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidine-1-carbonyl}pyrrolidine-1-carboxylate

[Chemical Formula 778]



A reaction, work-up, and purification were performed using the compound of Reference Example 122 (181 mg, 0.232 mmol) as the starting material by the same method described in Reference Example 121 to obtain the title compound (162 mg) as a colorless amorphous compound.

[0466]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.42 (1H, d, J = 8.1 Hz), 5.63-5.49 (1H, m), 5.00-3.94 (8H, m), 3.81-3.70 (1H, m), 3.48-3.32 (1H, m), 2.64-2.58 (2H, m), 2.36-2.14 (4H, m), 2.05-2.00 (1H, m), 1.98 (3H, s), 1.93-1.77 (2H, m), 1.56 (9H, s), 1.54 (9H, s), 1.47-1.43 (9H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).

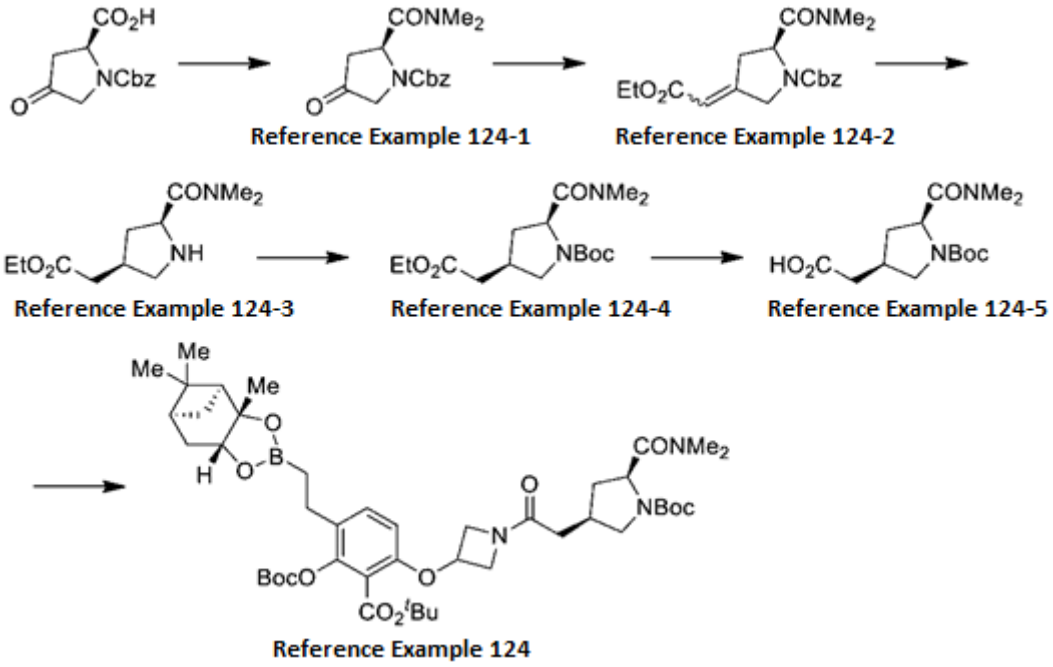
[0467]

LCMS: $[M+H]^+$/Rt = 826.7/2.81 min[B]

[0468]

Reference Example 124: tert-butyl (2S,4R)-4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-2-(dimethylcarbamoyl)pyrrolidine-1-carboxylate

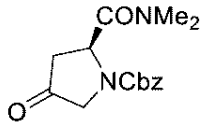
[Chemical Formula 779]



[0469]

Reference Example 124-1: benzyl (2S)-2-(dimethylcarbamoyl)-4-oxopyrrolidine-1-carboxylate

[Chemical Formula 780]



Triethylamine (0.48 mL, 3.44 mmol), HATU (873 mg, 2.30 mmol), and aqueous dimethylamine solution (about 9.5 mol/L, 0.24 mL, 2.3 mmol) were added to a THF solution (5.7 mL) of (2S)-1-benzyloxycarbonyl-4-oxopyrrolidine-2-carboxylic acid (302 mg, 1.15 mmol) while cooling with ice, and the reaction mixture was stirred for 8 hours at room

temperature. A saturated aqueous sodium hydrogen carbonate solution was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate) to obtain the title compound (285 mg) as a colorless oily compound.

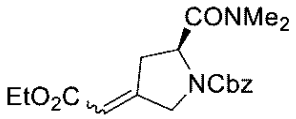
[0470]

LCMS: $[M+H]^+$/Rt = 291.14/0.582 min^A

[0471]

Reference Example 124-2: benzyl (2S)-2-(dimethylcarbamoyl)-4-(2-ethoxy-2-oxoethylidene)pyrrolidine-1-carboxylate

[Chemical Formula 781]



An n-butyl lithium/hexane solution (1.57 mol/L, 1.38 mL, 2.16 mmol) was slowly added to a THF solution (4.9 mL) of ethyl dimethylphosphonoacetate (423 mg, 2.16 mmol) at 78°C, and the reaction mixture was stirred for 30 minutes. A THF solution (4 ml) of the compound of Reference Example 124-1 (285 mg, 0.983 mmol) was added to the reaction solution at -78°C, and the reaction mixture was stirred for 5 hours at room temperature. A saturated aqueous ammonium chloride solution was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate) to obtain the title compound (190 mg) as a colorless oil.

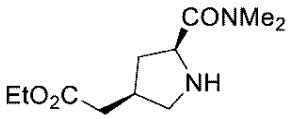
[0472]

LCMS: $[M+H]^+$/Rt = 361.19/0.757 min^A, 361.19/0.795 min^A (E/Z isomer mixture)

[0473]

Reference Example 124-3: ethyl [(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetate

[Chemical Formula 782]



A palladium on carbon-ethylenediamine complex (180 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (3.8 mL) of the compound of Reference Example 124-2 (190 mg, 0.526 mmol), and the reaction mixture was stirred for 7.5 hours under a hydrogen atmosphere. The reaction solution was filtered through celite. The filtered substance was washed with methanol, and the combined filtrate was concentrated to obtain the title compound (116.3 mg) as a colorless oil.

[0474]

^{1}H-NMR ($CDCl_3$) δ: 4.05 (2H, q, J = 7.1 Hz), 3.89 (1H, t, J = 7.9 Hz), 3.02 (1H, dd, J = 10.4, 6.7 Hz), 2.94 (3H, s), 2.91 (3H, s), 2.76 (1H, dd, J = 10.4, 7.3 Hz), 2.57-2.48 (1H, m), 2.38-2.30 (3H, m), 2.23 (1H, dd, J = 15.9, 7.9 Hz), 1.18 (3H, t, J = 7.0 Hz).

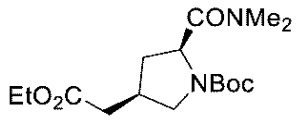
[0475]

LCMS: $[M+H]^+$/Rt = 229.12/0.244 min[A]

[0476]

Reference Example 124-4: tert-butyl (2S,4R)-2-(dimethylcarbamoyl)-4-(2-ethoxy-2-oxoethyl)pyrrolidine-1-carboxylate

[Chemical Formula 783]



Sodium hydrogen carbonate (128 mg, 1.53 mmol) and di-tert-butyl dicarbonate (0.237 mL, 1.02 mmol) were added to a THF-water (1:1) mixture solution (3 mL) of the compound of Reference Example 124-3 (116 mg, 0.509 mmol), and the reaction mixture was stirred for 14 hours at room

temperature. The reaction solution was extracted with ethyl acetate. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate) to obtain the title compound (125 mg) as a colorless oil.

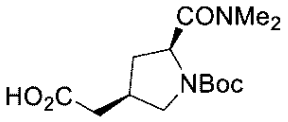
[0477]

^{1}H-NMR ($CDCl_3$) δ: 5.25 (1H, s), 4.00-3.94 (1H, m), 3.78-3.72 (1H, m), 3.76 (3H, s), 3.17 (1H, s), 1.46 (3H, s), 1.43 (9H, s).

[0478]

Reference Example 124-5: [(3R,5S)-1-(tert-butoxycarbonyl)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetic acid

[Chemical Formula 784]



An aqueous 2 N sodium hydroxide solution (0.38 mL, 0.76 mmol) was added to a THF-water (2:1) mixture solution (1.8 mL) of the compound of Reference Example 124-4 (125 mg, 0.380 mmol) while cooling with ice, and the reaction mixture was stirred for 16 hours at room temperature. 1 N hydrochloric acid was added to the reaction solution, which was extracted with chloroform. The organic phase was washed with saturated saline, dried over sodium sulfate, filtered, and concentrated to obtain the title compound (114 mg) as a white solid.

[0479]

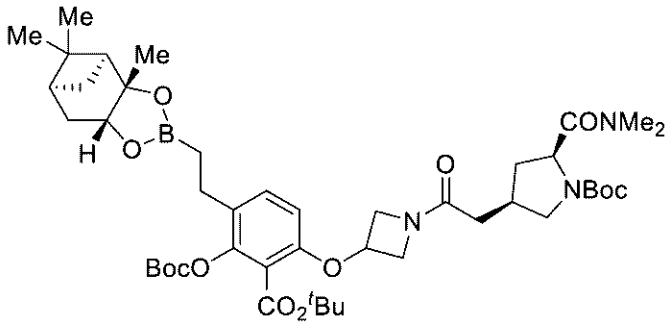
^{1}H-NMR ($CDCl_3$) δ: 4.54 (1H, dt, J = 38.8, 7.9 Hz), 3.82-3.73 (1H, m), 3.11 (1H, td, J = 9.6, 4.9 Hz), 3.04-2.97 (3H, m), 2.91 (3H, s), 2.54-2.35 (3H, m), 1.60-1.50 (2H, m), 1.35 (9H, d, J = 23.3 Hz).

[0480]

Reference Example 124: tert-butyl (2S,4R)-4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-

[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-2-(dimethylcarbamoyl)pyrrolidine-1-carboxylate

[Chemical Formula 785]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (145 mg, 0.253 mmol) and the compound of Reference Example 124-5 (114 mg, 0.380 mmol) as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (167 mg) as a colorless amorphous compound.

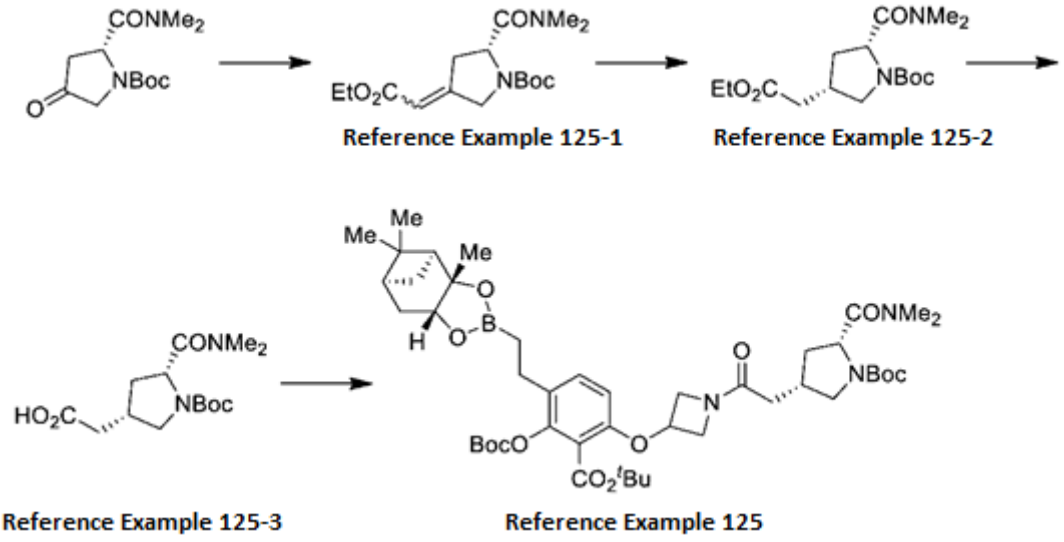
[0481]

LCMS: $[M+H]^+$/RT = 854.45/1.398 min[C]

[0482]

Reference Example 125: tert-butyl (2R,4S)-4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-2-(dimethylcarbamoyl)pyrrolidine-1-carboxylate

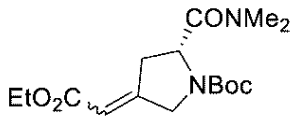
[Chemical Formula 786]



[0483]

Reference Example 125-1: tert-butyl (2R)-2-(dimethylcarbamoyl)-4-(2-ethoxy-2-oxoethylidene)pyrrolidine-1-carboxylate

[Chemical Formula 787]



A reaction, work-up, and purification were performed using tert-butyl (R)-2-(dimethylcarbamoyl)-4-oxopyrrolidine-1-carboxylate (325 mg, 1.27 mmol) as the starting material by the same method described in Reference Example 124-2 to obtain the title compound (167 mg) as a colorless oil.

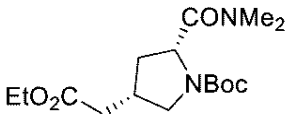
[0484]

LCMS: $[M+H]^+$/Rt = 327.24/0.704 min^A, 327.24/0.748 min^A (two peaks detected due to being an E/Z isomer mixture)

[0485]

Reference Example 125-2: tert-butyl (2R,4S)-2-(dimethylcarbamoyl)-4-(2-ethoxy-2-oxoethyl)pyrrolidine-1-carboxylate

[Chemical Formula 788]



A reaction and work-up were performed using the compound of Reference Example 125-1 (167 mg, 0.511 mmol) was used as the starting material by the same method described in Reference Example 124-3 to obtain the title compound (128 mg) as a colorless oil.

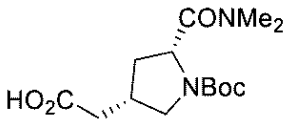
[0486]

LCMS: $[M+H]^+$/Rt = 329.18/0.681 min[A]

[0487]

Reference Example 125-3: [(3S,5R)-1-(tert-butoxycarbonyl)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetic acid

[Chemical Formula 789]



A reaction and work-up were performed using the compound of Reference Example 125-2 (128 mg, 0.388 mmol) as the starting materials by the same method described in Reference Example 124-4 to obtain the title compound (117 mg) as a white solid.

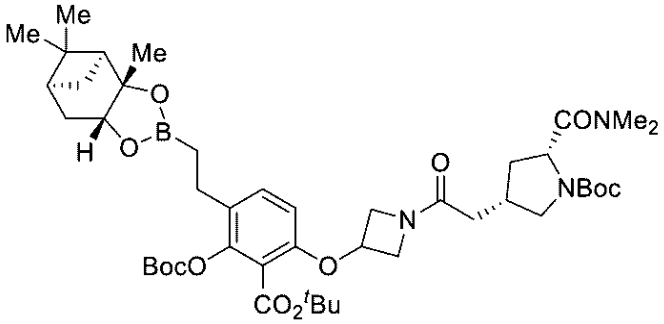
[0488]

^{1}H-NMR ($CDCl_3$) δ: 4.55 (1H, dt, J = 39.1, 7.9 Hz), 3.82-3.73 (1H, m), 3.10 (1H, dd, J = 11.3, 7.6 Hz), 3.02 (3H, d, J = 16.4 Hz), 2.91 (3H, d, J = 1.2 Hz), 2.52-2.39 (3H, m), 1.60-1.50 (2H, m), 1.35 (9H, d, J = 23.2 Hz).

[0489]

Reference Example 125: tert-butyl (2R,4S)-4-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-2-(dimethylcarbamoyl)pyrrolidine-1-carboxylate

[Chemical Formula 790]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (149 mg, 0.260 mmol) and the compound of Reference Example 125-3 (116 mg, 0.386 mmol) as the starting materials by the same method described in Reference Example 36-4 to obtain the title compound (153 mg) as a colorless amorphous compound.

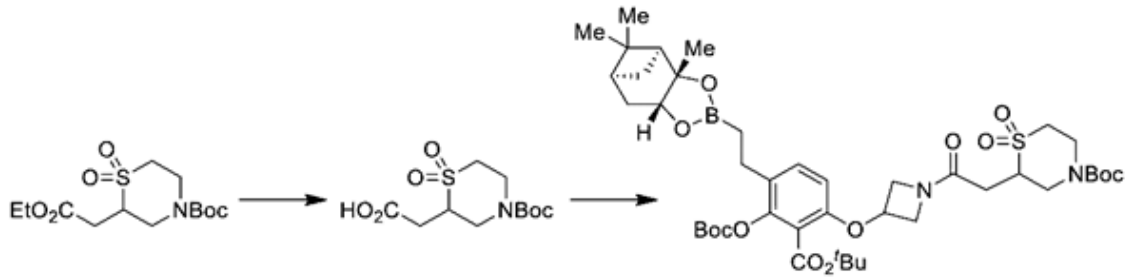
[0490]

LCMS: $[M+H]^+$/RT = 854.47/1.398 min[C]

[0491]

Reference Example 126: tert-butyl 2-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1,1-dioxo-1λ⁶-thiomorpholine-4-carboxylate

[Chemical Formula 791]

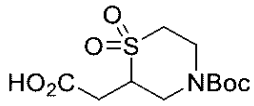


Reference Example 126-1 Reference Example 126

[0492]

Reference Example 126-1: [4-(tert-butoxycarbonyl)-1,1-dioxo-1λ⁶-thiomorpholin-2-yl]acetic acid

[Chemical Formula 792]



An aqueous 2 N sodium hydroxide solution (1.15 mL, 2.31 mmol) was added to a methanol solution (7 mL) of tert-butyl 2-(2-ethoxy-2-oxoethyl)thiomorpholine-4-carboxylate 1,1-dioxide (247 mg, 0.769 mmol) while cooling with ice, and the reaction mixture was stirred for 4.5 hours at room temperature. An aqueous 2 N sodium hydroxide solution (1.15 mL, 2.31 mmol) was further added, and the reaction mixture was stirred for 2 hours. 1 N hydrochloric acid was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was dried over sodium sulfate, filtered, and concentrated to obtain the title compound (225 mg) as a light yellow oily compound.

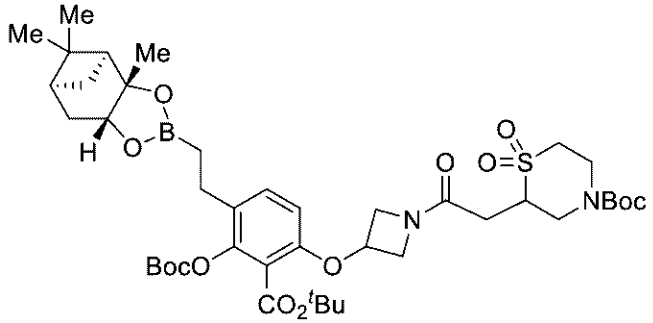
[0493]

LCMS: $[M+H]^+$/RT = 292.13/0.521 min[C]

[0494]

Reference Example 126: tert-butyl 2-(2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1,1-dioxo-1λ^6-thiomorpholine-4-carboxylate

[Chemical Formula 793]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 (0.30 g, 0.493 mmol) and the compound of Reference Example 126-1 (159 mg, 0.543 mmol) as the starting materials by the same method

described in Reference Example 36-4 to obtain the title compound (225 mg) as a light yellow oil.

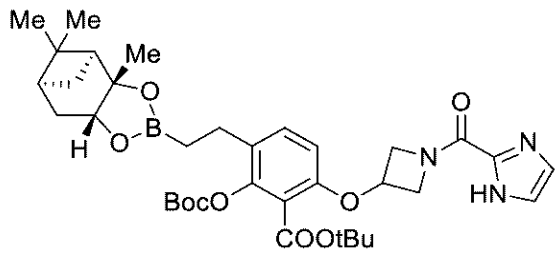
[0495]

^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.7 Hz), 6.40 (1H, d, J = 8.7 Hz), 4.97-4.91 (1H, m), 4.56-4.35 (3H, m), 4.31-4.16 (5H, m), 4.09-3.98 (2H, m), 3.05-3.00 (2H, m), 2.79 (1H, d, J = 16.0 Hz), 2.62 (2H, t, J = 8.2 Hz), 2.35-2.28 (1H, m), 2.22-2.15 (1H, m), 2.04-2.00 (1H, m), 1.95-1.85 (2H, m), 1.81 (1H, d, J = 14.6 Hz), 1.56 (9H, s), 1.54 (9H, s), 1.47 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.11 (2H, t, J = 8.2 Hz), 1.03 (1H, d, J = 11.0 Hz), 0.83 (3H, s).

[0496]

Reference Example 127: tert-butyl 2-[(tert-butoxycarbonyl)oxy]-6-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 794]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 (200 mg, 0.283 mmol) as the starting material by the same method described in Reference Example 40 to obtain the title compound (119 mg).

[0497]

^{1}H-NMR ($CDCl_3$) δ: 10.76 (1H, br), 7.23 (1H, d, J = 8.1 Hz), 7.19 (1H, s), 7.13 (1H, s), 6.46 (1H, d, J = 8.1 Hz), 5.15-4.99 (2H, m), 4.76-4.70 (1H, m), 4.60-4.54 (1H, m), 4.29-4.23 (2H, m), 2.65-2.59 (2H, m), 2.36-2.26 (1H, m), 2.23-2.14 (1H, m), 2.05-2.01 (1H, m), 1.93-1.78 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.36 (3H, s), 1.29 (3H, s), 1.15-

1.01 (3H, m), 0.84 (3H, s).

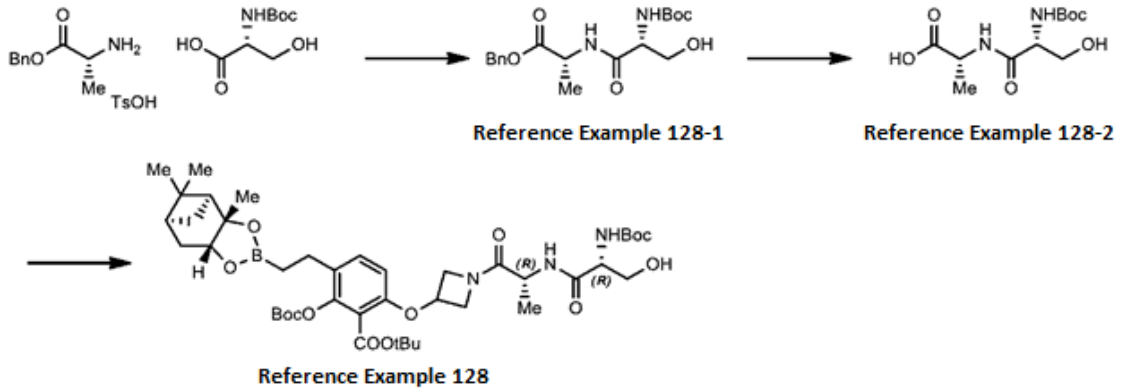
[0498]

LCMS: $[M+H]^+$/Rt = 666.9/2.83 min[B]

[0499]

Reference Example 128: N^2-(tert-butoxycarbonyl)-N-[(2R)-1-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

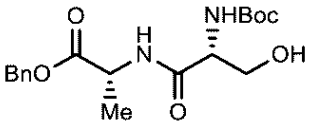
[Chemical Formula 795]



[0500]

Reference Example 128-1: benzyl N-(tert-butoxycarbonyl)-D-seryl-D-alaninate

[Chemical Formula 796]



4-(4,6-dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholinium chloride (809 mg, 2.92 mmol), triethylamine (0.355 mL, 2.56 mmol), and D-alanine benzyl p-toluenesulfonate (899 mg, 2.56 mmol) were added to a methanol (24 mL) solution of N-(tert-butoxycarbonyl)-D-serine (500 mg, 2.44 mmol), and the reaction mixture was stirred for 13 hours at room temperature. Water was added to the reaction solution, which was extracted with methylene chloride and then washed with 1 N hydrochloric acid and saturated aqueous sodium

hydrogen carbonate solution. The resultant was dried over anhydrous sodium sulfate, filtered, and concentrated to obtain the title compound (955 mg).

[0501]

^{1}H-NMR ($CDCl_3$) δ: 7.42-7.31 (5H, m), 7.03-7.00 (1H, m), 5.53-5.50 (1H, m), 5.23-5.13 (2H, m), 4.70-4.55 (1H, m), 4.23-4.15 (1H, m), 4.09-3.94 (1H, m), 3.68-3.59 (1H, m), 3.11-3.03 (1H, m), 1.45-1.42 (12H, m).

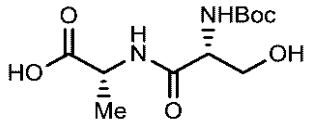
[0502]

LCMS: $[M+H]^+$/Rt = 367.2/1.77 min^B

[0503]

Reference Example 128-2: N-(tert-butoxycarbonyl)-D-seryl-D-alanine

[Chemical Formula 797]



10% palladium on carbon (48 mg) was added to a methanol (18 mL) solution of the compound of Reference Example 128-1 (955 mg, 2.61 mmol). The reaction mixture was subjected to hydrogen substitution and was stirred for 2 hours at room temperature. After the reaction solution was filtered, the filtrate was concentrated to obtain the title compound (735 mg).

[0504]

^{1}H-NMR ($CDCl_3$) δ: 7.50-7.42 (1H, m), 5.75-5.72 (1H, m), 4.62-4.51 (1H, m), 4.30 (1H, br), 4.03-3.66 (3H, m), 1.47-1.44 (12H, m).

[0505]

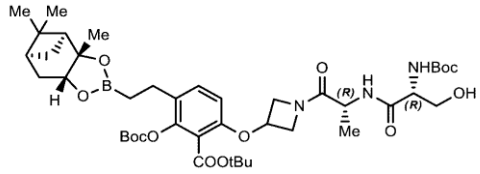
LCMS: $[M+H]^+$/Rt = 277.1/1.04 min^B

[0506]

Reference Example 128: N^2-(tert-butoxycarbonyl)-N-[(2R)-1-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-

serinamide

[Chemical Formula 798]



A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 (200 mg, 0.283 mmol) and the compound of Reference Example 128-2 (86.1 mg, 0.312 mmol) as the starting materials by the same method described in Reference Example 117 to obtain the title compound (203 mg).

[0507]

^{1}H-NMR ($CDCl_3$) δ: 7.24 (1H, d, J = 8.1 Hz), 6.92-6.82 (1H, m), 6.41 (1H, d, J = 8.1 Hz), 5.46-5.37 (1H, m), 5.02-4.95 (1H, m), 4.72-4.66 (1H, m), 4.51-3.94 (7H, m), 3.65-3.32 (2H, m), 2.65-2.49 (2H, m), 2.36-2.28 (1H, m), 2.22-2.13 (1H, m), 2.05-2.00 (1H, m), 1.93-1.77 (2H, m), 1.57 (9H, s), 1.54 (9H, s), 1.45 (9H, s), 1.36-1.23 (9H, m), 1.14-1.01 (3H, m), 0.84 (3H, s).

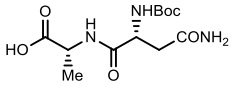
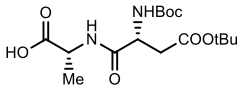
[0508]

LCMS: $[M+H]^+$/Rt = 830.4/2.80 min^B

[0509]

A reaction, work-up, and purification were performed using N^α-(tert-butoxycarbonyl)-D-asparagine and tert-butyl N^α-(tert-butoxycarbonyl)-D-aspartate as the starting materials by the same method described in Reference Example 128-1 and Reference Example 128-2 to obtain each of Reference Example compounds 129 and 130 shown in Table 2-21.

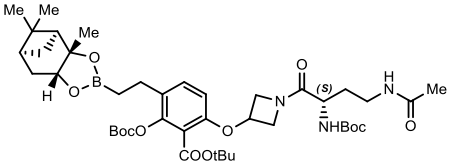
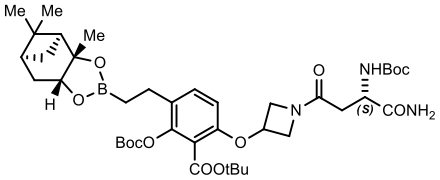
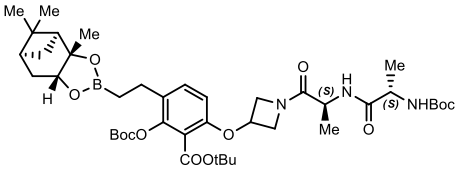
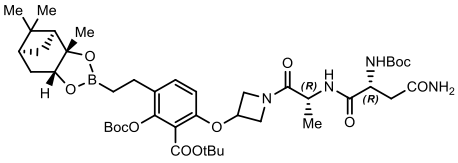
[Table 2-21]

Reference Example	Starting material	Structural formula	NMR and/or LCMS
129	N^{α}-(tert-butoxycarbonyl)-D-asparagine		LCMS:$[M+H]^+$/Rt=304.1/1.03min[B] ^{1}H-NMR (DMSO-d_6) δ: 12.6 (1H, br), 8.01 (1H, d, J = 8.1 Hz), 7.24 (1H, br), 6.91-6.88 (1H, m), 4.30-4.15 (2H, m), 3.42-3.35 (1H, m), 2.52-2.28 (2H, m), 1.37 (9H, s), 1.26 (3H, d, J = 8.1 Hz).
130	tert-Butyl N^{α}-(tert-butoxycarbonyl)-D-aspartate		LCMS:$[M+H]^+$/Rt=361.2/1.71min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.19 (1H, d, J = 5.4 Hz), 6.75 (1H, d, J = 8.1 Hz), 4.64-4.46 (2H, m), 2.89-2.57 (2H, m), 1.47-1.45 (21H, m).

[0510]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-7 and a corresponding commercially available carboxylic acid or the compound of Reference Example 129 as the starting materials by the same method described in Reference Example 42 to obtain each of Reference Example compounds 131 to 134 shown in Table 2-22.

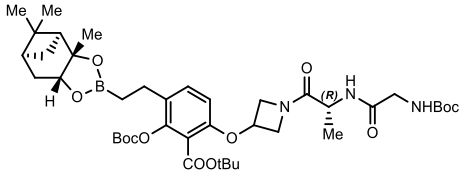
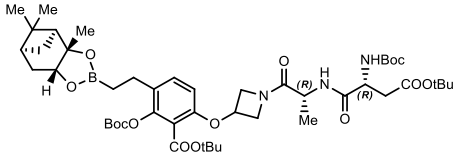
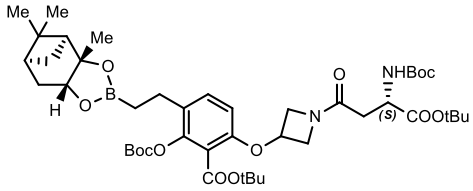
[Table 2-22]

Reference Example	Structural formula	NMR and/or LCMS
131		LCMS:[M+H]+/Rt=814.9/2.79minB 1H-NMR ($CDCl_3$) δ: 7.23 (1H, d, J = 8.1 Hz), 6.64-6.39 (2H, m), 5.50-5.39 (1H, m), 5.01-4.91 (1H, m), 4.63-4.00 (6H, m), 3.79-3.56 (1H, m), 3.07-2.83 (1H, m), 2.64-2.58 (2H, m), 2.37-2.26 (1H, m), 2.23-2.13 (1H, m), 2.05-1.77 (8H, m), 1.59-1.54 (18H, m), 1.44 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.01 (3H, m), 0.84 (3H, s).
132		LCMS:[M+H]+/Rt=786.8/2.77minB 1H-NMR ($CDCl_3$) δ: 7.24-7.20 (1H, m), 7.00-6.86 (1H, m), 6.41 (1H, d, J = 8.1 Hz), 6.34-6.07 (1H, m), 5.43-5.35 (1H, m), 4.98-4.89 (1H, m), 4.63-4.31 (3H, m), 4.26-4.22 (1H, m), 4.17-4.00 (2H, m), 2.96-2.83 (1H, m), 2.64-2.58 (2H, m), 2.44-2.27 (2H, m), 2.21-2.13 (1H, m), 2.05-2.00 (1H, m), 1.93-1.76 (2H, m), 1.59-1.53 (18H, m), 1.45 (9H, s), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.00 (3H, m), 0.83 (3H, s).
133		LCMS:[M+H]+/Rt=814.8/2.88minB 1H-NMR ($CDCl_3$) δ: 7.24 (1H, d, J = 8.1 Hz), 6.80-6.70 (1H, m), 6.41 (1H, d, J = 8.1 Hz), 5.05-4.90 (2H, m), 4.71-4.03 (7H, m), 2.65-2.59 (2H, m), 2.37-2.27 (1H, m), 2.22-2.13 (1H, m), 2.05-2.00 (1H, m), 1.93-1.76 (2H, m), 1.59-1.54 (18H, m), 1.45-1.44 (9H, m), 1.36-1.26 (12H, m), 1.14-1.01 (3H, m), 0.84 (3H, s).
134		LCMS:[M+H]+/Rt=857.8/2.71minB 1H-NMR ($CDCl_3$) δ: 7.40-7.31 (1H, m), 7.23 (1H, d, J = 8.1 Hz), 6.41 (1H, d, J = 8.1 Hz), 6.09-5.95 (1H, m), 5.90-5.79 (1H, m), 5.51-5.41 (1H, m), 5.01-4.92 (1H, m), 4.70-4.00 (7H, m), 2.97-2.88 (1H, m), 2.64-2.48 (3H, m), 2.37-2.27 (1H, m), 2.22-2.13 (1H, m), 2.05-2.00 (1H, m), 1.93-1.77 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.46-1.45 (9H, m), 1.36 (3H, s), 1.32-1.23 (6H, m), 1.14-1.01 (3H, m), 0.84 (3H, s).

[0511]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 and a corresponding commercially available carboxylic acid or the compound of Reference Example 130 as the starting materials by the same method described in Reference Example 3 to obtain each of Reference Example compounds 135 to 137 shown in Table 2-23.

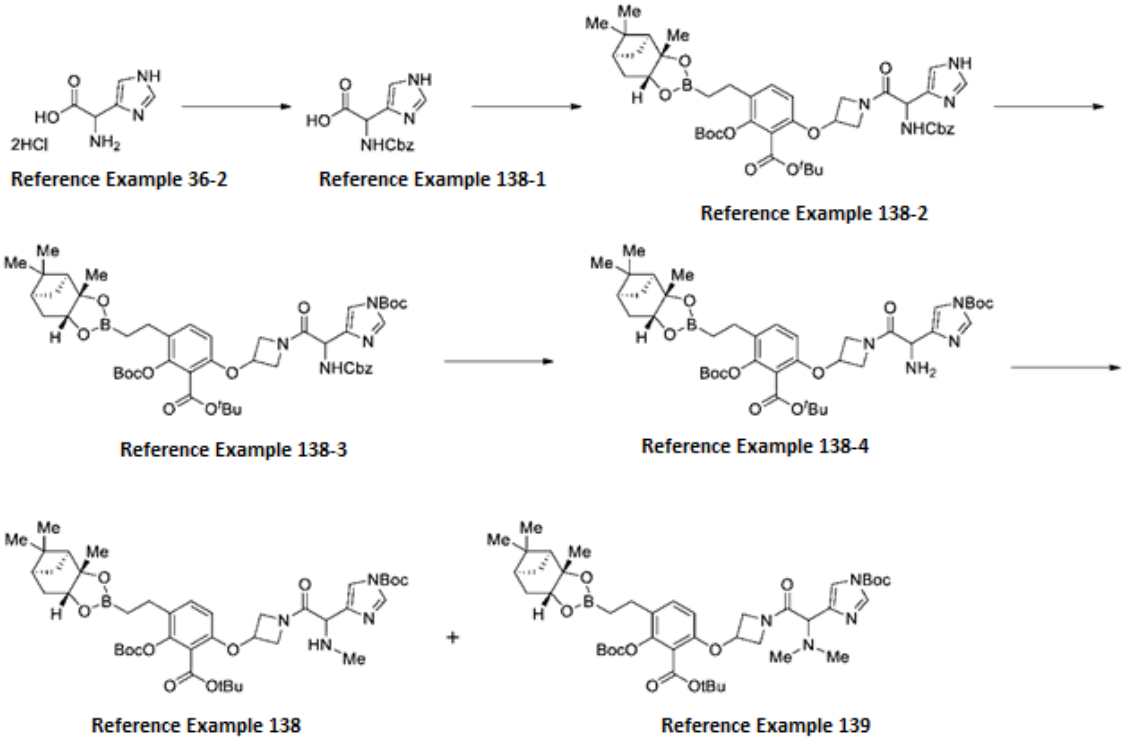
[Table 2-23]

Reference Example	Structural formula	NMR and/or LCMS
135		LCMS:$[M+H]^+$/Rt=800.7/2.83min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.26-7.21 (1H, m), 6.77-6.68 (1H, m), 6.41 (1H, d, J = 8.1 Hz), 5.10-4.92 (2H, m), 4.72-4.03 (6H, m), 3.85-3.76 (2H, m), 2.65-2.59 (2H, m), 2.36-2.28 (1H, m), 2.22-2.12 (1H, m), 2.04-2.00 (1H, m), 1.93-1.76 (2H, m), 1.56-1.54 (18H, m), 1.46 (9H, s), 1.36-1.28 (9H, m), 1.14-1.01 (3H, m), 0.84 (3H, s).
136		LCMS:$[M+H]^+$/Rt=914.7/3.07min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.24-7.03 (1H, m), 6.42-6.38 (1H, m), 5.66-5.53 (1H, m), 4.99-4.91 (1H, m), 4.69-4.04 (8H, m), 2.94-2.82 (1H, m), 2.64-2.55 (3H, m), 2.36-2.27 (1H, m), 2.20-2.12 (1H, m), 2.05-2.00 (1H, m), 1.93-1.77 (2H, m), 1.59-1.53 (18H, m), 1.46-1.43 (18H, m), 1.36 (3H, s), 1.32-1.23 (6H, m), 1.14-1.01 (3H, m), 0.84 (3H, s).
137		LCMS:$[M+H]^+$/Rt=843.6/3.14min[B] ^{1}H-NMR ($CDCl_3$) δ: 7.22 (1H, d, J = 8.1 Hz), 6.40 (1H, d, J = 8.1 Hz), 5.75-5.67 (1H, m), 4.94-4.89 (1H, m), 4.48-4.32 (3H, m), 4.26-4.22 (1H, m), 4.19-4.11 (1H, m), 4.07-4.02 (1H, m), 2.86-2.71 (1H, m), 2.64-2.48 (3H, m), 2.37-2.26 (1H, m), 2.23-2.13 (1H, m), 2.05-2.00 (1H, m), 1.92-1.77 (2H, m), 1.56 (9H, s), 1.53 (9H, s), 1.46-1.43 (18H, m), 1.36 (3H, s), 1.28 (3H, s), 1.14-1.00 (3H, m), 0.83 (3H, s).

[0512]

Reference Example 138: tert-butyl 4-[2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-1-(methylamino)-2-oxoethyl]-1H-imidazole-1-carboxylate

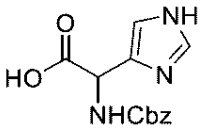
[Chemical Formula 799]



[0513]

Reference Example 138-1: {[(benzyloxy)carbonyl]amino}(1H-imidazol-4-yl)acetic acid

[Chemical Formula 800]



Sodium hydrogen carbonate (5.78 g, 68.8 mmol) and benzyl chloroformate (5.87 g, 34.4 mmol) were added to an ethanol/water (1:1) mixture solution (57 mL) of the compound of Reference Example 36-2 (3.68 g, 17.2 mmol) while cooling with ice. After stirring for 15 minutes, the reaction solution was warmed up to room temperature, and stirred for another 12 hours. Saturated ammonium chloride water was added to the reaction solution, which was extracted with ethanol (40 mL) and dichloromethane (40 mL). The organic phase was dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by chromatography (dichloromethane/methanol = 10/1) to obtain

the title compound (1.7 g).

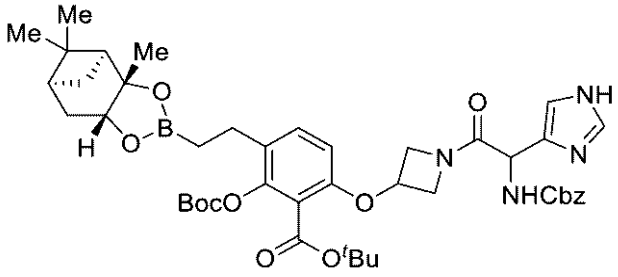
[0514]

^{1}H-NMR (500 MHz, $CDCl_3$) δ: 8.86-8.82 (1H, m), 7.51-7.47 (1H, m), 7.37-7.24 (5H, m), 5.57 (1H, s), 5.10 (2H, s).

[0515]

Reference Example 138-2: tert-butyl 6-({1-[{[(benzyloxy)carbonyl]amino}(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 801]



Triethylamine (5 mL, 18 mmol), ethyldicarbodiimide (1.16 g, 6 mmol), and 1-hydroxybenzotriazole (1.64 g, 12 mmol) were added to a DMF (24 mL) solution of the compound of Reference Example 138-1 (1.7 g, 6.1 mmol) and the compound of Reference Example 1-8 (1.7 g, 3.0 mmol), and the reaction mixture was stirred for 12 hours at room temperature. A saturated aqueous sodium hydrogen carbonate solution (30 mL) was added to the reaction solution, which was extracted with ethyl acetate (30 mL). The organic phase was washed with saturated saline (30 mL), then dried over sodium sulfate, filtered, and concentrated. The resulting residue was purified by column chromatography (dichloromethane/methanol = 50/1) to obtain the title compound (956 mg).

[0516]

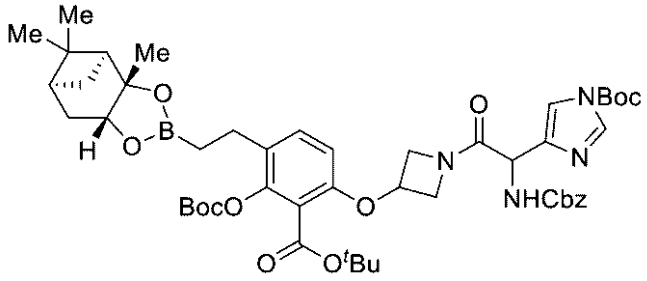
^{1}H-NMR (500 MHz, $CDCl_3$) δ: 9.30 (1H, brs), 7.59 (1H, s), 7.40-7.22 (5H, m), 7.21-7.05 (2H, m), 6.03 (1H, brs), 5.48-5.32 (2H, m), 5.15-5.08 (4H, m), 4.43-4.06 (2H, m), 3.79-3.67 (3H, m), 2.63-1.79 (3H, m), 1.54 (9H, s), 1.53 (9H, s),

1.36-1.16 (6H, m), 1.13-1.01 (2H, m), 0.89-0.80 (4H, m).

[0517]

Reference Example 138-3: tert-butyl 4-(1-{[(benzyloxy)carbonyl]amino}-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1H-imidazole-1-carboxylate

[Chemical Formula 802]



Triethylamine (0.641 mL, 4.6 mmol) and di-tert-butyl dicarbonate (503 mg, 2.3 mmol) were added to a dichloromethane (5.75 mL) solution of the compound of Reference Example 138-2 (956 mg, 1.15 mmol), and the reaction mixture was stirred overnight at room temperature. A saturated aqueous ammonium chloride solution (10 mL) was added to the reaction solution, which was extracted with dichloromethane (10 mL). The organic phase was dried over sodium sulfate, then filtered and concentrated. The resulting residue was purified by column chromatography (dichloromethane/methanol = 50/1) to obtain the title compound (228 mg).

[0518]

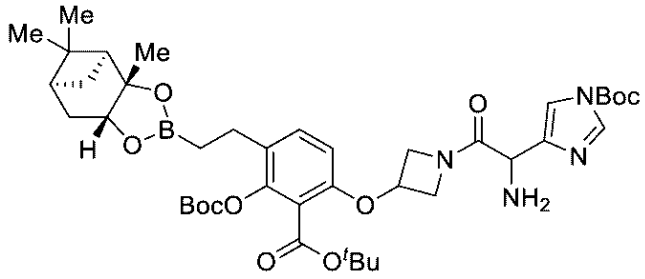
^{1}H-NMR (500 MHz, $CDCl_3$)δ: 8.02-7.98 (1H, m), 7.38-7.12 (7H, m), 6.39-6.07 (1H, m), 5.32-4.05 (5H, m), 3.50-3.49 (1H, m), 2.63-1.78 (7H, m), 1.62 (9H, s), 1.56 (9H, s), 1.52 (9H, s), 1.38-1.23 (8H, m), 1.15-1.08 (2H, m), 1.05-0.83 (5H, m).

[0519]

Reference Example 138-4: tert-butyl 4-(1-amino-2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-

1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-2-oxoethyl)-1H-imidazole-1-carboxylate

[Chemical Formula 803]



Palladium hydroxide (22 mg) was added to a methanol solution (4 mL) of the compound of Reference Example 138-3 (228 mg, 0.245 mmol), and the reaction mixture was stirred under a hydrogen atmosphere at room temperature. After 12 hours, the reaction solution was filtered through celite, and the filtrate was concentrated. The resulting residue was purified by column chromatography (dichloromethane/methanol = 50/1) to obtain the title compound (123 mg).

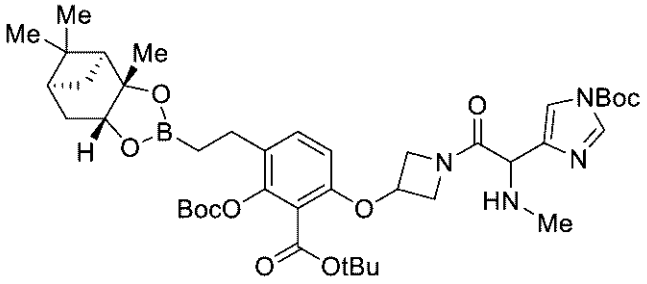
[0520]

^{1}H-NMR (500 MHz, $CDCl_3$)δ: 8.02-8.00 (1H, m), 7.35-7.20 (2H, m), 6.40-6.37 (1H, m), 4.96-4.90 (1H, brs), 4,45-4.39 (m, 1H), 4.25-4.20 (1H, m), 4.13-4.11 (1H, m), 2.63-2.60 (2H, m), 2.35-2.28 (1H, m), 2.17-2.14 (1H. m), 2.03-2.01 (1H, m), 1.61 (9H, s), 1.56 (9H, s), 1.52 (9H, s), 1.28-1.26 (6H, m), 1.13-1.10 (1H, m), 0.83 (6H, s).

[0521]

Reference Example 138: tert-butyl 4-[2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-1-(methylamino)-2-oxoethyl]-1H-imidazole-1-carboxylate

[Chemical Formula 804]



A formalin solution (30% methanol solution, 2.32 μL, 0.231 mmol) was added to a diethyl ether solution (3 mL) of the compound of Reference Example 138-4 (123 mg, 0.154 mmol), and the reaction mixture was stirred for 1.5 hours at room temperature. Dichloromethane (10 mL) was added to the reaction solution. The organic layer was washed three times with water (10 mL), dried over sodium sulfate, then filtered and concentrated. Sodium triacetoxyborohydride (65 mg, 0.308 mmol) was added to a dichloromethane/acetic acid (1:1) mixture solution (3 mL) of the resulting residue, and the reaction mixture was stirred for 1.5 hours at room temperature. The reaction solution was added to a saturated aqueous sodium hydrogen carbonate solution (10 mL) and extracted with dichloromethane (10 mL). The retrieved organic layer was dried over sodium sulfate, filtered and concentrated. The resulting residue was purified by preparative thin-layer chromatography (dichloromethane/methanol = 10/1) to obtain the compound of Reference Example 138 (26 mg) and the compound of Reference Example 139 (42 mg).

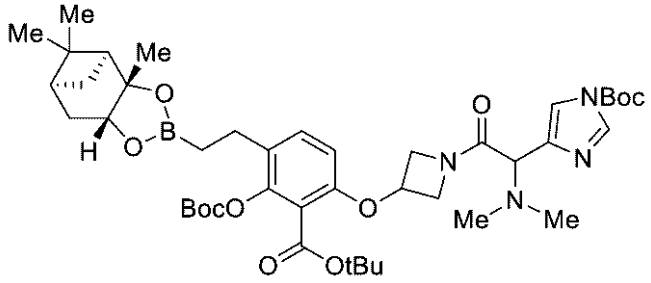
[0522]

^{1}H-NMR (500 MHz, $CDCl_3$)δ: 8.00 (1H, d, J = 6.3 Hz), 7.35 (1H, d, J = 8.6 Hz), 7.24-7.15 (1H, m), 6.38 (1H, dd, J = 8.6, 8.3 Hz), 4.95-4.72 (1H, m), 4.66-4.05 (4H, m), 2.63-2.58 (2H, m), 2.41 (3H, s), 2.35-1.78 (5H, m), 1.47 (9H, s), 1.52 (9H, s), 1.52 (9H, s), 1.35 (3H, s), 1.28 (3H, s), 1.28-1.23 (2H, m), 1.24-1.08 (2H, m), 1.04-1.02 (1H, m), 0.83 (3H, s).

[0523]

Reference Example 139: tert-butyl 4-[2-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-1-(dimethylamino)-2-oxoethyl]-1H-imidazole-1-carboxylate

[Chemical Formula 805]



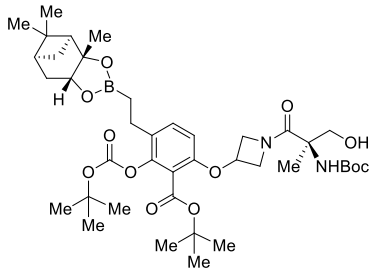
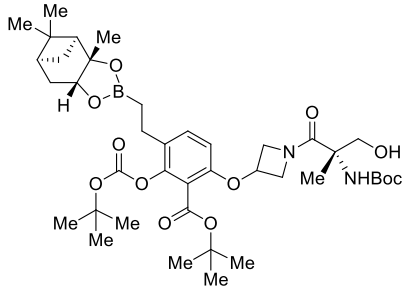
[0524]

^{1}H-NMR (500 MHz, $CDCl_3$)δ: 8.04-8.03 (1H, m), 7.52-7.49 (1H, m), 7.21-7.19 (1H, m), 6.39-6.37 (1H, m), 4.91-3.98 (6H, m), 2.63-2.58 (2H, m), 2.35-1.78 (11H, m), 1.56 (9H, s), 1.53 (9H, s), 1.52 (9H, s), 1.35-1.23 (5H, m), 1.14-1.03 (3H, m), 0.83 (4H, s).

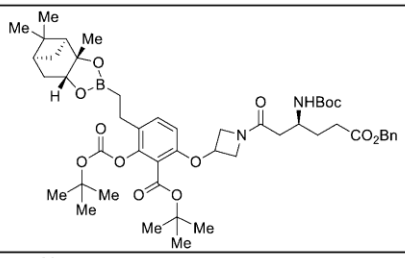
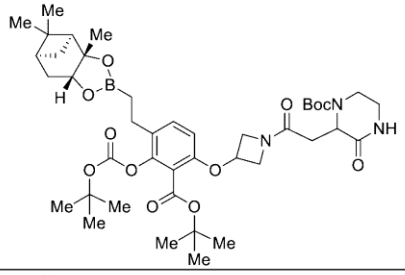
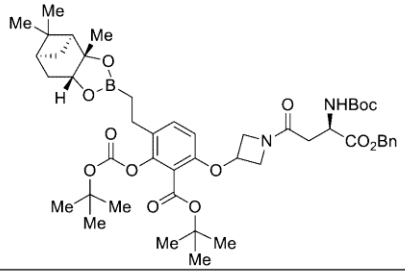
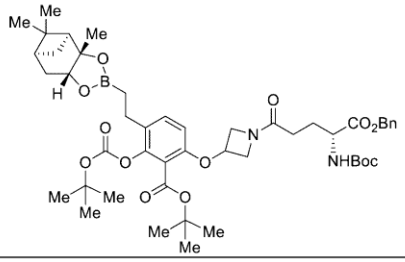
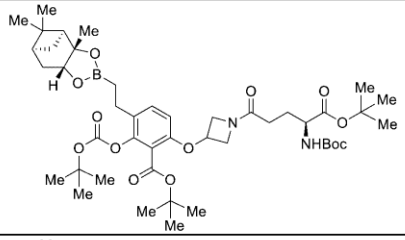
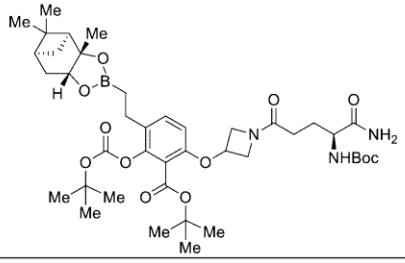
[0525]

A reaction, work-up, and purification were performed using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 3 to obtain each of Reference Example compounds 140 to 147 shown in Tables 2-24 and 2-25. Further, a reaction, work-up, and purification were performed using the compound of Reference Example 1-8 as the starting material by the same method described in Reference Example 36-4 to obtain Reference Example compounds 148 and 149 shown in Table 2-26.

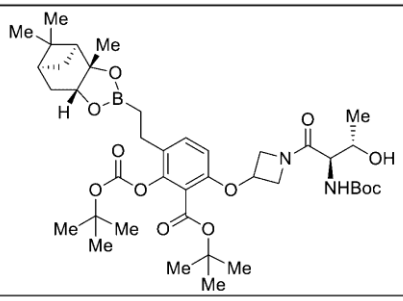
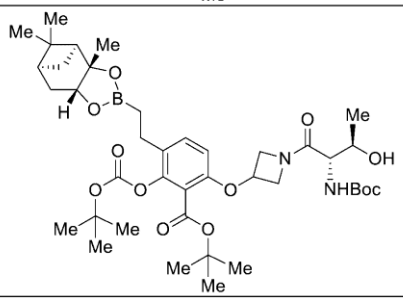
[Table 2-24]

Reference Example	Structural formula	NMR and/or LCMS
140		LCMS:$[M+H]^+$/Rt=773.00/1.394 min^{A1} H-NMR (CD_3OD) δ: 7.39-7.26 (6H, m), 6.67 (1H, d, *J* = 8.5 Hz), 5.12-5.05 (3H, m), 4.39-4.33 (1H, m), 4.29 (2H, d, *J* = 8.5 Hz), 4.00-3.94 (1H, m), 3.74-3.67 (2H, m), 3.34 (2H, s), 2.58 (2H, t, *J* = 7.9 Hz), 2.39-2.32 (1H, m), 2.21-2.16 (1H, m), 1.99 (1H, t, *J* = 5.5 Hz), 1.89-1.87 (1H, m), 1.79 (1H, d, *J* = 15.3 Hz), 1.55 (9H, d, *J* = 7.9 Hz), 1.52 (9H, s), 1.35 (3H, s), 1.29 (3H, s), 1.08 (2H, t, *J* = 8.2 Hz), 0.99 (1H, d, *J* = 10.4 Hz), 0.86 (3H, s).
141		LCMS:$[M+H]^+$/Rt=773/2.275 min^{H}

[Table 2-25]

142		LCMS:$[M+H]^+$/Rt=905/2.433min^H
143		LCMS:$[M+H]^+$/Rt=812/2.217min^H
144		LCMS:$[M+H]^+$/Rt=877/2.150min^H
145		LCMS:$[M+H]^+$/Rt=892/1.411min^E
146		LCMS:$[M+H]^+$/Rt=857.7/3.17min^B
147		LCMS:$[M+H]^+$/Rt=800.7/2.81min^B

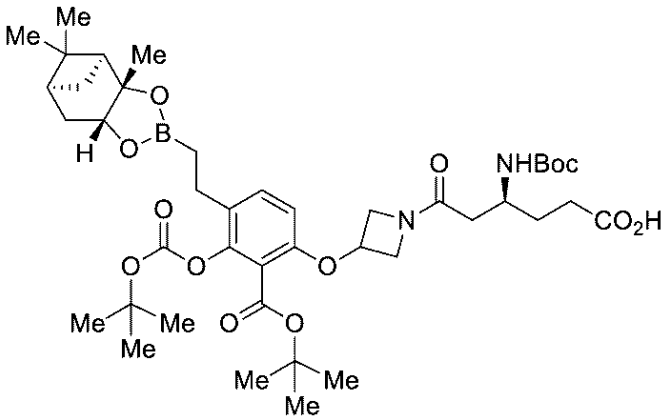
[Table 2-26]

148		LCMS:$[M+H]^+$/Rt=773.54/3.960min[I]
149		LCMS:$[M+H]^+$/Rt=773.54/3.940min[I]

[0526]

Reference Example 150: (4S)-4-[(tert-butoxycarbonyl)amino]-6-{3-[2-(tert-butoxycarbonyl)-3-[(tert-butoxycarbonyl)oxy]-4-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}phenoxy]azetidin-1-yl}-6-oxohexanoic acid

[Chemical Formula 806]



10% palladium on carbon (113 mg) was added to a methanol (7 mL) solution of the compound of Reference Example 142 (334 mg, 0.369 mmol). The reaction mixture was subjected to hydrogen substitution and was stirred for 2 hours at room temperature. After filtering the reaction solution, the filtrate was concentrated to obtain the title

compound (329 mg).

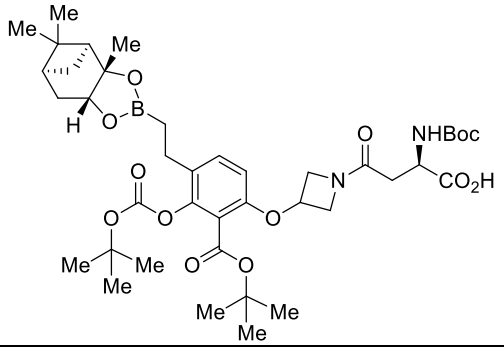
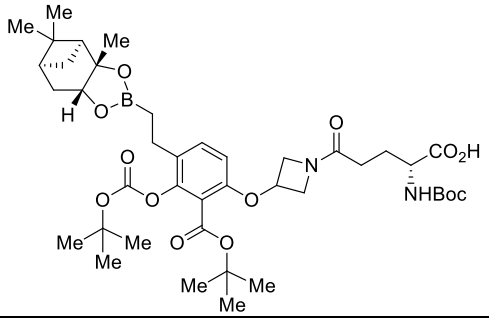
[0527]

LCMS: $[M+H]^+$/Rt = 815.5/2.211 min^H

[0528]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 144 and 145 as the starting materials by the same method described in Reference Example 151 to obtain Reference Example compounds 151 and 152 shown in Table 2-27, respectively.

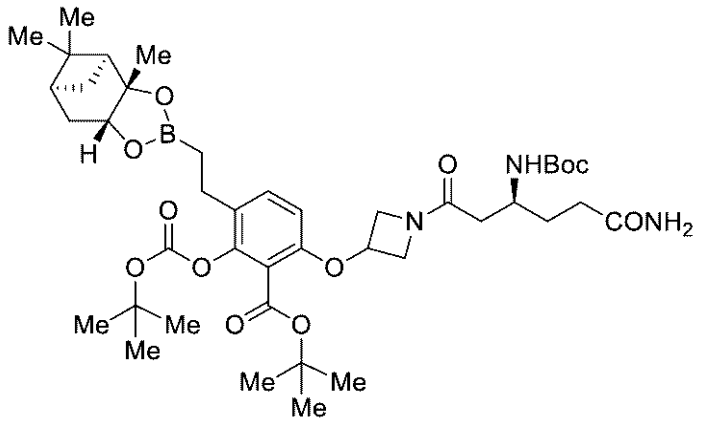
[Table 2-27]

Reference Example	Starting material	Structural formula	NMR and/or LCMS
151	Reference Example 144		LCMS:$[M+H]^+$/Rt=787/2.247 min^H
152	Reference Example 145		LCMS:$[M+H]^+$/Rt=801/2.231 min^H

[0529]

Reference Example 153: tert-butyl 6-[(1-{(3S)-6-amino-3-[(tert-butoxycarbonyl)amino]-6-oxohexanoyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 807]



N,N—diisopropylethylamine (0.131 mL, 0.750 mmol) and HATU (107 mg, 0.281 mmol) were added to a DMF (1 mL) solution of the compound of Reference Example 150 (153 mg, 0.188 mmol), and the reaction mixture was stirred for 30 minutes at room temperature. Ammonium chloride (16.1 mg, 0,300 mmol) was added, and the reaction mixture was stirred for 2 hours at room temperature. A saturated aqueous ammonium chloride solution was added to the reaction solution, which was extracted with ethyl acetate. The organic phase was washed with a saturated aqueous sodium hydrogen carbonate solution and then saturated saline, dried over sodium sulfate and filtered, and the filtrate was concentrated. The resulting residue was purified by silica gel column chromatography (chloroform/methanol) to obtain the title compound (45.7 mg).

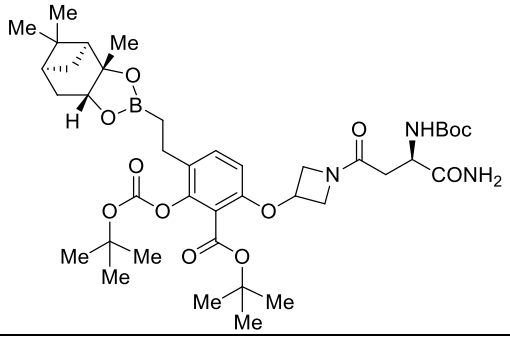
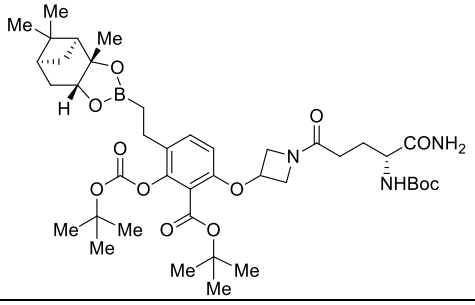
[0530]

LCMS: $[M+H]^+$/Rt = 814.5/2.204 min^H

[0531]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 151 and 152 as the starting materials by the same method described in Reference Example 153 to obtain Reference Example compounds 154 and 155 shown in Table 2-28, respectively.

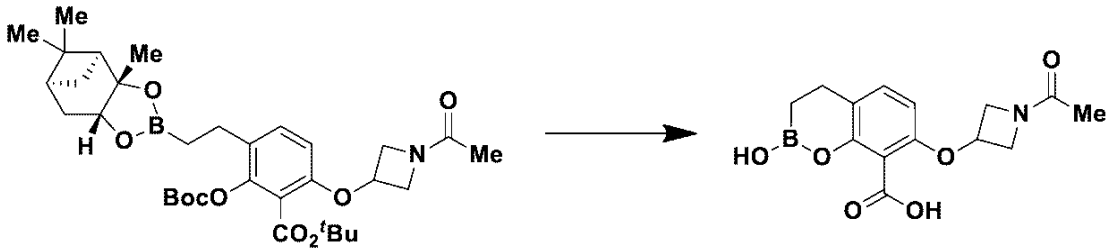
[Table 2-28]

Reference Example	Starting material	Structural formula	NMR and/or LCMS
154	Reference Example 151		LCMS:[M+H]+/Rt=786.5/2.150 minH
155	Reference Example 152		LCMS:[M+H]+/Rt=800.55/2.210 minH

[0532]

Example 1: 7-[(1-acetylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 808]



The compound of Reference Example 1 (105 mg) and phenylboronic acid (19 mg) were added to CPME (0.9 mL). 3 mol/L hydrochloric acid (1.14 mL) was added thereto, and the reaction mixture was stirred overnight at room temperature. The aqueous layer was concentrated and purified by reversed phase column chromatography (eluent: acetonitrile/water = 1/99 to 95/5) to obtain the title compound (9.2 mg).

[0533]

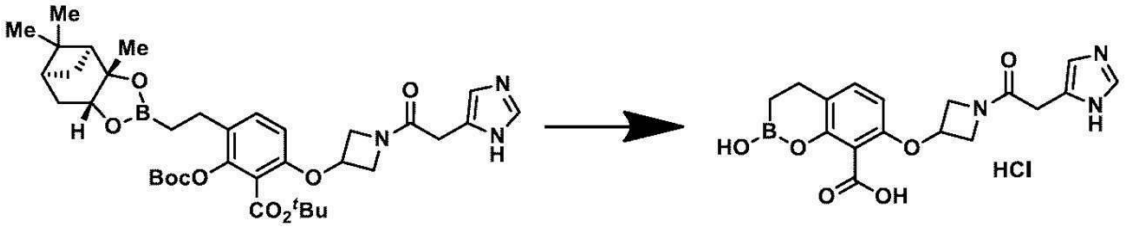
^{1}H-NMR (CD_3OD) δ: 7.16-7.08 (1H, m), 6.35-6.25 (1H, m),

5.06-4.97 (1H, m), 4.58-4.52 (1H, m), 4.37-4.30 (1H, m), 4.22-4.17 (1H, m), 3.96-3.89 (1H, m), 2.70-2.62 (2H, m), 1.86 (3H,s), 1.05-1.01 (2H, m).

[0534]

Example 2: 2-hydroxy-7-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride

[Chemical Formula 809]



Triethylsilane (0.2 mL) and, additionally, TFA (0.9 mL) was added to the compound of Reference Example 3 (96 mg) and phenylboronic acid (14 mg), and the reaction mixture was stirred for 3 hours at room temperature. After concentrating the reaction mixture, the residue was washed with a mixture solvent of diethyl ether/hexane (1:1). The resulting solid was dissolved in methanol and purified by reversed phase chromatography and concentrated. After adding 0.2 mL of aqueous 1 N hydrochloric acid solution to the residue, the mixture was concentrated to obtain the compound of interest (21.6 mg).

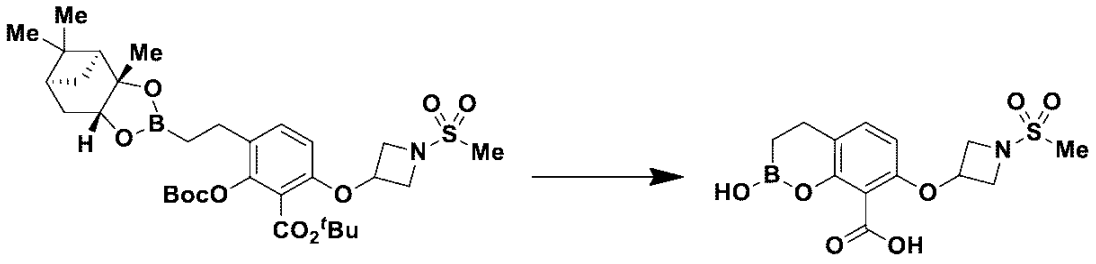
[0535]

LCMS: $[M+H]^+$/Rt = 372/0.44 min[C]

[0536]

Example 3: 2-hydroxy-7-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 810]



Triethylsilane (0.2 mL) and, additionally, TFA (0.9 mL) was added to the compound of Reference Example 2 (96 mg) and phenylboronic acid (14 mg), and the reaction mixture was stirred for 3 hours at room temperature. After concentrating the reaction mixture, the residue was washed with a mixture solvent of diethyl ether/hexane (1:1). The resulting solid was dissolved in methanol and purified by reversed phase chromatography and concentrated to obtain the compound of interest (28 mg).

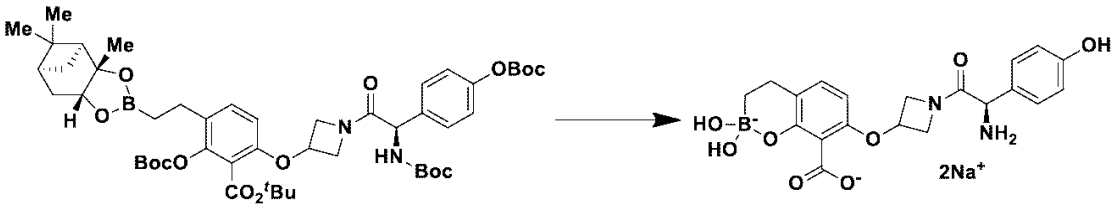
[0537]

^{1}H-NMR (CD_3OD) δ: 7.16-7.00 (1H, m), 6.37-6.20 (1H, m), 5.06-4.97 (1H, m), 4.31-4.25 (2H, m), 3.98-3.94 (2H, m), 2.96 (3H, s), 2.68-2.65 (2H, m), 1.05-1.01 (2H, m)

[0538]

Example 4: 8-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

[Chemical Formula 811]



The compound of Reference Example 17 (119 mg), phenylboronic acid (16.2 mg), acetonitrile (2.0 mL), hexane (2.0 mL), and 4 N hydrochloric acid/dioxane solution (1.0 mL) were added, and the reaction mixture was stirred for 19 hours at room temperature. After allowing it to stand, the

supernatant (top layer) of the reaction solution separated into two layers was removed, and the remaining bottom layer was washed 5 times with hexane and twice with diethyl ether (the washing process removes the supernatant after standing). The solid produced in the solution at the bottom layer was washed with acetonitrile (5.0 mL). The residue of the solid obtained by removing the solvent was dried under reduced pressure. The resulting dried residue was dissolved in water. An aqueous 2 N sodium hydroxide solution (0.5 mL) was added. The mixture was purified by reversed phase column chromatography to obtain the title compound (41.7 mg) as a colorless solid.

[0539]

^{1}H-NMR (D_2O) δ: 7.20-7.13 (2H, m), 6.83-6.75 (3H, m), 5.98-5.90 (1H, m), 5.00-4.91 (1H, m), 4.63-3.90 (5H, m), 2.59-2.50 (2H, m), 0.39-0.29 (2H, m).

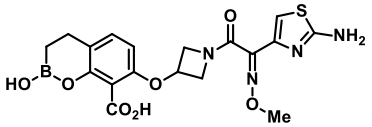
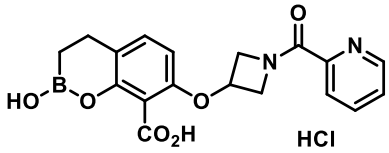
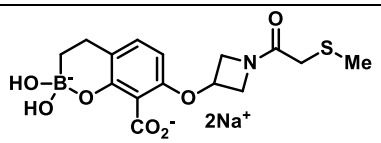
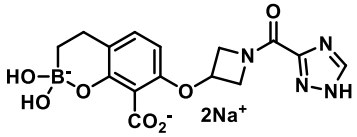
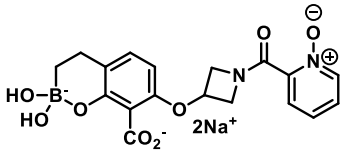
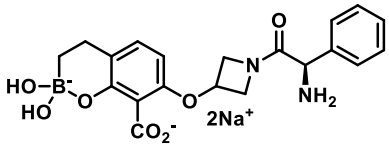
[0540]

A reaction, work-up, and purification were performed using Reference Example compounds 4 to 16 and 18 to 33 shown in Table 2 as the starting materials by the same method described in Example 4 to obtain each of Example compounds 5 to 33. However, if a free form is the final product (Examples 5 and 34), the free form was obtained without sodium hydroxide treatment. If a hydrochloride (hydrochloride salt) is the final product (Example 6), the hydrochloride was obtained by purifying the compound by using reversed phase chromatography and then adding hydrochloric acid and concentrating. A reaction, work-up, and purification were performed using Reference Example compound 34 as the starting material by the same method described in Example 3 to obtain Example compound 34.

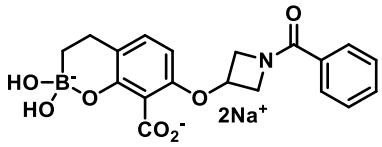
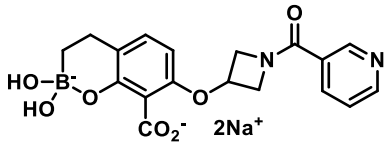
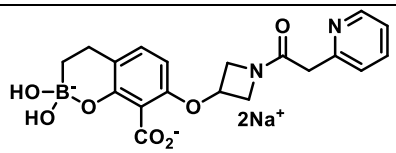
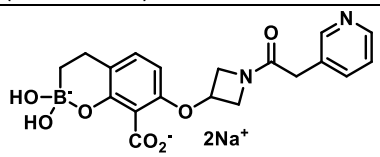
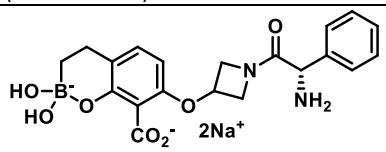
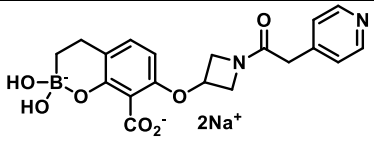
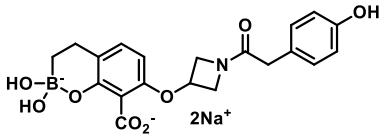
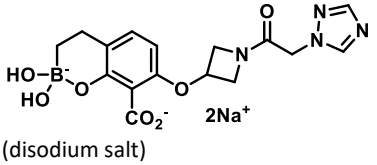
[0541]

[Table 3-1]

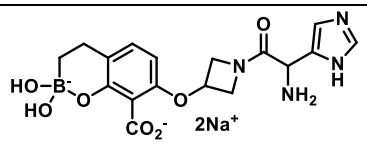
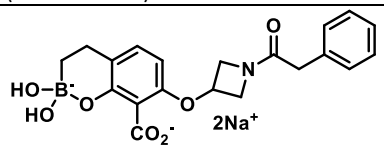
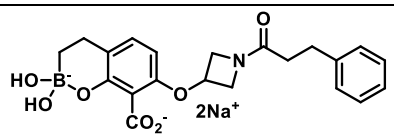
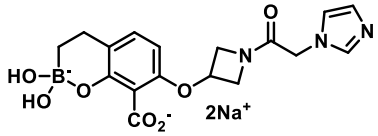
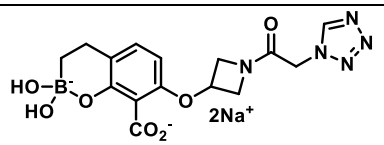
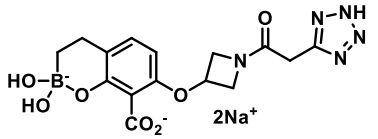
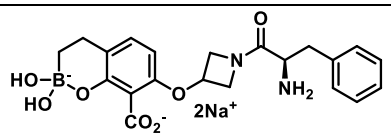
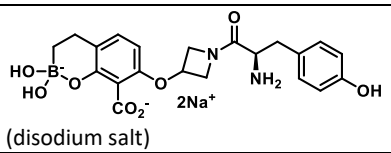
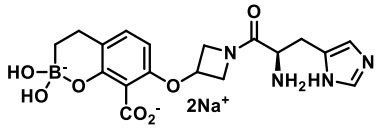
Table 3

Example	Starting material	Structural formula	NMR and/or LCMS
5	Reference Example 4	 (free form)	LCMS:$[M+H]^+$/Rt=447 /0.626min[C]
6	Reference Example 5	 (hydrochloride)	^{1}H-NMR (CD_3OD) δ: 8.67-8.64 (1H, m), 8.06-8.01 (2H, m), 7.59-7.56 (1H, m), 7.18-7.15 (1H, m), 6.38-6.35 (1H, m), 5.13-5.10 (2H, m), 4.72-4.69 (1H, m), 4.63-4.60 (1H, m), 4.22-4.19 (1H, m), 2.70 (2H, t, *J* = 7.3 Hz), 1.05 (2H, t, *J* = 7.3 Hz).
7	Reference Example 6	 (disodium salt)	^{1}H-NMR(D_2O) as a mixture of keto and enol forms δ: 6.87-6.82 (1H, m), 6.04-6.02 (1H, m), 5.02-4.97 (1H, m), 4.65-3.64 (4H, m), 3.20-3.13 (2H, m), 2.57-2.54 (2H, m), 2.11 and 2.07 (3H, s) and 0.36-0.33 (2H, m).
8	Reference Example 7	 (disodium salt)	^{1}H-NMR(D_2O) δ: 8.32-8.31 (1H, m), 6.94-6.92 (1H, m), 6-94-6.92 (1H, m), 5.13-5.11 (1H, m), 4.99-4.94 (1H, m), 4.65-4.59 (2H, m), 4.28-4.25 (1H, m), 2.63-2.60 (2H, m), and 0.45-0.42 (2H, m).
9	Reference Example 8	 (disodium salt)	^{1}H-NMR (D_2O) δ: 8.41 (1H, d, J = 6.4 Hz), 7.83 (1H, t, J = 7.8 Hz), 7.76 (1H, dd, J = 7.8, 1.8 Hz), 7.73-7.69 (1H, m), 6.91 (1H, d, J = 7.8 Hz), 6.07 (1H, d, J = 7.8 Hz), 5.15-5.10 (1H, m), 4.69-4.63 (1H, m), 4.47 (1H, dd, J = 9.6, 7.3 Hz), 4.32 (1H, dd, J = 13.3, 4.1 Hz), 4.20 (1H, dd, J = 9.6, 3.2 Hz), 2.61 (2H, t, J = 7.1 Hz), 0.44 (2H, s).
10	Reference Example 9	 (disodium salt)	^{1}H-NMR (D_2O) as a mixture of isomers δ: 7.46-7.38 (5H, m), 6.89-6.80 (1H, m), 6.01-5.91 (1H, m), 5.04-4.93 (0.5H, m), 4.71-4.59 (1.5H, m), 4.49-4.38 (0.5H, m), 4.22-4.07 (1H, m), 4.01-3.91 (1H, m), 2.63-2.50 (2H, m), 0.45-0.30 (2H, m).

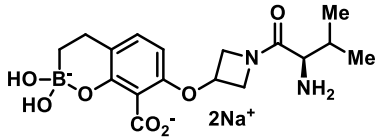
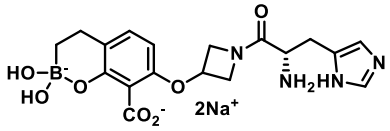
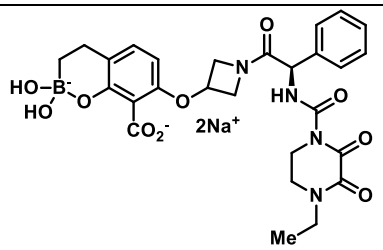
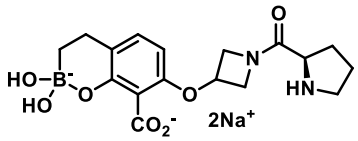
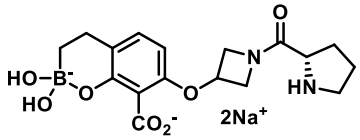
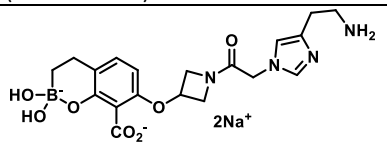
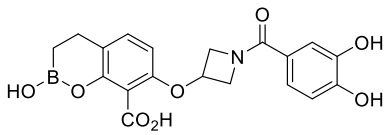
[Table 3-2]

11	Reference Example 10	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.65-7.49 (5H, m), 6.88 (1H, d, J = 8.2 Hz), 6.04 (1H, d, J = 8.2 Hz), 5.04 (1H, td, J = 7.0, 3.7 Hz), 4.65 (1H, dd, J = 10.1, 6.4 Hz), 4.57 (1H, dd, J = 11.4, 6.9 Hz), 4.45 (1H, dd, J = 10.5, 2.7 Hz), 4.23 (1H, dd, J = 10.8, 3.4 Hz), 2.58 (2H, t, J = 6.9 Hz), 0.38 (2H, t, J = 7.1 Hz).
12	Reference Example 11	 (disodium salt)	^{1}H-NMR (D_2O) δ: 8.72 (1H, d, J = 1.4 Hz), 8.63 (1H, dd, J = 5.0, 1.4 Hz), 8.05 (1H, dt, J = 7.8, 1.8 Hz), 7.53 (1H, dd, J = 7.8, 5.0 Hz), 6.85 (1H, d, J = 8.2 Hz), 6.01 (1H, d, J = 8.2 Hz), 5.04 (1H, td, J = 7.9, 4.7 Hz), 4.66 (1H, t, J = 8.5 Hz), 4.56 (1H, dd, J = 11.2, 6.6 Hz), 4.44 (1H, dd, J = 10.1, 3.7 Hz), 4.23 (1H, dd, J = 11.2, 3.9 Hz), 2.55 (2H, t, J = 7.1 Hz), 0.34 (2H, t, J = 6.9 Hz).
13	Reference Example 12	 (disodium salt)	^{1}H-NMR (CD_3OD) δ:8.85-8.78 (1H, m), 8.62-8.52 (1H, m), 8.06-7.95 (2H, m), 7.18 (1H, d, J = 8.2 Hz), 6.36 (1H, d, J = 7.9 Hz), 5.19-5.06 (1H, m), 4.83-4.70 (2H, m), 4.49-4.38 (2H, m), 4.14-4.02 (2H, m), 2.71 (2H, t, J = 7.7 Hz), 1.07 (2H, t, J = 7.7 Hz).
14	Reference Example 13	 (disodium salt)	^{1}H-NMR (CD_3OD)) δ: 8.87-8.74 (2H, m), 8.62-8.53 (1H, m), 8.12-8.03 (1H, m), 7.18 (1H, d, J = 8.2 Hz), 6.36 (1H, d, J = 8.2 Hz), 5.18-5.09 (1H,m), 4.82-4.70 (2H, m), 4.49-4.36 (2H, m), 4.07-3.99 (2H, m), 2.71 (2H, t, J = 7.7 Hz), 1.07 (2H, t, J = 7.7 Hz).
15	Reference Example 14	 (disodium salt)	^{1}H-NMR (D_2O) as a mixture of isomers δ: 7.43-7.29 (5H, m), 6.84-6.76 (1H, m), 6.01-5.89 (1H, m), 4.95-4.83 (1H, m), 4.65-4.53 (1H, m), 4.41-3.50 (4H, m) 2.52 (2H, t, J = 6.6 Hz), 0.31 (2H, q, J = 6.4 Hz).
16	Reference Example 15	 (disodium salt)	^{1}H-NMR (D_2O)δ: 8.32 (2H, d, J = 6.0 Hz), 7.19 (2H, d, J = 6.0 Hz), 6.74 (1H, d, J = 8.2 Hz), 5.91 (1H, d, J = 8.2 Hz), 4.91-4.80 (1H,m), 4.52-4.49 (1H, m), 4.29-4.20 (2H, m), 3.96-3.91 (1H, m), 3.52 (2H, s), 2.44 (2H, t, J = 7.1 Hz), 0.23 (2H, t, J = 7.1 Hz).
17	Reference Example 16	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.03 (2H, d, J = 8.2 Hz), 6.86 (1H, d, J = 8.2 Hz), 6.67 (2H, d, J = 8.2 Hz), 6.01 (1H, d, J = 8.2 Hz), 4.99-4.93 (1H, m), 4.62-4.55 (1H, m), 4.29-4.38 (2H, m), 4.05-3.99 (1H, m), 3.46-3.36 (2H, m), 2.56 (2H, t, J = 7.1 Hz), 0.35 (2H, t, J = 7.1 Hz).
18	Reference Example 18	 (disodium salt)	^{1}H-NMR (D_2O) δ: 8.51 (1H, s), 8.12 (1H, s), 6.94 (1H, d, J = 8.2 Hz), 6.11 (1H, d, J = 8.2 Hz), 5.20-5.05 (3H, m), 4.72-4..64 (1H, m), 4.52-4.45 (1H, m), 4.42-4.37 (1H, m), 4.20-4.13 (1H, m), 2.62 (2H, t, J = 6.9 Hz), 0.46 (2H, t, J = 6.9 Hz).

[Table 3-3]

19	Reference Example 19	 (disodium salt)	^{1}H-NMR (D_2O)) δ: 7.75-7.65 (1H, m), 7.42-7.35 and 7.70-7.09 (1H, m), 6.90-6.82 (1H, m), 6.02-5.96 (1H, m), 5.05-4.85 and 4.70-3.91 (6H, m), 2.62-2.50 (2H, m), 0.43-0.31 (2H, m).
20	Reference Example 20	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.41-7.24 (5H, m), 6.86 (1H, d, J = 8.2 Hz), 6.02 (1H, d, J = 8.2 Hz), 5.01-4.96 (1H, m), 4.63-4.58 (1H, m), 4.40-4.32 (2H,m), 4.08-4.01 (1H, m), 3.58 (2H, s), 2.56 (2H, t, J = 7.1 Hz), 0.35 (2H, t, J = 6.9 Hz).
21	Reference Example 21	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.39-7.28 (2H, m), 7.30-7.22 (3H, m), 6.84 (1H, d, J = 7.8 Hz), 5.92 (1H, d, J = 7.8 Hz), 4.28-4.20 (1H, m), 4.17-4.09 (1H, m), 3.98-3.88 (2H, m), 2.94-2.80 (2H, m), 2.60-2.50 (2H, m), 2.50-2.43 (2H, m), 0.40-0.31 (2H, m).
22	Reference Example 22	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.80-7.62 (1H, m), 7.22-7.0 (2H, m), 6.96-6.85 (1H, m), 6.13-5.99 (1H, m), 5.10-5.05 (1H, m), 4.64-4.53 (1H, m), 4.47-4.38 (1H, m), 4.36-4.27 (1H, m), 4.20-4.05 (1H, m), 2.67 (2H, m), 0.50-0.38 (2H,m).
23	Reference Example 23	 (disodium salt)	^{1}H-NMR (CD_3OD) δ: 9.18 (1H, s), 7.21-7.14 (1H, m), 6.44-6.12 (1H, m), 5.38 (2H, s), 5.22-5.08 (1H, m), 4.80-4.69 (1H, m), 4.51-4.38 (2H, m), 4.15-4.03 (1H, m), 2.78-2.65 (2H, m), 1.14-0.98 (2H, m).
24	Reference Example 24	 (disodium salt)	^{1}H-NMR (D_2O) δ: 6.89 (1H, d, J = 8.2 Hz), 6.05 (1H, d, J = 8.2 Hz), 5.03-4.97 (1H, m), 4.54 (1H, dd, J = 9.6, 6.9 Hz), 4.40 (1H, dd, J = 11.0, 6.9 Hz), 4.29 (1H, dd, J = 9.6, 3.7 Hz), 4.08 (1H, dd, J = 11.0, 3.7 Hz), 3.85 (1H, d, J = 16.3 Hz), 3.75(1H, d, J = 16.3 Hz), 2.58 (2H, t, J = 6.9 Hz), 0.41 (2H, t, J = 7.1 Hz).
25	Reference Example 25	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.41-7.21 (5H, m), 6.97-6.78 (1H, m), 5.93-5.80 (1H, m), 4.59-4.52, 4.33-4.25, 4.33-4.25, 4.18-4.10, 4.05-3.99, 3.91-3.82, 3.74-3.65, 3.53-3.48, 3.38-3.30 (6H, m), 2.99-2.90 (1H, m), 2.88-2.72 (1H, m), 2.60-2.50 (2H, m), 0.43-0.27 (2H, m).
26	Reference Example 26	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.14-7.01 (2H, m), 6.88-6.76 (3H, m), 5.86-5.70 (1H, m), 4.61-4.56, 4.30-4.12, 4.00-3.82, 3.63-3.44, 2.95-2.80, 2.72-2.48 (10H, m), 0.44-0.26 (2H, m).
27	Reference Example 27	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.69, 7.52 (1H, s), 6.93-6.83 (2H, m), 5.99-5.78 (1H, m), 4.42-4.07, 4.01-3.79, 3.70-3.50, 3.05-2.91 (5H, m), 2.91-2.66 (1H, m), 2.61-2.48 (2H, m), 0.42-0.28 (2H, m).

[Table 3-4]

28	Reference Example 28	 (disodium salt)	^{1}H-NMR (D_2O) δ: 6.87 (1H, d, J = 8.2 Hz), 6.03 (1H, d, J = 8.2 Hz), 5.04-4.96 (1H, m), 4.68-4.58 (1H, m), 4.43-4.28 (2H, m), 4.08-4.00 (1H, m), 3.19-3.13 (1H, m), 2.56 (2H, t, J = 6.9 Hz), 1.81-1.73 (1H, m), 1.00-0.81 (6H, m), 0.35 (2H, t, J = 7.1 Hz).
29	Reference Example 29	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.73, 7.54 (1H, s), 6.98-6.80 (2H, m), 5.96-5.80 (1H, m), 4.42-4.11, 4.04-3.83, 3.74-3.66, 3.65-3.57, 3.08-2.96 (5H, m), 2.90-2.74 (2H, m), 2.64-2.50 (2H, m), 0.48-0.31 (2H,m).
30	Reference Example 30	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.50-7.31 (5H, m), 6.89-6.84 (1H, m), 6.03-5.95 (1H, m), 5.33-5.27 (1H, m), 5.15-4.97 (1H, m), 4.50-4.28 (2H, m), 4.20-3.95 (2H, m), 3.33 (6H, dt, J = 28.1, 9.6 Hz), 2.63-2.48 (2H, m), 1.16-1.02 (3H, m), 0.50-0.30 (2H, m).
31	Reference Example 31	 (disodium salt)	^{1}H-NMR (D_2O) δ: 6.87 (1H, d, J = 7.9 Hz), 6.04 (1H, d, J = 7.9 Hz), 5.09-4.96 (1H, m), 4.90-4.84 (1H, m), 4.66-4.52 (1H, m), 4.43-4.30 (2H, m), 4.10-4.00 (1H, m), 3.93-3.80 (1H, m), 3.08-2.90 (2H, m), 2.57 (2H, t, J = 6.9 Hz), 2.28-2.02 (1H, m), 1.93-1.68 (3H, m), 0.36 (2H, t, J = 6.9 Hz).
32	Reference Example 32	 (disodium salt)	LCMS:$[M+H]^+$/Rt=361 /0.87min[B]
33	Reference Example 33	 (disodium salt)	^{1}H-NMR (D_2O) δ: 7.56 (1H, s), 6.93 (1H, s), 6.83 (1H, d, J = 8.2 Hz), 5.99 (1H, d, J = 8.2 Hz), 5.04-4.93 (1H, m), 4.57-4.48 (1H, m), 4.42-4.33 (1H, m), 4.23-4.17 (1H, m), 4.09-3.98 (1H, m), 3.14 (2H, t, J = 6.6 Hz), 2.82 (2H, t, J = 6.6 Hz), 2.52 (2H, t, J = 6.9 Hz), 0.31 (2H, t, J = 6.9 Hz).
34	Reference Example 34	 (free form)	^{1}H-NMR (CD_3OD) δ: 6.96 (1H, d, *J* = 7.9 Hz), 6.90-6.87 (1H, m), 6.80-6.78 (2H, m), 6.58 (1H, d, *J* = 7.9 Hz), 4.99-4.97 (2H, m), 4.68-4.65 (1H, m), 4.48-4.45 (1H, m), 4.18-4.16 (1H, m), 2.57 (2H, t, *J* = 7.3 Hz), 0.51 (2H, t, *J* = 7.3 Hz).

[0542]

The names of the compounds of Examples 5 to 34 are described below.

7-({1-[(2-amino-1,3-thiazol-4-

yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 5)

2-hydroxy-7-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 6)

4,4-dihydroxy-8-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 7)

4,4-dihydroxy-8-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 8)

4,4-dihydroxy-8-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 9)

8-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 10)

8-[(1-benzoylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 11)

4,4-dihydroxy-8-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 12)

4,4-dihydroxy-8-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 13)

4,4-dihydroxy-8-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 14)

8-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 15)

4,4-dihydroxy-8-({1-[(pyridin-4-yl)acetyl]azetidin-3-

yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 16)

4,4-dihydroxy-8-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 17)

4,4-dihydroxy-8-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 18)

8-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 19)

4,4-dihydroxy-8-{[1-(phenylacetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 20)

4,4-dihydroxy-8-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 21)

4,4-dihydroxy-8-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 22)

4,4-dihydroxy-8-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 23)

4,4-dihydroxy-8-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 24)

4,4-dihydroxy-8-[(1-D-phenylalanylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 25)

4,4-dihydroxy-8-[(1-D-tyrosylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 26)

8-[(1-D-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic

acid disodium salt (Example 27)

4,4-dihydroxy-8-[(1-D-valylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 28)

8-[(1-L-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 29)

8-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 30)

4,4-dihydroxy-8-[(1-D-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 31)

4,4-dihydroxy-8-[(1-L-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 32)

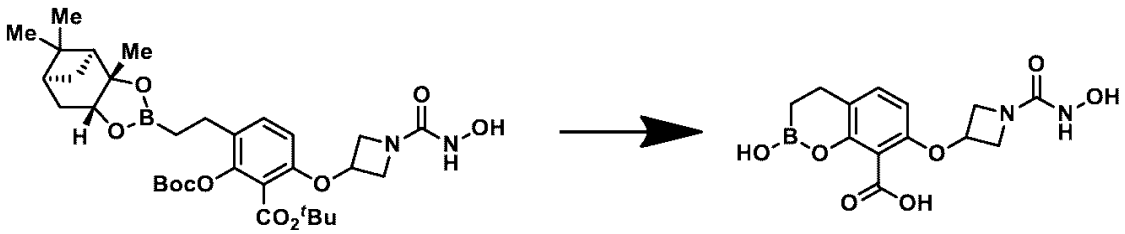
8-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 33)

7-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 34)

[0543]

Example 35: 2-hydroxy-7-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 812]



Phenylboronic acid (10.3 mg), 4 N hydrocholic acid/ethyl acetate solution, and hexane (3.6 mL) were added

to an acetonitrile (0.73 mL) solution of the compound of Reference Example 35. The reaction mixture was stirred for 7 hours at room temperature and allowed to stand overnight. The acetonitrile phase was washed with hexane and concentrated. The residue was washed with acetonitrile to obtain the title compound (0.4 mg).

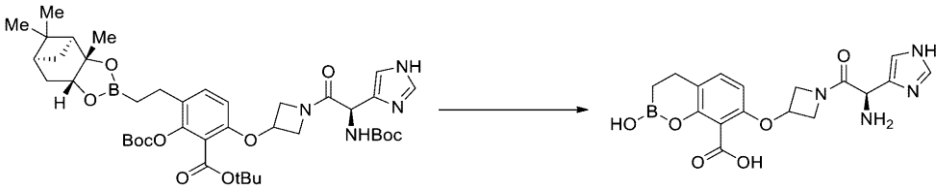
[0544]

LCMS: $[M+H]^+$/Rt = 323/0.489 min[C]

[0545]

Example 36: 7-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 813]



Phenylboronic acid (0.146 g) and 1 N hydrochloric acid/acetic acid solution (25.2 mL) were added to Reference Example (R)-36 (1.0 g). The reaction mixture was stirred for 1 hour at room temperature and then concentrated. The residue was dissolved in methanol (3 mL) and washed twice with heptane (6 mL) (the washing process removes the supernatant (top layer) after standing). The bottom layer was concentrated under reduced pressure, and the resulting residue was purified by reversed phase column chromatography to obtain the title compound (200 mg).

[0546]

^{1}H-NMR (600 MHz, D_2O) δ: 7.56 (1H, m), 6.99 (1H, m), 6.73 (1H, d, J = 8.4 Hz), 5.86 (1H, d, J = 8.4 Hz), 4.86-4.65 (2H, m), 4.51-4.46 (0.5H, m), 4.30-4.14 (2H, m), 3.96-3.82 (1.5H, m), 2.45-2.43 (2H, m), 0.24-0.21 (2H, m).

[0547]

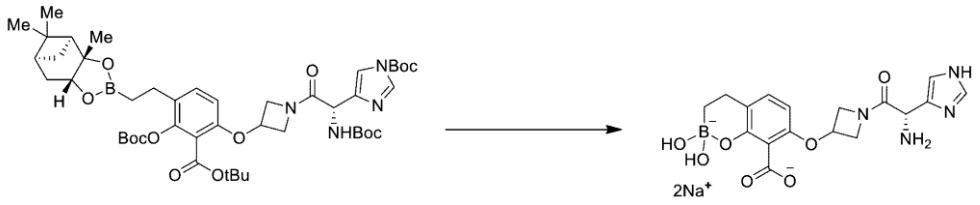
LCMS: $[M+H]^+$/Rt = 387.05/0.421 min[C]

[0548]

Example 37: 8-({1-[(2S)-2-amino-2-(1H-imidazol-4-

yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

[Chemical Formula 814]



Phenylboronic acid (2.46 mg), hexane (0.337 mL), and 4 N hydrochloric acid/cyclopentyl methyl ether solution (0.151 mL) were added to an acetonitrile (0.337 mL) solution of the compound of Reference Example (S)-36 (18.1 mg), and the reaction mixture was stirred for 16 hours at room temperature. After allowing it to stand, the supernatant (top layer) of the reaction solution separated into two layers was removed, and the remaining bottom layer was washed with hexane (the washing process removes the supernatant after standing). The solid produced in the solution at the bottom layer was washed with diethyl ether. The residue of the solid obtained by removing the solvent was dried under reduced pressure. The resulting dried residue was dissolved in water. An aqueous 2 N sodium hydroxide solution (0.1 mL) was added. The mixture was purified by reversed phase column chromatography to obtain the title compound (7.8 mg) as a white solid.

[0549]

LCMS: $[M+H]^+$/Rt = 387.00/0.428 min[C]

[0550]

The column retention times of the compound of Example 36 and the compound of Example 37 in chiral chromatography were the following.

Column: CROWNPAK CR-I(-) (0.30 cm I.D. x 15 cm L) (Daicel Corporation)

Mobile phase: aqueous perchloric acid solution (pH 1.0)/acetonitrile (60% perchloric acid: 1.7%)

Flow rate: 0.5 mL/min

Temperature: 25°C

Rt of compound of Example 36: 6.001 min

Rt of compound of Example 37: 3.968 min

Optical purity of Example 36 (computed by HPLC area percentage value): 98.5% ee

Optical purity of Example 37 (computed by HPLC area percentage value): 98.3% ee

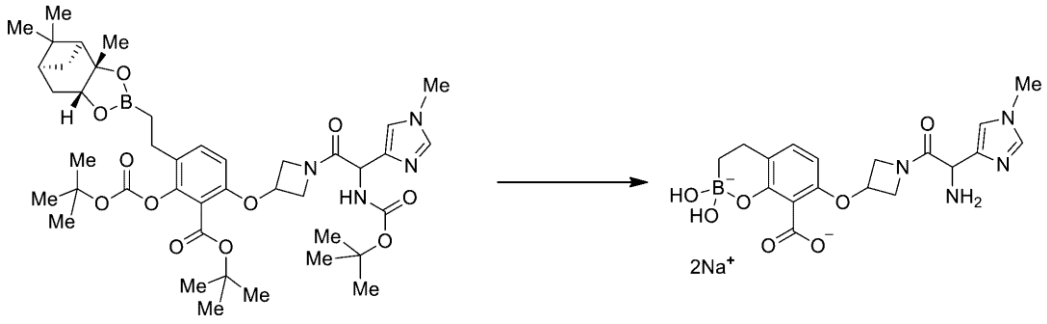
[0551]

The stereostructure of the compound of Example 36 was estimated to be an R form by Mosher's method (reference document for Mosher's method include: The Journal of Organic Chemistry, 2016, 81, 7373).

[0552]

Example 38: 8-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt

[Chemical Formula 815]



Phenylboronic acid (18.6 mg) and 4 N hydrochloric acid/cyclopentyl methyl ether solution (1.21 mL) were added to an acetic acid (1.61 mL) solution of the compound of Reference Example 37 (130 mg) while cooling with ice, and the reaction mixture was stirred for 3 hours at room temperature. The solvent was removed under reduced pressure. The resulting dried residue was dissolved in water. An aqueous 2 N sodium hydroxide solution (0.402 mL) was added, and the mixture was purified by reversed phase column chromatography to obtain the title compound (5 mg) as a

white solid.

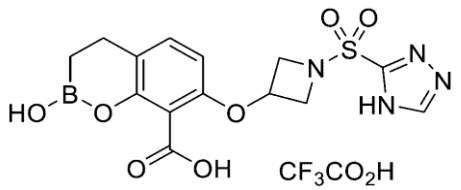
[0553]

LCMS: $[M+H]^+$/Rt = 401.31/0.473 min[C]

[0554]

Example 39: 2-hydroxy-7-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate

[Chemical Formula 816]



Phenylboronic acid (35.6 mg), hexane (2.9 mL), and TFA (2.23 mL) were added to an acetonitrile (2.9 mL) solution of the compound of Reference Example 41 (205 mg), and the reaction mixture was stirred for 5 hours at room temperature. After allowing it to stand, the supernatant (top layer) of the reaction solution separated into two layers was removed, and the remaining bottom layer was washed with hexane (the washing process removes the supernatant after standing). The solid produced in the solution at the bottom layer was washed with diethyl ether. The residue of the solid obtained by removing the solvent was dried under reduced pressure. The resulting dried residue was purified by reversed phase column chromatography to obtain the title compound (39.8 mg) as a colorless solid.

[0555]

^{1}H-NMR (CD_3OD) δ: 8.69 (1H, s), 7.11 (1H, d, J = 8.1 Hz), 6.21 (1H, d, J = 8.1 Hz), 4.95-4.85 (1H, m), 4.44-4.35 (2H, m), 4.04-3.99 (2H, m), 2.65 (2H, t, J = 8.1 Hz), 1.04 (2H, t, J = 8.1 Hz).

[0556]

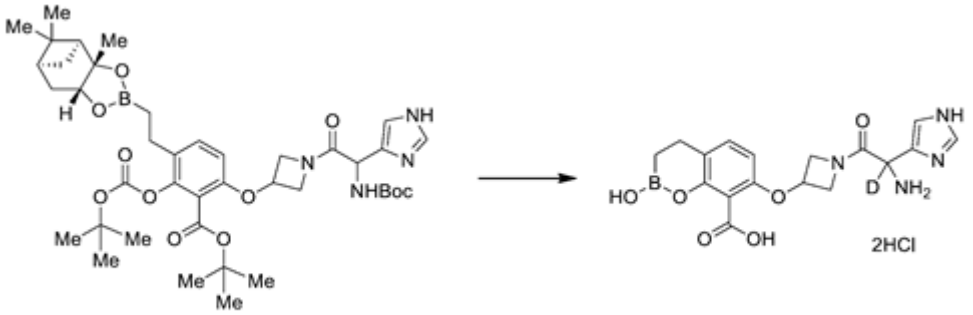
LCMS: $[M+H]^+$/Rt = 395.1/1.24 min[B]

[0557]

Example 40: 7-({1-[2-amino-2-(1H-imidazol-4-

yl)(2H)ethanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid dihydrochloride

[Chemical Formula 817]



Reference Example 36-4 Example 40

Acetic acid-d1 (3 mL) was added to the compound of Reference Example 36-4 (0.3 g, 0.377 mmol), and the reaction mixture was stirred for 4 days at room temperature. Phenylboronic acid (46 mg, 0.377 mmol) and 4 N hydrochloric acid cyclopentyl methyl ether solution (2 mL, 8.0 mmol) were then added, and the reaction mixture was stirred for 4 hours at room temperature. The reaction mixture was dried and solidified under reduced pressure. The resulting dried residue was dissolved in methanol (1 mL), and isopropanol (10 mL) was added. The precipitated solid was filtered out, dried and solidified under reduced pressure. The resulting solid was purified by reversed phase column chromatography, and the resulting dried residue was washed with acetonitrile, dried and solidified under reduced pressure to obtain the title compound (71 mg) as a white solid.

[0558]

^{1}H-NMR (0.1M Na_2CO_3in D_2O) δ: 7.84-7.76 (1H, m), 7.30-7.20 (1H, m), 6.91-6.89 (1H, m), 6.12-6.01 (1H, m), 5.02-4.89 (1H, m), 4.58-3.76 (4H, m), 2.59 (2H, m), 0.55 (2H, m).

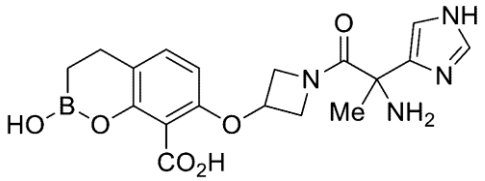
[0559]

LCMS: $[M+H]^+$/Rt = 388.12/0.410 min[C]

[0560]

Example 41: 7-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 818]



A reaction, work-up, and purification were performed using the compound of Reference Example 39 (153 mg, 0.189 mmol) as the starting material by the same method described in Example 36 to obtain the title compound (42 mg) as a white solid.

[0561]

^{1}H-NMR (0.1M Na_2CO_3in D_2O) δ: 7.77 (1H, m), 7.18 (1H, m), 6.83 (1H, m), 5.91 (1H, m), 4.35 (1H, m), 3.95-4.20 (2H, m), 3.30-3.51 (2H, m), 2.57 (2H, m), 1.63 (3H, s), 0.36 (2H, m).

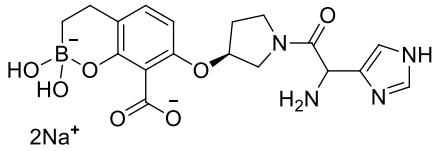
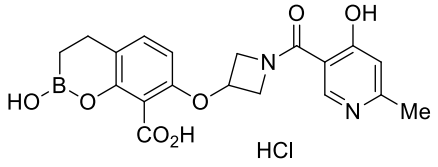
[0562]

LCMS: $[M+H]^+$/Rt = 401.12/0.422 min[C]

[0563]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 56 and 58 as the starting materials by the same method described in Example 37 to obtain Example compounds 42 and 43, respectively. However, if hydrochloride is the final product (Example 43), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-5]

Example	Starting material	Structural formula	NMR and/or LCMS
42	Reference Example 56		LCMS:$[M+H]^+$/Rt = 401.10/0.451min[C]
43	Reference Example 58		LCMS:$[M+H]^+$/Rt = 399.10/0.493min[C] ^{1}H-NMR (CD_3OD) δ: 8.61 (1H, s), 7.21 (1H, s), 7.17 (1H, d, J = 7.9 Hz), 6.34 (1H, d, J = 7.9 Hz), 5.18-5.15 (1H, m), 4.70-4.67 (2H, m), 4.34-4.21 (2H, m), 2.70 (2H, t, J = 7.6 Hz), 2.67 (3H, s), 1.05 (2H, t, J = 7.6 Hz).

[0564]

The names of the compounds of Examples 42 and 43 are described below.

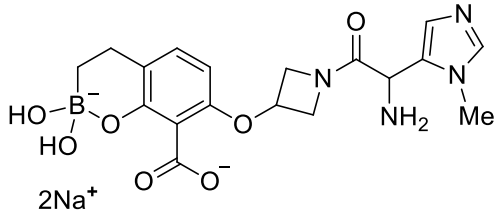
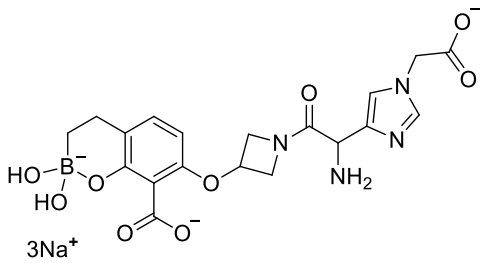
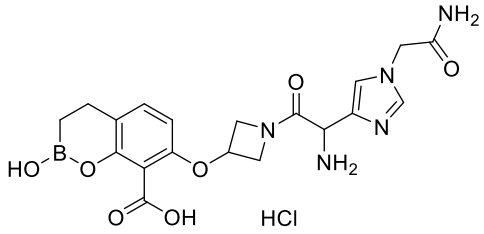
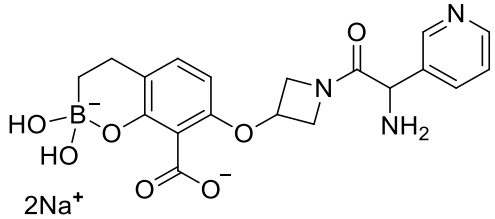
8-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 42)

2-hydroxy-7-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 43)

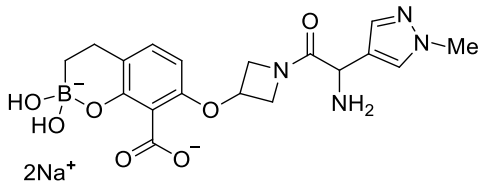
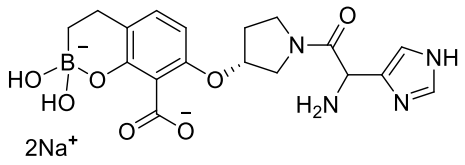
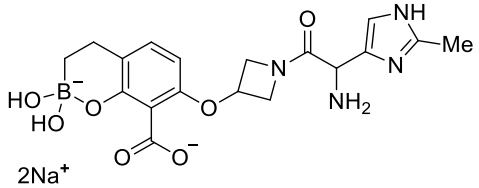
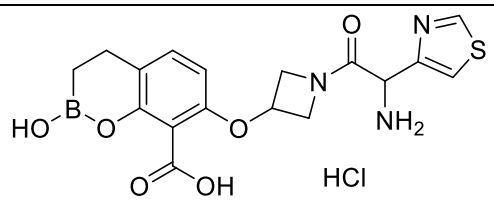
[0565]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 38, 48, 49, 55, 57, 63, 64, and 71 as the starting materials by the same method described in Example 38 to obtain each of the following Example compounds 44 to 51. However, if hydrochloride is the final product (Examples 46 and 51), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-6]

Example	Starting material	Structural formula	NMR and/or LCMS
44	Reference Example 57		LCMS:[M+H]+/Rt=401.20/0.393 min[C]
45	Reference Example 48		LCMS:[M+H]+/Rt=445.2/0.82min[B] 1H-NMR (CD_3OD) δ: 7.57 (1H, s), 7.08 (1H, s), 6.70 (1H, d, J = 8.1 Hz), 5.90 (1H, d, J = 8.1 Hz), 4.98-4.90 (1H, m), 4.62-3.93 (7H, m), 2.55 (2H, t, J = 5.4 Hz), 0.44 (2H, t, J = 5.4 Hz).
46	Reference Example 49		LCMS:[M+H]+/Rt=444.3/0.52min[B] 1H-NMR (CD_3OD) δ: 9.01 (1H, s), 7.88 (1H, s), 7.15 (1H, d, J = 8.1 Hz), 6.35-6.28 (1H, m), 5.55 (1H, d, J = 16.2 Hz), 5.20-4.97 (3H, m), 4.77-3.72 (4H, m), 2.69 (2H, t, J = 8.1 Hz), 1.05 (2H, t, J = 8.1 Hz).
47	Reference Example 63		LCMS:[M+H]+/Rt=398.3/0.82min[B] 1H-NMR (CD_3OD) δ: 8.59 (1H, s), 8.50-8.47 (1H, m), 7.90-7.84 (1H, m), 7.47-7.41 (1H, m), 6.67 (1H, d, J = 8.1 Hz), 5.89-5.85 (1H, m), 5.01-4.94 (1H, m), 4.73-3.73 (5H, m), 2.54 (2H, t, J = 5.4 Hz), 0.41 (2H, t, J = 5.4 Hz).

[Table 3-7]

48	Reference Example 64		LCMS:[M+H]+/Rt=401.3/0.92min[B] ^{1}H-NMR (CD_3OD) δ: 7.61-7.59 (1H, m), 7.47 (1H, s), 6.68 (1H, d, J = 8.1 Hz), 5.90-5.86 (1H, s), 5.00-4.94 (1H, m), 4.64-3.96 (5H, m), 3.86 (3H, s), 2.55 (2H, t, J = 8.1 Hz), 0.41 (2H, t, J = 8.1 Hz).
49	Reference Example 55		LCMS:[M+H]+/Rt=401.05/0.442min[C]
50	Reference Example 38		LCMS:[M+H]+/RT=401.16/0.387min[C] ^{1}H-NMR (D_2O) δ: 6.62 (1H, d, J = 12.8 Hz), 6.48 (1H, d, J = 7.9 Hz), 5.61 (1H, d, J = 7.9 Hz), 4.61-4.49 (2H, m), 4.30-4.26 (1H, m), 4.05-3.94 (1H, m), 3.90-3.81 (1H, m), 3.70-3.63 (1H, m), 2.18 (2H, t, J = 6.4 Hz), 1.94 (3H, d, J = 4.3 Hz), 0.00 (2H, t, J = 6.1 Hz).
51	Reference Example 71		LCMS:[M+H]+/Rt=404.2/0.95min[B] ^{1}H-NMR (CD_3OD) δ: 9.13-9.10 (1H, m), 7.92-7.91 (1H, m), 7.13 (1H, d, J = 8.2 Hz), 6.27 (1H, d, J = 8.2 Hz), 5.50-5.49 (1H, m), 5.12-5.03 (1H, m), 4.73-3.62 (4H, m), 2.68 (2H, t, J = 8.1 Hz), 1.05 (2H, t, J = 8.1 Hz).

[0566]

The names of the compounds of Examples 44 to 51 are described below.

8-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 44)

8-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid trisodium salt (Example 45)

7-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-

yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 46)

8-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 47)

8-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 48)

8-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 49)

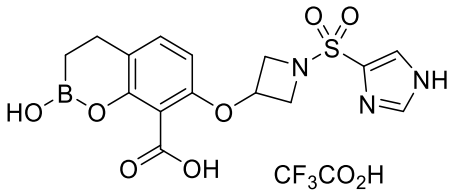
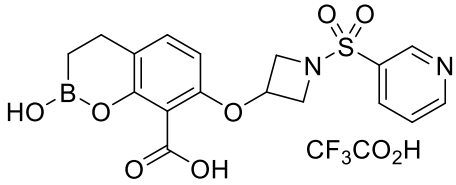
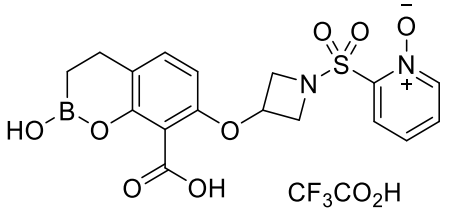
8-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 50)

7-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 51)

[0567]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 106 to 108 as the starting materials by the same method described in Example 38 to obtain the following Example compounds 52 to 54, respectively.

[Table 3-8]

Example	Starting material	Structural formula	NMR and/or LCMS
52	Reference Example 106		LCMS:[M+H]+/Rt=394.4/1.20minB 1H-NMR (CD_3OD) δ: 8.07 (1H, s), 7.87 (1H, s), 7.12 (1H, d, J = 8.1 Hz), 6.23 (1H, d, J = 8.1 Hz), 4.93-4.87 (1H, m), 4.34-4.26 (2H, m), 3.91-3.88 (2H, m), 2.66 (2H, t, J = 8.1 Hz), 1.04 (2H, t, J = 8.1 Hz).
53	Reference Example 107		LCMS:[M+H]+/Rt=405.3/1.41minB 1H-NMR (CD_3OD) δ: 9.00 (1H, s), 8.87 (1H, d, J = 5.4 Hz), 8.31 (1H, d, J = 8.1 Hz), 7.74-7.00 (1H, m), 7.10 (1H, d, J = 8.1 Hz), 6.22 (1H, d, J = 8.1 Hz), 4.97-4.65 (1H, m), 4.33-4.27 (2H, m), 3.83-3.77 (2H, m), 2.65 (2H, t, J = 8.1 Hz), 1.02 (2H, t, J = 8.1 Hz).
54	Reference Example 108		LCMS:[M+H]+/Rt=421.3/1.30minB 1H-NMR (CD_3OD) δ: 8.46-8.36 (1H, m), 8.06 (1H, dd, J = 5.4 Hz, 2.7 Hz), 7.70-7.57 (2H, m), 7.12 (1H, d, J = 8.1 Hz), 6.28 (1H, d, J = 8.1 Hz), 5.08-5.00 (1H, m), 4.61-4.55 (2H, m), 4.33-4.26 (2H, m), 2.65 (2H, t, J = 8.1 Hz), 1.05 (2H, t, J = 8.1 Hz).

[0568]

The names of the compounds of Examples 52 to 54 are described below.

2-hydroxy-7-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 52)

2-hydroxy-7-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 53)

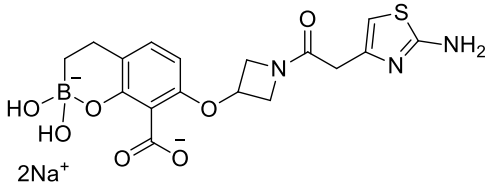
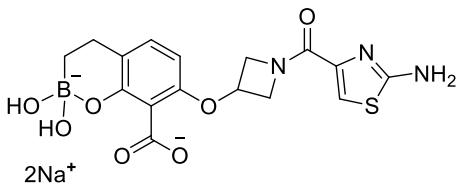
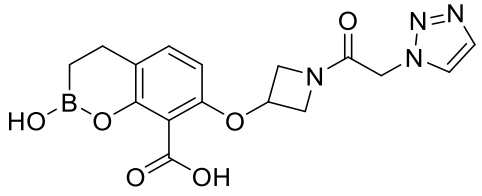
2-hydroxy-7-{[1-(1-oxo-1λ5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 54)

[0569]

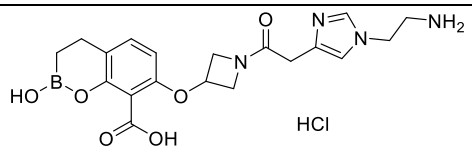
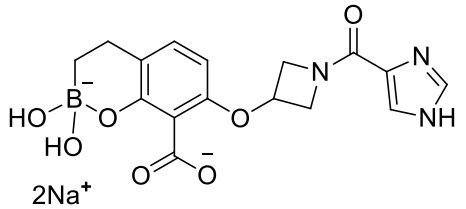
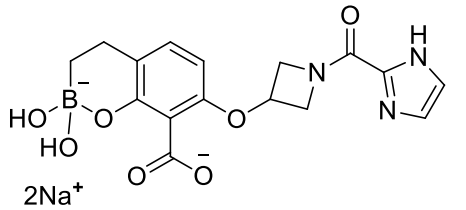
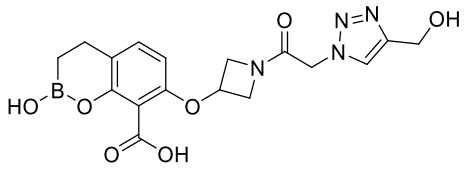
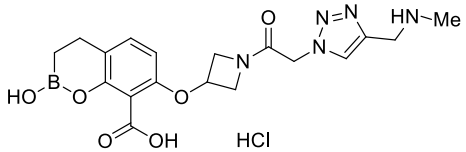
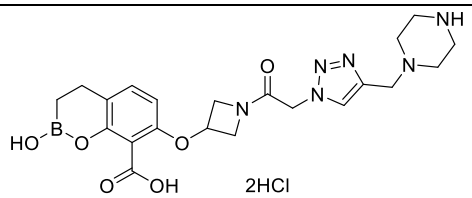
A reaction, work-up, and purification were performed using the compounds of Reference Examples 40, 43 to 47, 50, 51, 59, 65, 66, 69, 70, 114 to 116, and 127 as the starting materials by the same method described in Example 4 to

obtain the following Example compounds 55 to 71 (corresponding starting materials are not in order). However, if a free form is the final product (Examples 57, 61, 64, 65, 67, and 71), the free form was obtained from purifying the compound without sodium hydroxide treatment. If hydrochloride is the final product (Examples 58, 62, and 63), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

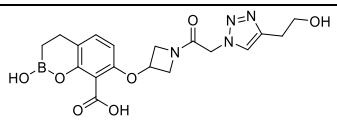
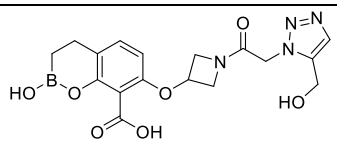
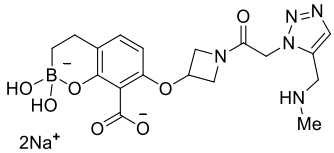
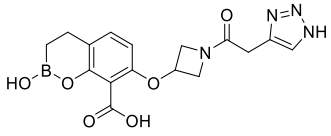
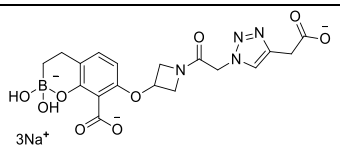
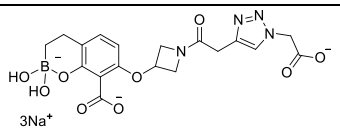
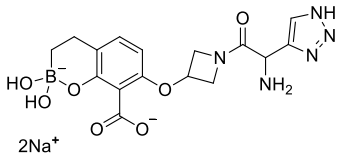
[Table 3-9]

Example	Starting material	Structural formula	NMR and/or LCMS
55	Reference Example 65		LCMS:[M+H]+/Rt=404.4/1.03min[B] 1H-NMR (CD_3OD) δ: 6.69 (1H, d, J = 8.2 Hz), 6.31 (1H, s), 5.90 (1H, d, J = 8.2 Hz), 5.00-4.86 (1H, m), 4.63-4.47 (1H, m), 4.39-4.21 (2H, m), 4.08-3.96 (1H, m), 3.41-3.35 (2H, m), 2.63-2.49 (2H, m), 0.48-0.35 (2H, m).
56	Reference Example 66		LCMS:[M+H]+/Rt=390.2/1.16min[B] 1H-NMR (CD_3OD) δ: 7.24 (1H, s), 6.72 (1H, d, J = 8.1 Hz), 5.94 (1H, d, J = 8.1 Hz), 4.95-4.90 (2H, m), 4.62-4.56 (1H, m), 4.47-4.41 (1H, m), 4.16-4.12 (1H, m), 2.59-2.54 (2H, m), 0.47-0.42 (2H, m).
57	Reference Example 69		LCMS:[M+H]+/Rt=373.22/1.62min[D] 1H-NMR (CD_3OD) δ: 8.11 (1H, d, J = 1.1 Hz), 7.91 (1H, s), 7.22-7.13 (1H, m), 6.40-6.28 (1H, m), 5.32 (2H, s), 5.16-5.10 (1H, m), 4.74-4.66 (1H, m), 4.50-4.42 (1H, m), 4.37-4.31 (1H, m), 4.10-4.02 (1H, m), 2.77-2.62 (2H, m), 1.10-1.01 (2H, m).

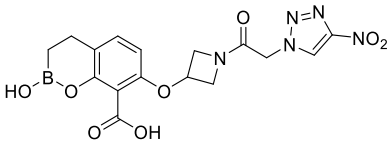
[Table 3-10]

58	Reference Example 70		LCMS:[M+H]+/Rt=415.2/0.52min[B] 1H-NMR (CD_3OD) δ: 9.04 (1H, s), 7.63 (1H, s), 7.18 (1H, d, J = 8.1 Hz), 6.37 (1H, d, J = 8.1 Hz), 5.15-5.12 (1H, m), 4.79-4.73 (1H, m), 4.60 (2H, t, J = 5.4 Hz), 4.54-4.33 (2H, m), 4.18-4.02 (1H, m), 3.79 (2H, s), 3.53 (2H, t, J = 5.4 Hz), 2.71-2.65 (2H, m), 1.10-1.04 (2H, m).
59	Reference Example 40		LCMS:[M+H]+/Rt=358.2/0.90min[B] 1H-NMR (CD_3OD) δ: 7.81 (1H, s), 7.67 (1H, s), 6.93 (1H, d, J = 8.1 Hz), 6.11 (1H, d, J = 8.1 Hz), 5.14-5.03 (1H, m), 4.92-4.73 (1H, m), 4.59-4.52 (2H, m), 4.24-4.19 (1H, m), 2.60 (2H, t, J = 8.1 Hz), 0.40 (2H, t, J = 8.1 Hz).
60	Reference Example 127		LCMS:[M+H]+/Rt=358.1/1.17min[B] 1H-NMR (CD_3OD) δ: 7.28 (2H, s), 6.93 (1H, d, J = 8.1 Hz), 6.11 (1H, d, J = 8.1 Hz), 5.16-5.09 (1H, m), 5.04-4.71 (1H, m), 4.67-4.55 (2H, m), 4.27-4.21 (1H, m), 2.61 (2H, t, J = 8.1 Hz), 0.41 (2H, t, J = 8.1 Hz).
61	Reference Example 43		LCMS:[M+H]+/Rt=403.17/1.58min[D] 1H-NMR (CD_3OD) δ: 8.06 (1H, s), 7.21-7.12 (1H, m), 6.41-6.27 (1H, m), 5.31 (2H, s), 5.16-5.10 (1H, m), 4.77-4.67 (3H, m), 4.50-4.42 (1H, m), 4.38-4.31 (1H, m), 4.10-4.02 (1H, m), 2.74-2.63 (2H, m), 1.06 (2H, t, J = 7.7 Hz).
62	Reference Example 114		LCMS:[M+H]+/Rt=416.30/1.25min[D] 1H-NMR (CD_3OD) δ: 8.12 (1H, s), 7.23-7.10 (1H, m), 6.41-6.29 (1H, m), 5.30 (2H, s), 5.18-5.10 (1H, m), 4.78-4.71 (1H, m), 4.50-4.43 (1H, m), 4.40-4.28 (3H, m), 4.11-4.03 (1H, m), 2.79-2.65 (5H, m), 1.10-1.02 (2H, m).
63	Reference Example 115		LCMS:[M+H]+/Rt=471.27/1.15min[D] 1H-NMR (CD_3OD) δ: 8.29 (1H, s), 7.21-7.13 (1H, m), 6.40-6.30 (1H, m), 5.34 (2H, s), 5.19-5.13 (1H, m), 4.79-4.73 (1H, m), 4.64 (2H, s), 4.50-4.45 (1H, m), 4.41-4.36 (1H, m), 4.11-4.04 (1H, m), 3.71-3.54 (8H, m), 2.74-2.66 (2H, m), 1.10-1.03 (2H, m).

[Table 3-11]

64	Reference Example 116		LCMS:[M+H]+/Rt=417.26/1.56minD 1H-NMR (CD_3OD) δ: 8.10 (1H, s), 7.23-7.13 (1H, m), 6.43-6.28 (1H, m), 5.36 (2H, s), 5.19-5.12 (1H, m), 4.76-4.68 (1H, m), 4.52-4.44 (1H, m), 4.38-4.32 (1H, m), 4.13-4.06 (1H, m), 3.90-3.78 (2H, m), 3.04-2.95 (2H, m), 2.78-2.65 (2H, m), 1.12-1.00 (2H, m).
65	Reference Example 44		LCMS:[M+H]+/Rt=403.35/1.44minD 1H-NMR (CD_3OD) δ: 7.77 (1H, s), 7.23-7.12 (1H, m), 6.44-6.25 (1H, m), 5.35-5.31 (2H, m), 5.16-5.12 (1H, m), 4.76-4.70 (3H, m), 4.51-4.44 (1H, m), 4.40-4.32 (1H, m), 4.11-4.04 (1H, m), 2.77-2.65 (2H, m), 1.10-1.03 (2H, m).
66	Reference Example 45		LCMS:[M+H]+/Rt=416.34/1.12minD 1H-NMR (D_2O) δ: 7.76 (1H, s), 6.89 (1H, d, J = 8.0 Hz), 6.06 (1H, d, J = 8.0 Hz), 5.33-5.22 (2H, m), 5.12-5.06 (1H, m), 4.74-4.67 (1H, m), 4.49-4.36 (2H, m), 4.16-4.10 (1H, m), 3.79 (2H, s), 2.62-2.54 (2H, m), 2.34 (3H, s), 0.41-0.33 (2H, m).
67	Reference Example 59		LCMS:[M+H]+/Rt=373.35/1.59minD 1H-NMR (CD_3OD) δ: 8.19 (1H, s), 7.21-7.07 (1H, m), 6.42-6.21 (1H, m), 5.09-5.05 (1H, m), 4.72-4.65 (1H, m), 4.43-4.36 (1H, m), 4.35-4.28 (1H, m), 4.03-3.95 (1H, m), 3.84 (2H, s), 2.71-2.61 (2H, m), 1.06-0.97 (2H, m).
68	Reference Example 46		LCMS:[M+H]+/Rt=431.12/1.71minD 1H-NMR (D_2O) δ: 7.84 (1H, d, J = 6.9 Hz), 6.92 (1H, d, J = 8.0 Hz), 6.09 (1H, d, J = 8.0 Hz), 5.33-5.22 (2H, m), 5.12-5.05 (1H, m), 4.72-4.66 (1H, m), 4.50-4.43 (1H, m), 4.43-4.37 (1H, m), 4.16-4.10 (1H, m), 3.64 (2H, s), 2.64-2.56 (2H, m), 0.51-0.42 (2H, m).
69	Reference Example 47		LCMS:[M+H]+/Rt=431.16/1.44minD 1H-NMR (D_2O) δ: 7.86 (1H, s), 6.89 (1H, d, J = 8.0 Hz), 6.06 (1H, d, J = 8.0 Hz), 5.06-5.00 (3H, m), 4.70-4.65 (1H, m), 4.44-4.35 (2H, m), 4.11-4.05 (1H, m), 3.80-3.67 (2H, m), 2.62-2.55 (2H, m), 0.41-0.34 (2H, m).
70	Reference Example 50		LCMS:[M+H]+/R=388.35/0.93minD 1H-NMR (D_2O) δ: 7.77-7.72 (1H, m), 6.92-6.84 (1H, m), 6.05-5.93 (1H, m), 5.03-4.85 (2H, m), 4.64-3.91 (4H, m), 2.62-2.49 (2H, m), 0.49-0.37 (2H, m).

[Table 3-12]

71	Reference Example 51		LCMS:[M+H]+/R=418.13/2.03minD 1H-NMR (CD_3OD) δ: 8.92 (1H, s), 7.22-7.13 (1H, m), 6.40-6.12 (1H, m), 5.41-5.34 (2H, m), 5.19-5.12 (1H, m), 4.78-4.71 (1H, m), 4.52-4.45 (1H, m), 4.44-4.37 (1H, m), 4.13-4.06 (1H, m), 2.76-2.66 (2H, m), 1.11-1.02 (2H, m).

[0570]

The names of the compounds of Examples 55 to 71 are described below.

8-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-

yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 55)

8-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 56)

2-hydroxy-7-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 57)

7-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 58)

4,4-dihydroxy-8-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 59)

4,4-dihydroxy-8-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 60)

2-hydroxy-7-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 61)

2-hydroxy-7-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 62)

2-hydroxy-7-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid dihydrochloride (Example 63)

2-hydroxy-7-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 64)

2-hydroxy-7-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-

benzoxaborinine-8-carboxylic acid (Example 65)

4,4-dihydroxy-8-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 66)

2-hydroxy-7-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 67)

8-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid trisodium salt (Example 68)

8-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid trisodium salt (Example 69)

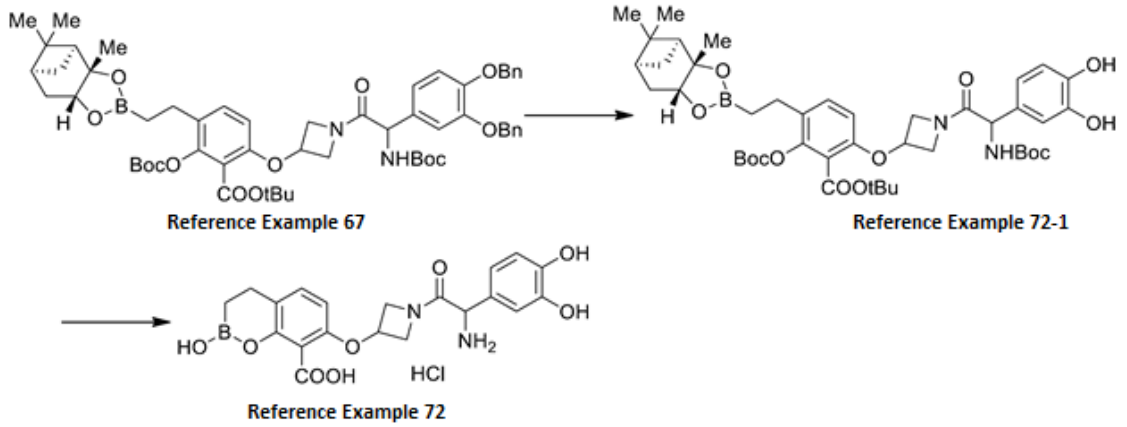
8-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 70)

2-hydroxy-7-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 71)

[0571]

Example 72: 7-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride

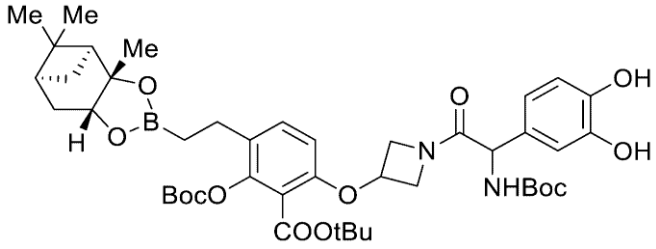
[Chemical Formula 819]



[0572]

Example 72-1: tert-butyl 6-[(1-{[(tert-butoxycarbonyl)amino](3,4-dihydroxyphenyl)acetyl}azetidin-3-yl)oxy]-2-[(tert-butoxycarbonyl)oxy]-3-{2-[(3aS,4S,6S,7aR)-3a,5,5-trimethylhexahydro-2H-4,6-methano-1,3,2-benzodioxaborol-2-yl]ethyl}benzoate

[Chemical Formula 820]



Palladium on carbon (19 mg, Pd content: 10%, wetted with ca. 55% water) was added to a methanol solution (2 mL) of the compound of Reference Example 67 (190 mg, 0.187 mmol), and the reaction mixture was stirred for 2.5 hours under a hydrogen atmosphere at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methanol, and the combined filtrate was concentrated to obtain the title compound (143 mg) as a colorless amorphous compound.

[0573]

^{1}H-NMR ($CDCl_3$) δ: 7.19 (1H, d, J = 8.1 Hz), 6.93 (1H, d, J = 16.2 Hz), 6.82-6.71 (2H, m), 6.32 (1H, d, J = 8.1 Hz), 5.99 (1H, br), 5.77-5.65 (1H, m), 5.08-3.80 (7H, m), 2.63-

2.56 (2H, m), 2.36-2.27 (1H, m), 2.19-2.12 (1H, m), 2.04-1.99 (1H, m), 1.89-1.77 (2H, m), 1.63-1.39 (27H, m), 1.35 (3H, s), 1.28 (3H, s), 1.12-1.00 (3H, m), 0.83 (3H,s).

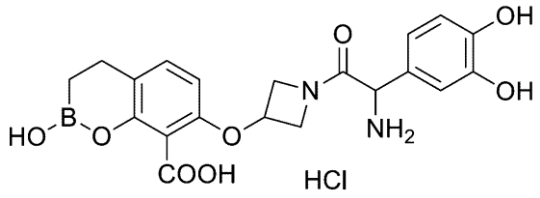
[0574]

LCMS: $[M+H]^+$/Rt = 837.7/2.83 min[B]

[0575]

Example 72: 7-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride

[Chemical Formula 821]



Phenylboronic acid (18.7 mg, 0.153 mmol), hexane (1.5 mL), and 4 N hydrochloric acid/dioxane solution (0.76 mL) were added to an acetonitrile solution (1.5 mL) of the compound of Example 72-1 (128 mg, 0.153 mmol), and the reaction mixture was stirred for 17 hours at room temperature. The reaction solution was allowed to stand. The supernatant (top layer) was removed, and hexane (5 mL) was added to the remaining bottom layer. After stirring and then allowing it to stand, the supernatant was removed. This was repeated 5 times. Diethyl ether (5 mL) was added to the bottom layer. After stirring and then allowing it to stand, the supernatant (top layer) was removed. This was repeated 3 times. The resulting residue was dried under reduced pressure. Since an intermediate (Boc-undeprotected form of the title compound) was also found in the resulting residue, a 4 N hydrochloric acid/dioxane solution (3.0 mL) was further added. The reaction mixture was stirred for 21 hours at room temperature, and the reaction solution was concentrated. The resulting residue was dissolved in methanol (1.5 mL) and purified by reversed phase column

chromatography to obtain the title compound (19.3 mg) as a light yellow solid.

[0576]

^{1}H-NMR (CD_3OD) δ: 7.25-7.05 (1H, m), 6.91-6.79 (3H, m), 6.25-6.00 (1H, m), 5.09-4.94 (1H, m), 4.63-3.98 (3H, m), 3.76-3.53 (2H, m), 2.81-2.39 (2H, m), 1.16-0.51 (2H, m).

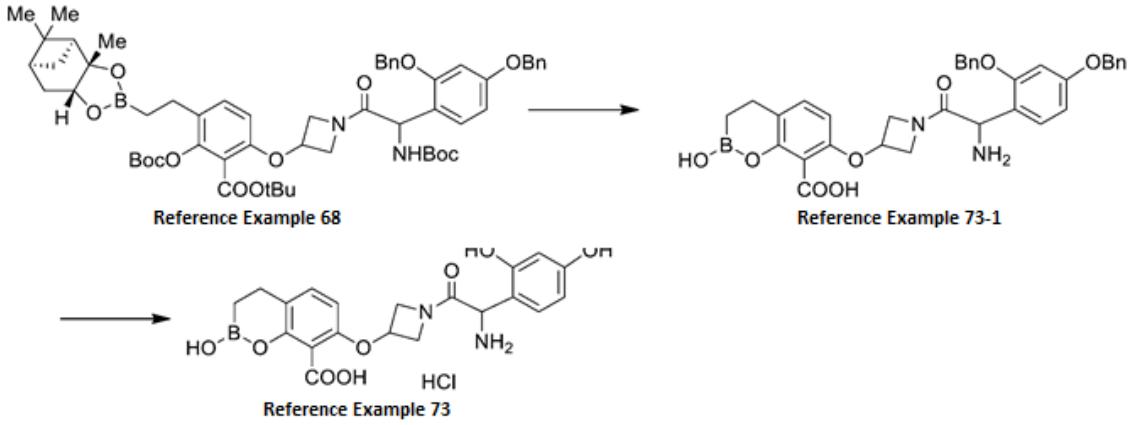
[0577]

LCMS: $[M+H]^+$/Rt = 429.2/0.96 min^B

[0578]

Example 73: 7-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride

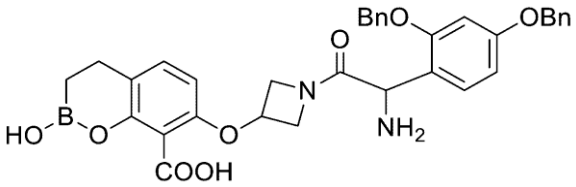
[Chemical Formula 822]



[0579]

Example 73-1: 7-[(1-{amino[2,4-bis(benzyloxy)phenyl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 823]



A reaction, work-up, and purification were performed using the compound of Reference Example 68 (195 mg, 0.192 mmol) as the starting material by the same method described in Example 72 to obtain the title compound (78 mg) as a

colorless solid.

[0580]

^{1}H-NMR (CD_3OD) δ: 7.45-7.26 (11H, m), 7.14-7.11 (1H, m), 6.87-6.79 (1H, m), 6.74-6.65 (1H, m), 6.16 (1H, brs), 5.25-5.04 (5H, m), 5.03-4.91 (1H, m), 4.48-3.90 (3H, m), 3.77-3.60 (1H, m), 2.73-2.64 (2H, m), 1.09-1.02 (2H, m).

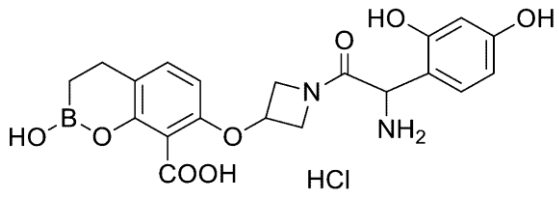
[0581]

LCMS: $[M+H]^+$/Rt = 609.6/1.80 min^B

[0582]

Example 73: 7-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride

[Chemical Formula 824]



Palladium on carbon (13 mg, Pd content: 10%, wetted with ca. 55% water) was added to a THF solution (25 mL) of the compound of Example 73-1 (65.1 mg, 0.101 mmol), and the reaction mixture was stirred for 2.5 hours under a hydrogen atmosphere at room temperature. Subsequently, methanol (0.25 mL) was added, and the reaction mixture was stirred for 4 days at room temperature. Subsequently, palladium on carbon (13 mg) was added, and the reaction mixture was stirred for 1 day at room temperature. Palladium on carbon (13 mg) was further added, and the reaction mixture was stirred for 5 days at room temperature. The reaction solution was filtered through cellulose. The filtered substance was washed with methanol, and the combined filtrate was concentrated. The resulting residue was dissolved in methanol (2 mL) and purified by reversed phase column chromatography to obtain the title compound (9.0 mg) as a colorless solid.

[0583]

^{1}H-NMR (CD_3OD) δ: 7.13-5.98 (5H, m), 5.23-5.19 (1H, m), 5.04-4.79 (1H, m), 4.51-3.47 (4H, m), 2.85-1.93 (2H, m), 1.16-0.65 (2H, m).

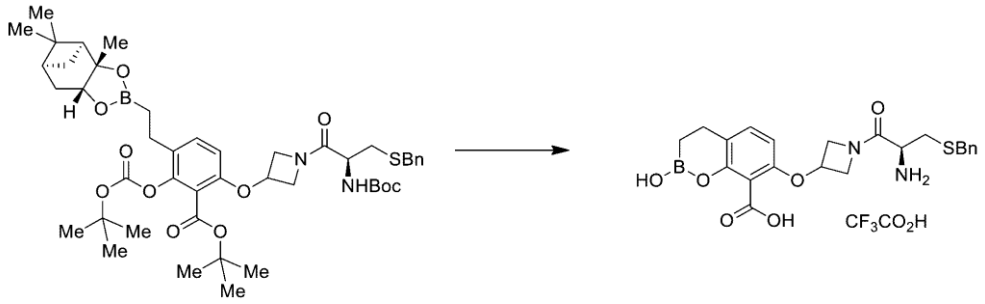
[0584]

LCMS: $[M+H]^+$/Rt = 429.2/0.94 min^B

[0585]

Example 74: 7-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine 8-carboxylic acid trifluoroacetate

[Chemical Formula 825]



Trifluoroacetic acid (3.3 mL) was added to the compound of Reference Example 72 (106 mg), and the reaction mixture was stirred for 8 hours at room temperature. The reaction mixture was dried and solidified under reduced pressure. The resulting dried residue was purified by reversed phase column chromatography. The resulting dried residue was washed with acetonitrile, dried and solidified under reduced pressure to obtain the title compound (24.6 mg) as a white solid.

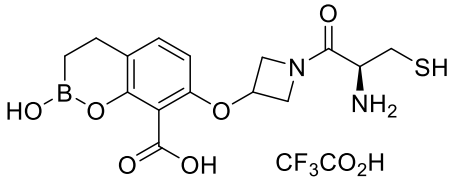
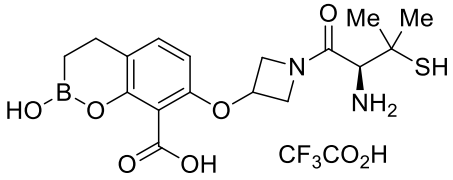
[0586]

LCMS: $[M+H]^+$/Rt = 865.61/1.332 min^A

[0587]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 73 and 74 as the starting materials by the same method described in Reference Example 74 to obtain the following Example compounds 75 and 76, respectively.

[Table 3-13]

Example	Starting material	Structural formula	NMR and/or LCMS
75	Reference Example 73		LCMS:M+H]+/Rt=367.09/0.495 min[C] 1H-NMR (400 MHz, CD_3OD) δ: 7.19-7.11 (1H, m), 6.16-6.12 (1H, m), 5.07-5.02 (2H, m), 4.53-4.33 (2H, m), 4.23-4.06 (2H, m), 3.07-2.99 (1H, m), 2.89-2.82 (1H, m), 2.76-2.68 (1H, m), 2.62-2.50 (1H, m), 1.07-0.67 (2H, m).
76	Reference Example 74		LCMS:M+H]+/Rt=395.17/0.489 min[C] 1H-NMR (400 MHz, CD_3OD) δ: 7.19-7.12 (1H, m), 6.37-6.13 (1H, m), 5.06-5.01 (2H, m), 4.77-4.73 (1H, m), 4.52-4.39 (2H, m), 4.18-3.99 (2H, m), 2.76-2.53 (2H, m), 1.54 (3H, s), 1.46 (3H, s), 1.08-0.68 (2H, m).

[0588]

The names of the compounds of Examples 75 and 76 are described below.

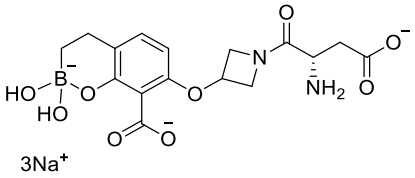
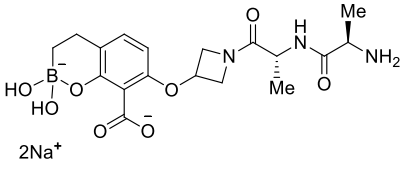
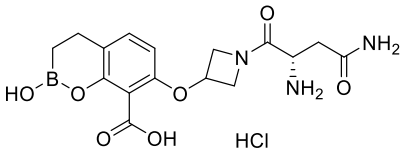
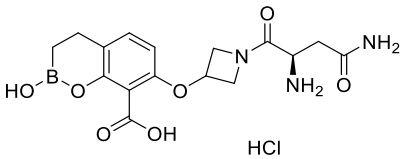
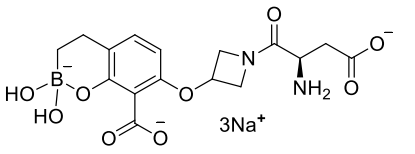
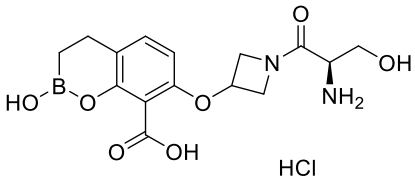
7-[(1-D-cysteinylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 75)

2-hydroxy-7-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 76)

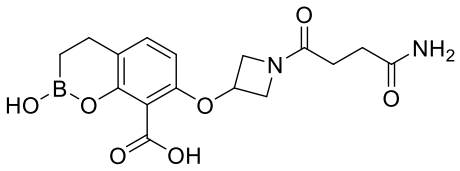
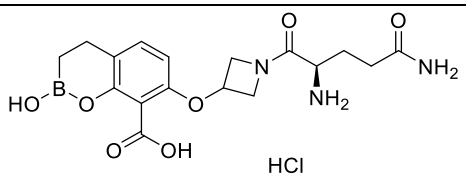
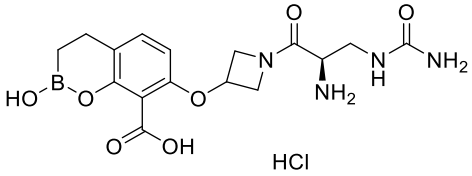
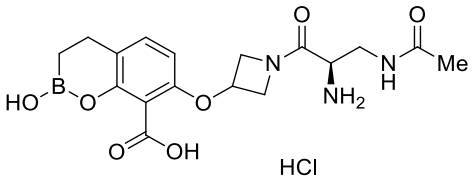
[0589]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 42, 52, 76 to 78, and 109 to 113 as the starting materials by the same method described in Example 38 to obtain the following Example compounds 77 to 86 (corresponding starting materials are not in order). However, if a free form is the final product (Example 83), the free form was obtained from purifying the compound without sodium hydroxide treatment. If hydrochloride is the final product (Examples 79, 80, 82, and 84 to 86), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-14]

Example	Starting material	Structural formula	NMR and/or LCMS
77	Reference Example 76		LCMS:[M+H]+/Rt=379.1/0.76min[B] 1H-NMR (CD_3OD) δ: 6.71 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.00-4.93 (1H, m), 4.73-4.61 (1H, m), 4.37-4.27 (2H, m), 4.05-4.01 (1H, m), 3.79-3.71 (1H, m), 2.59-2.47 (3H, m), 2.38-2.25 (1H, m), 0.41 (2H, t, J = 8.1 Hz).
78	Reference Example 77		LCMS:[M+H]+/Rt=406.3/1.00min[B] 1H-NMR (CD_3OD) δ: 6.73 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.05-4.95 (1H, m), 4.75-4.53 (1H, m), 4.48-4.28 (3H, m), 4.08-3.98 (1H, m), 3.66-3.42 (1H, m), 2.57 (2H, d, J = 8.1 Hz), 1.32-1.25 (6H, m), 0.45 (2H, t, J = 8.1 Hz).
79	Reference Example 42		LCMS:[M+H]+/Rt=378.2/0.81min[B] 1H-NMR (CD_3OD) δ: 7.21-7.11 (1H, m), 6.38-6.10 (1H, m), 5.16-4.98 (1H, m), 4.78-4.64 (1H, m), 4.54-4.26 (3H, m), 4.12-4.02 (1H, m), 2.90-2.54 (4H, m), 1.10-0.64 (2H, m).
80	Reference Example 109		LCMS:[M+H]+/Rt=378.2/0.58min[B] 1H-NMR (CD_3OD) δ: 7.18 (1H, d, J = 8.1 Hz), 6.35 (1H, d, J = 8.1 Hz), 5.17-5.07 (1H, m), 4.79-4.72 (1H, m), 4.55-4.27 (3H, m), 4.12-4.01 (1H, m), 2.92-2.64 (4H, m), 1.07 (2H, t, J = 8.1 Hz).
81	Reference Example 78		LCMS:[M+H]+/Rt=379.1/0.56min[B] 1H-NMR (CD_3OD) δ: 6.72 (1H, d, J = 8.1 Hz), 5.94 (1H, d, J = 8.1 Hz), 5.00-4.92 (1H, m), 4.73-4.61 (1H, m), 4.37-4.27 (2H, m), 4.06-4.00 (1H, m), 3.80-3.72 (1H, m), 2.59-2.47 (3H, m), 2.39-2.26 (1H, m), 0.44 (2H, t, J = 8.1 Hz).
82	Reference Example 52		LCMS:[M+H]+/Rt=351.0/0.48min[B] 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.2 Hz), 6.35 (1H, d, J = 8.1 Hz), 5.18-5.09 (1H, m), 4.79-4.70 (1H, m), 4.55-4.33 (2H, m), 4.12-4.02 (2H, m), 3.92-3.84 (1H, m), 3.80-3.73 (1H, m), 2.70 (2H, t, J = 8.1 Hz), 1.06 (2H, t, J = 8.1 Hz).

[Table 3-15]

83	Reference Example 110		LCMS:[M+H]+/Rt=363.0/0.97minB 1H-NMR (CD_3OD) δ: 7.18-7.09 (1H, m), 6.33-6.09 (1H, m), 5.10-5.02 (1H, m), 4.67-4.62 (1H, m), 4.40-4.34 (1H, m), 4.28-4.23 (1H, m), 3.99-3.94 (1H, m), 2.72-2.38 (6H, m), 1.09-0.91 (2H, m).
84	Reference Example 111		LCMS:[M+H]+/Rt=392.1/0.79minB 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.2 Hz), 6.40-6.30 (1H, m), 5.17-5.08 (1H, m), 4.77-4.71 (1H, m), 4.54-4.31 (2H, m), 4.14-4.02 (2H, m), 2.70 (2H, t, J = 8.1 Hz), 2.48-2.42 (2H, m), 2.15-2.00 (2H, m), 1.06 (2H, t, J = 8.1 Hz).
85	Reference Example 113		LCMS:[M+H]+/Rt=393.1/0.47minB 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.2 Hz), 6.35 (1H, d, J = 8.2 Hz), 5.17-5.08 (1H, m), 4.81-4.72 (1H, m), 4.55-4.30 (2H, m), 4.17-4.03 (2H, m), 3.60-3.40 (2H, m), 2.70 (2H, t, J = 8.1 Hz), 1.06 (2H, t, J = 8.1 Hz).
86	Reference Example 112		LCMS:[M+H]+/Rt=392.1/0.86minB 1H-NMR (CD_3OD) δ: 7.18 (1H, d, J = 8.2 Hz), 6.39-6.30 (1H, m), 5.18-5.09 (1H, m), 4.80-4.72 (1H, m), 4.55-4.32 (2H, m), 4.21-4.03 (2H, m), 3.60-3.42 (2H, m), 2.70 (2H, t, J = 8.1 Hz), 2.01-1.98 (3H, m), 1.06 (2H, t, J = 8.1 Hz).

[0590]

The names of the compounds of Examples 77 to 86 are described below.

8-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid trisodium salt (Example 77)

8-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 78)

7-[(1-L-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 79)

7-[(1-D-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 80)

8-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid trisodium salt (Example 81)

2-hydroxy-7-[(1-D-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 82)

7-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 83)

7-[(1-D-glutaminylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 84)

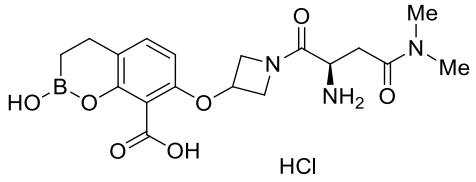
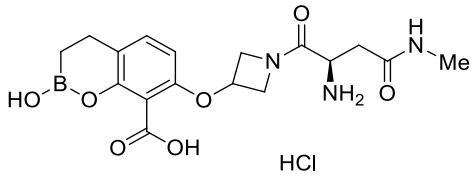
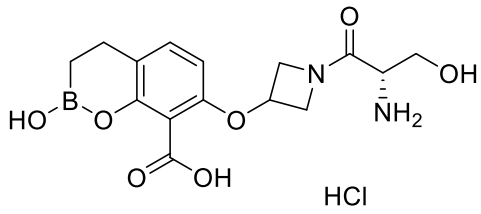
7-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 85)

1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 86)

[0591]

The following Example compounds 87 to 89 (corresponding starting materials are not in order) were obtained by performing a reaction and work-up using the compounds of Reference Examples 53, 54, and 75 as the starting materials by the same method described in Example 4, and purifying the compounds by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-16]

Example	Starting material	Structural formula	NMR and/or LCMS
87	Reference Example 54	 HCl	LCMS:[M+H]+/Rt = 406.36/1.38 min[D] ^{1}H-NMR (CD_3OD) δ: 7.22-7.12 (1H, m), 6.41-6.28 (1H, m), 5.17-5.07 (1H, m), 4.83-4.68 (1H, m), 4.54-4.24 (3H, m), 4.13-4.00 (1H, m), 3.11-2.77 (8H, m), 2.75-2.64 (2H, m), 1.10-1.00 (2H, m).
88	Reference Example 53	 HCl	LCMS:[M+H]+/Rt=392.19/1.43min [D] ^{1}H-NMR (CD_3OD) δ: 7.24-7.10 (1H, m), 6.46-6.23 (1H, m), 5.18-5.09 (1H, m), 4.79-4.68 (1H, m), 4.57-4.27 (3H, m), 4.22-3.98 (1H, m), 2.85-2.61 (7H, m), 1.10-1.03 (2H, m).
89	Reference Example 75	 HCl	LCMS:[M+H]+/Rt = 351.21/0.97 min[D] ^{1}H-NMR (CD_3OD) δ: 7.20-7.14 (1H, m), 6.40-6.28 (1H, m), 5.17-5.09 (1H, m), 4.78-4.70 (1H, m), 4.56-4.41 (1H, m), 4.39-4.32 (1H, m), 4.14-4.02 (2H, m), 3.92-3.85 (1H, m), 3.81-3.74 (1H, m), 2.75-2.65 (2H, m), 1.12-1.03 (2H, m).

[0592]

The names of the compounds of Examples 87 to 89 are described below.

7-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 87)

2-hydroxy-7-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 88)

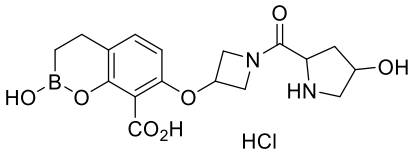
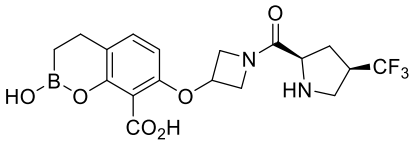
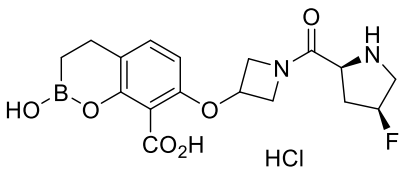
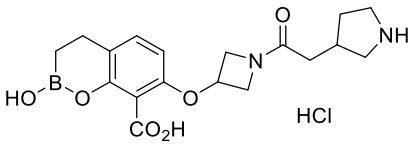
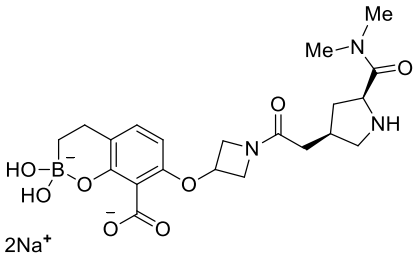
2-hydroxy-7-[(1-L-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid hydrochloride (Example 89)

[0593]

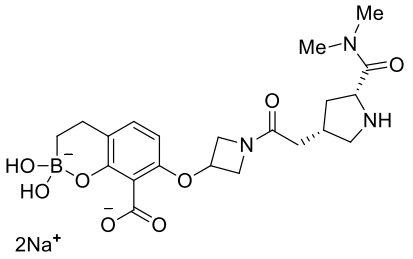
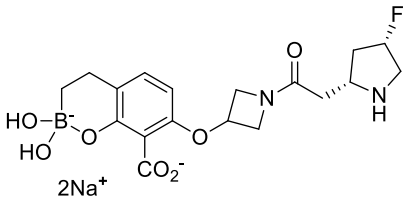
A reaction, work-up, and purification were performed using the compounds of Reference Examples 60, 62, 79 to 81, 124, and 125 as the starting materials by the same method described in Example 37 to obtain the following Example

compounds 90 to 96 (corresponding starting materials are not in order). However, if a free form is the final product (Example 91), the free form was obtained from purifying the compound without sodium hydroxide treatment. If hydrochloride is the final product (Examples 90, 92, and 93), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-17]

Example	Starting material	Structural formula	NMR and/or LCMS
90	Reference Example 79		LCMS:[M+H]+/Rt=377.4/0.425min[C] ^{1}H-NMR (CD_3OD) δ: 7.16 (1H, d, J = 8.5 Hz), 6.34 (1H, d, J = 8.5 Hz), 5.15 (1H, s), 4.72-4.66 (1H, m), 4.54-4.48 (4H, m), 4.32-4.25 (1H, m), 4.13-4.05 (1H, m), 3.39-3.33 (1H, m), 2.72-2.67 (2H, m), 2.61-2.57 (1H, m), 2.09-2.05 (1H, m), 1.03-1.00 (2H, m).
91	Reference Example 80		LCMS:[M+H]+/Rt=429.1/0.537min[C] ^{1}H-NMR (CD_3OD) δ: 7.19-7.17 (1H, m), 6.36-6.33 (1H, m), 5.22-5.11 (2H, m), 4.58-4.50 (2H, m), 4.36-4.33 (1H, m), 4.13-4.11 (1H, m), 3.68-3.66 (1H, m), 3.52-3.50 (2H, m), 2.84-2.81 (1H, m), 2.70 (2H, t, J = 7.9 Hz), 2.11-2.09 (1H, m), 1.06 (2H, t, J = 7.6 Hz).
92	Reference Example 81		LCMS:[M+H]+/Rt=379.09/0.453min[C]
93	Reference Example 60		LCMS:[M+H]+/Rt=375.01/0.304min[A] ^{1}H-NMR (CD_3OD) δ: 7.16 (1H, d, J = 7.3 Hz), 6.35-6.33 (1H, m), 5.08-5.06 (1H, m), 4.62-4.59 (1H, m), 4.39-4.37 (1H, m), 4.22 (1H, d, J = 9.8 Hz), 3.97 (1H, d, J = 11.0 Hz), 3.52 (1H, t, J = 9.8 Hz), 3.38-3.35 (1H, m), 3.25-3.23 (1H, m), 2.93 (1H, t, J = 10.4 Hz), 2.70-2.68 (3H, m), 2.48-2.45 (1H, m), 2.39-2.35 (1H, m), 2.26-2.24 (1H, m), 1.73-1.68 (1H, m), 1.07 (2H, t, J = 7.9 Hz).
94	Reference Example 124		LCMS:[M+H]+/Rt=466.23/0.486min[C] ^{1}H-NMR (D_2O) δ: 6.51 (1H, d, J = 8.5 Hz), 5.67 (1H, dd, J = 8.5, 2.7 Hz), 4.64-4.59 (1H, m), 4.22-4.16 (1H, m), 4.00-3.84 (3H, m), 3.65 (1H, dd, J = 10.7, 3.4 Hz), 2.87-2.82 (1H, m), 2.68 (3H, d, J = 3.1 Hz), 2.57 (3H, d, J = 8.5 Hz), 2.49-2.44 (1H, m), 2.23-2.14 (4H, m), 1.99-1.90 (2H, m), 1.07-1.03 (1H, m), 0.00 (2H, t, J = 7.0 Hz).

[Table 3-18]

95	Reference Example 125		LCMS:[M+H]+/Rt=466.28/0.482minC 1H-NMR (D_2O) δ: 6.51 (1H, d, J = 7.9 Hz), 5.67 (1H, dd, J = 7.9, 2.4 Hz), 4.64-4.59 (1H, m), 4.19 (1H, d d, J = 15.9, 9.2 Hz), 4.00-3.84 (3H, m), 3.64 (1H, dd, J = 11.0, 3.4 Hz), 2.90-2.85 (1H, m), 2.68 (3H, d, J = 3.7 Hz), 2.57 (3H, d, J = 7.9 Hz), 2.52-2.46 (1H, m), 2.23-2.17 (4H, m), 1.98-1.92 (2H, m), 1.07 (1H, dd, J = 8.9, 4.0 Hz), 0.00 (2H, t, J = 7.0 Hz).
96	Reference Example 62		LCMS:[M+H]+/Rt=393.10/0.477minC 1H-NMR (D_2O) δ: 6.49 (1H, d, J = 7.9 Hz), 5.67 (1H, d, J = 7.9 Hz), 4.98 (1H, dq, J = 53.1, 4.3 Hz), 4.64-4.58 (1H, m), 4.42-4.39 (1H, m), 4.20-4.15 (1H, m), 3.97 (1H, dd, J = 10.4, 6.1 Hz), 3.88 (1H, dd, J = 10.4, 3.7 Hz), 3.64 (1H, dd, J = 11.0, 3.1 Hz), 3.41-3.31 (1H, m), 3.07 (1H, dt, J = 20.0, 13.0 Hz), 2.84-2.67 (1H, m), 2.29-2.22 (1H, m), 2.18 (2H, t, J = 7.0 Hz), 2.15-2.02 (1H, m), 1.59-1.47 (1H, m), 0.00 (2H, t, J = 7.0 Hz).

[0594]

The names of the compounds of Examples 90 to 96 are described below.

2-hydroxy-7-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 90)

2-hydroxy-7-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid (Example 91)

7-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 92)

2-hydroxy-7-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 93)

8-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 94)

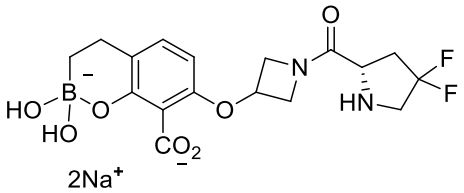
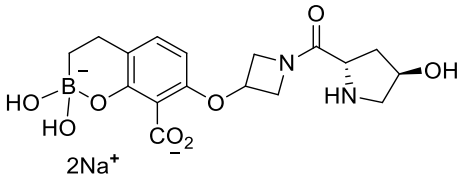
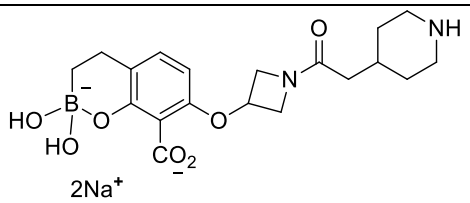
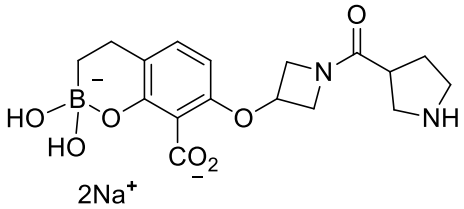
8-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 95)

8-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 96)

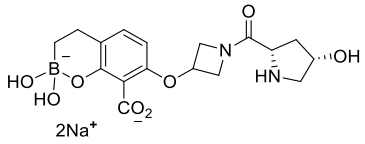
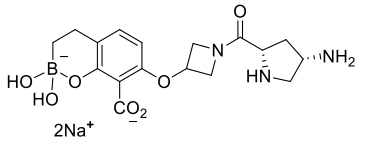
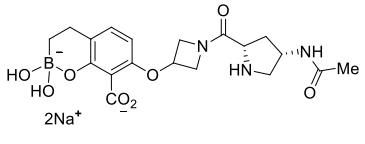
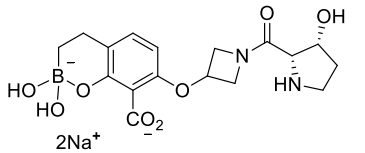
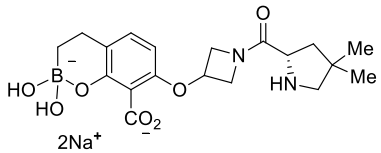
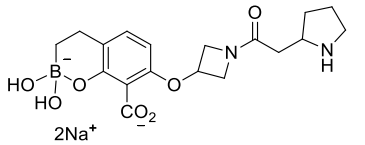
[0595]

A reaction, work-up, and purification were performed using the compounds of Reference Examples 82 to 105 and 117 to 123 as the starting materials by the same method described in Example 38 to obtain the following Example compounds 97 to 127 (corresponding starting materials are not in order). However, if hydrochloride is the final product (Examples 119, 120, and 123), the hydrochloride was obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

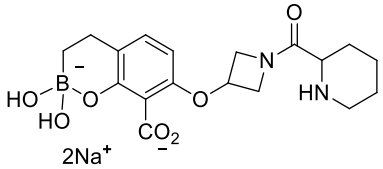
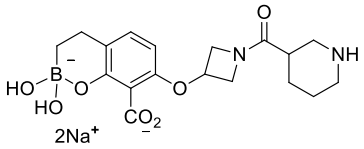
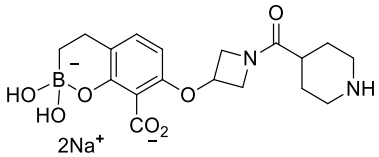
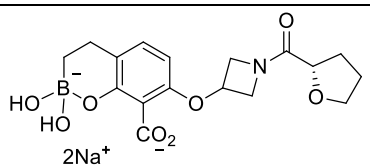
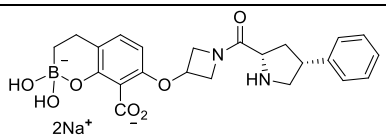
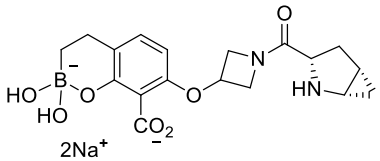
[Table 3-19]

Example	Starting material	Structural formula	NMR and/or LCMS
97	Reference Example 82		LCMS:[M+H]+/Rt=397.3/1.08minB 1H-NMR (CD_3OD) δ: 7.63 (1H, d, J = 8.1 Hz), 5.95 (1H, d, J = 8.1 Hz), 5.03-4.95 (1H, m), 4.64-4.52 (1H, m), 4.39-4.25 (2H, m), 4.09-3.95 (2H, m), 3.37-3.01 (2H, m), 2.62-2.20 (4H, m), 0.46 (2H, t, J = 8.1 Hz).
98	Reference Example 117		LCMS:[M+H]+/Rt=377.2/0.65minB 1H-NMR (CD_3OD) δ: 6.73 (1H, d, J = 8.1 Hz), 5.94 (1H, d, J = 8.1 Hz), 5.02-4.92 (1H, m), 4.62-4.52 (1H, m), 4.42-4.22 (3H, m), 4.08-4.00 (1H, m), 3.92-3.86 (1H, m), 3.22-3.16 (1H, m), 2.80-2.75 (1H, m), 2.57 (2H, t, J = 8.1 Hz), 2.10-2.01 (1H, m), 1.89-1.76 (1H, m), 0.45 (2H, t, J = 8.1 Hz).
99	Reference Example 83		LCMS:[M+H]+/Rt=389.3/0.91minB 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 4.99-4.89 (1H, m), 4.54-4.48 (1H, m), 4.33-4.19 (2H, m), 4.02-3.97 (1H, m), 3.00-2.95 (2H, m), 2.63-2.53 (4H, m), 2.19 (2H, d, J = 8.1 Hz), 1.99-1.81 (1H, m), 1.73-1.65 (2H, m), 1.33-1.14 (2H, m), 0.43 (2H, t, J = 8.1 Hz).
100	Reference Example 84		LCMS:[M+H]+/Rt=361.2/0.93minB 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.00-4.92 (1H, m), 4.58-4.52 (1H, m), 4.32-4.25 (2H, m), 4.02-3.97 (1H, m), 3.09-2.76 (5H, m), 2.56 (2H, d, J = 8.1 Hz), 2.03-1.85 (2H, m), 0.43 (2H, t, J = 8.1 Hz).

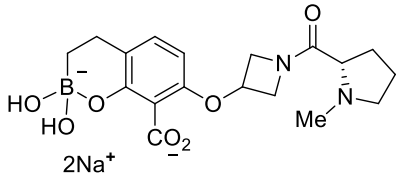
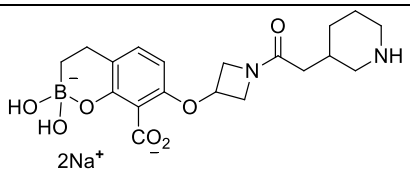
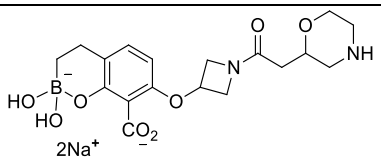
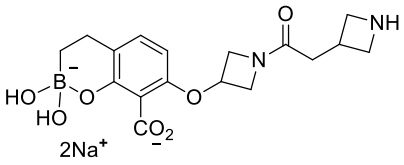
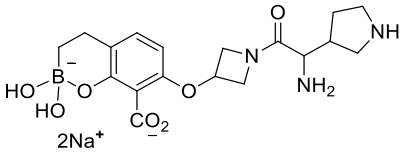
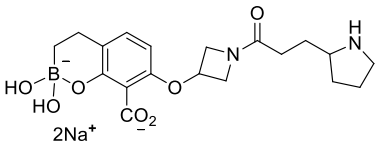
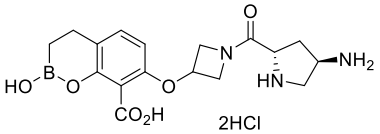
[Table 3-20]

101	Reference Example 118		LCMS:[M+H]+/Rt=377.2/0.54min[B] 1H-NMR (CD_3OD) δ: 6.72 (1H, d, J = 8.1 Hz), 5.94 (1H, d, J = 8.1 Hz), 5.04-4.94 (1H, m), 4.60-4.49 (1H, m), 4.40-4.24 (3H, m), 4.10-4.01 (1H, m), 3.72-3.66 (1H, m), 3.01-2.97 (1H, m), 2.81-2.75 (1H, m), 2.56 (2H, d, J = 8.1 Hz), 2.40-2.26 (1H, m), 1.76-1.67 (1H, m), 0.44 (2H, t, J = 8.1 Hz).
102	Reference Example 120		LCMS:[M+H]+/Rt=376.2/0.31min[B] 1H-NMR (CD_3OD) δ: 6.73 (1H, d, J = 8.1 Hz), 5.95 (1H, d, J = 8.1 Hz), 5.02-4.94 (1H, m), 4.61-4.49 (1H, m), 4.38-4.21 (2H, m), 4.09-4.00 (1H, m), 3.75-3.61 (1H, m), 3.49-3.29 (1H, m), 3.00-2.78 (1H, m), 2.56 (2H, d, J = 8.1 Hz), 2.41-2.18 (1H, m), 1.64-1.29 (2H, m), 0.45 (2H, t, J = 8.1 Hz).
103	Reference Example 121		LCMS:[M+H]+/Rt=418.3/0.74min[B] 1H-NMR (CD_3OD) δ: 6.77 (1H, d, J = 8.1 Hz), 5.97 (1H, d, J = 8.1 Hz), 5.02-4.96 (1H, m), 4.62-4.52 (1H, m), 4.40-4.23 (3H, m), 4.10-4.03 (1H, m), 3.76-3.72 (1H, m), 3.02-2.86 (2H, m), 2.57 (2H, d, J = 8.1 Hz), 2.48-2.35 (1H, m), 1.92 (3H, s), 1.75-1.63 (1H, m), 0.54-0.45 (2H, m).
104	Reference Example 119		LCMS:[M+H]+/Rt=377.2/0.55min[B] 1H-NMR (CD_3OD) δ: 6.76 (1H, d, J = 8.1 Hz), 5.98 (1H, d, J = 8.1 Hz), 5.03-4.97 (1H, m), 4.62-4.49 (2H, m), 4.39-4.22 (2H, m), 4.11-4.05 (1H, m), 3.69-3.65 (1H, m), 3.35-3.19 (1H, m), 2.89-2.80 (1H, m), 2.57 (2H, d, J = 8.1 Hz), 2.11-1.80 (2H, m), 0.50-0.42 (2H, m).
105	Reference Example 85		LCMS:[M+H]+/Rt=389.3/1.18min[B] 1H-NMR (CD_3OD) δ: 6.72 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.02-4.96 (1H, m), 4.59-4.47 (1H, m), 4.39-4.20 (2H, m), 4.08-4.00 (1H, m), 3.83-3.77 (1H, m), 2.80-2.54 (4H, m), 2.00-1.88 (1H, m), 1.59-1.50 (1H, m), 1.09 (3H, s), 1.06 (3H, s), 0.44 (2H, t, J = 8.1 Hz).
106	Reference Example 86		LCMS:[M+H]+/Rt=375.2/0.99min[B] 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.92 (1H, d, J = 8.1 Hz), 4.98-4.91 (1H, m), 4.53-4.47 (1H, m), 4.33-4.19 (2H, m), 4.03-3.96 (1H, m), 3.37-3.33 (1H, m), 3.08-2.80 (2H, m), 2.56 (2H, t, J = 8.1 Hz), 2.35-2.30 (2H, m), 2.06-1.90 (1H, m), 1.85-1.72 (2H, m), 1.43-1.29 (1H, m), 0.42 (2H, t, J = 8.1 Hz).

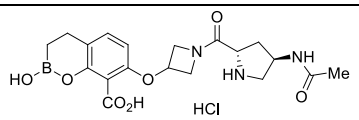
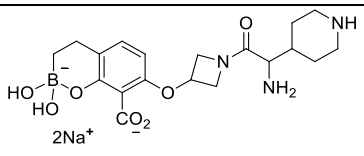
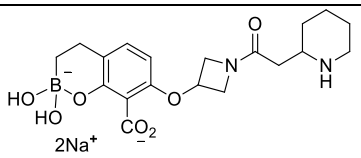
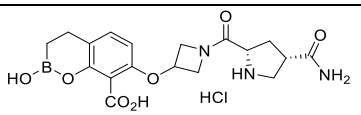
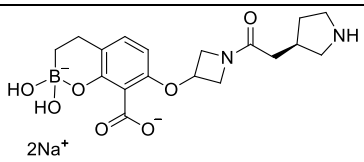
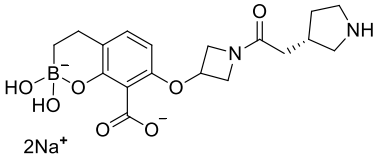
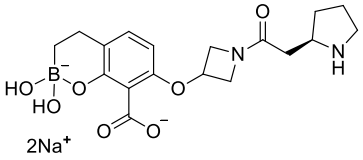
[Table 3-21]

107	Reference Example 87		LCMS:[M+H]+/Rt=375.3/0.96min[B] 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.00-4.92 (1H, m), 4.63-4.52 (1H, m), 4.36-4.22 (2H, m), 4.06-3.96 (1H, m), 3.09-3.02 (1H, m), 2.66-2.53 (3H, m), 1.94-1.75 (2H, m), 1.63-1.27 (5H, m), 0.43 (2H, t, J = 8.1 Hz).
108	Reference Example 88		LCMS:[M+H]+/Rt=375.3/0.99min[B] 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 4.99-4.92 (1H, m), 4.60-4.53 (1H, m), 4.31-4.25 (2H, m), 4.01-3.95 (1H, m), 2.95 (2H, t, J = 8.1 Hz), 2.66-2.39 (5H, m), 1.88-1.43 (4H, m), 0.43 (2H, t, J = 8.1 Hz).
109	Reference Example 89		LCMS:[M+H]+/Rt=375.3/0.95min[B] 1H-NMR (CD_3OD) δ: 6.70 (1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 4.99-4.90 (1H, m), 4.58-4.53 (1H, m), 4.31-4.25 (2H, m), 4.01-3.96 (1H, m), 3.08-2.99 (2H, m), 2.66-2.40 (5H, m), 1.71-1.51 (4H, m), 0.43 (2H, t, J = 8.1 Hz).
110	Reference Example 90		LCMS:[M+H]+/Rt=362.2/1.31min[B] 1H-NMR (CD_3OD) δ: 6.63 (1H, d, J = 8.1 Hz), 5.84 (1H, d, J = 8.1 Hz), 4.91-4.83 (1H, m), 4.62-4.52 (1H, m), 4.35-4.21 (3H, m), 3.97-3.68 (3H, m), 2.47 (2H, t, J = 8.1 Hz), 2.19-2.01 (1H, m), 1.96-1.71 (3H, m), 0.41-0.31 (2H, m).
111	Reference Example 91		LCMS:[M+H]+/Rt=437.0/1.34min[B] 1H-NMR (CD_3OD) δ: 7.31-7.26 (4H, m), 7.21-7.15 (1H, m), 6.70(1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.05-4.94 (1H, m), 4.65-4.54 (1H, m), 4.42-4.26 (2H, m), 4.11-4.03 (1H, m), 3.89 (1H, t, J = 8.1 Hz), 3.77-3.65 (1H, m), 3.39-3.20 (1H, m), 3.07-2.96 (1H, m), 2.85-2.53 (3H, m), 1.94-1.77 (1H, m), 0.42 (2H, t, J = 8.1 Hz).
112	Reference Example 92		LCMS:[M+H]+/Rt=373.3/0.96min[B] 1H-NMR (CD_3OD) δ: 6.70(1H, d, J = 8.1 Hz), 5.91 (1H, d, J = 8.1 Hz), 5.00-4.91 (1H, m), 4.54-4.46 (1H, m), 4.36-4.26 (2H, m), 4.05-3.99 (2H, m), 2.77-2.71 (1H, m), 2.58-2.39 (3H, m), 1.95-1.87 (1H, m), 1.52-1.43 (1H, m), 0.63-0.55 (1H, m), 0.48-0.38 (3H, m).

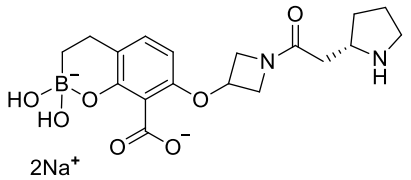
[Table 3-22]

113	Reference Example 93		LCMS:[M+H]+/Rt=375.2/0.85min[B] 1H-NMR (CD_3OD) δ: 6.70(1H, d, J = 8.1 Hz), 5.92 (1H, d, J = 8.1 Hz), 5.00-4.92 (1H, m), 4.65-4.55 (1H, m), 4.38-4.26 (2H, m), 4.07-3.99 (1H, m), 3.08-3.02 (1H, m), 2.95-2.88 (1H, m), 2.56 (2H, t, J = 8.1 Hz), 2.30-2.10 (5H, m), 1.88-1.79 (3H, m), 0.43 (2H, t, J = 8.1 Hz).
114	Reference Example 94		LCMS:[M+H]+/Rt=389.3/0.95min[B] 1H-NMR (CD_3OD) δ: 6.72(1H, d, J = 8.1 Hz), 5.97-5.93 (1H, m), 4.96-4.86 (1H, m), 4.63-4.57 (1H, m), 4.31-4.20 (2H, m), 4.02-3.96 (1H, m), 3.00-2.84 (2H, m), 2.62-2.50 (3H, m), 2.35-2.23 (1H, m), 2.09-1.96 (3H, m), 1.89-1.80 (1H, m), 1.74-1.54 (2H, m), 1.26-1.10 (1H, m), 0.43 (2H, t, J = 8.1 Hz).
115	Reference Example 95		LCMS:[M+H]+/Rt=391.3/0.9 min[B] 1H-NMR (CD_3OD) δ: 6.72(1H, d, J = 8.1 Hz), 5.93 (1H, d, J = 8.1 Hz), 5.00-4.80 (1H, m), 4.58-4.49 (1H, m), 4.33-4.21 (2H, m), 4.02-3.98 (1H, m), 3.90-3.76 (2H, m), 3.64-3.51 (1H, m), 2.95-2.47 (6H, m), 2.37-2.29 (1H, m), 2.22-2.12 (1H, m), 0.44 (2H, t, J = 8.1 Hz).
116	Reference Example 96		LCMS:[M+H]+/Rt=361.2/0.84min[B] 1H-NMR (CD_3OD) δ: 6.72(1H, d, J = 8.1 Hz), 5.94 (1H, d, J = 8.1 Hz), 5.16-5.03 (1H, m), 4.56-4.50 (2H, m), 4.37-4.26 (2H, m), 3.78-3.65 (1H, m), 3.57-3.44 (3H, m), 2.89-2.68 (2H, m), 2.61-2.53 (3H, m), 0.43 (2H, t, J = 8.1 Hz).
117	Reference Example 97		LCMS:[M+H]+/Rt= 390.3/0.34min[B] 1H-NMR (CD_3OD) δ: 6.70(1H, d, J = 8.1 Hz), 5.95-5.91 (1H, m), 5.10-4.97 (1H, m), 4.44-3.61 (4H, m), 3.35-1.52 (10H, m), 0.43 (2H, t, J = 8.1 Hz).
118	Reference Example 98		LCMS:[M+H]+/Rt=389.3/0.98min[B] 1H-NMR (CD_3OD) δ: 6.80-6.73 (1H, m), 5.98-5.91 (1H, m), 5.00-4.76 (1H, m), 4.35-3.79 (4H, m), 3.22-3.00 (3H, m), 2.65-2.51 (2H, m), 2.33-1.29 (8H, m), 0.55-0.28 (2H, m).
119	Reference Example 122		LCMS:[M+H]+/Rt=376.2/0.41min[B] 1H-NMR (CD_3OD) δ: 7.18 (1H, d, J = 8.1 Hz), 6.41-6.30 (1H, m), 5.22-5.10 (1H, m), 4.89-4.69 (2H, m), 4.57-4.26 (2H, m), 4.20-4.05 (2H, m), 3.93-3.86 (1H, m), 3.57-3.47 (1H, m), 2.70 (2H, t, J = 8.1 Hz), 2.64-2.45 (2H, m), 1.07 (2H, t, J = 8.1 Hz).

[Table 3-23]

120	Reference Example 123		LCMS:[M+H]+/Rt=418.2/0.89minB 1H-NMR (CD_3OD) δ: 7.18 (1H, d, J = 8.1 Hz), 6.41-6.30 (1H, m), 5.20-5.12 (1H, m), 4.77-4.26 (5H, m), 4.14-4.05 (1H, m), 3.67-3.60 (1H, m), 3.36-3.30 (1H, m), 2.71 (2H, t, J = 8.1 Hz), 2.48-2.21 (2H, m), 1.98 (3H, s), 1.07 (2H, t, J = 8.1 Hz).
121	Reference Example 99		LCMS:[M+H]+/Rt=404.3/0.34minB 1H-NMR (CD_3OD) δ: 6.74-6.69 (1H, m), 5.98-5.92 (1H, m), 5.03-4.94 (1H, m), 4.64-4.47 (1H, m), 4.39-4.19 (2H, m), 4.05-3.97 (1H, m), 3.19-2.46 (7H, m), 2.00-1.80 (1H, m), 1.71-1.28 (4H, m), 0.43 (2H, t, J = 8.1 Hz).
122	Reference Example 104		LCMS:[M+H]+/Rt=389.3/1.05minB 1H-NMR (CD_3OD) δ: 6.74-6.69 (1H, m), 5.91-5.86 (1H, m), 4.94-4.83 (1H, m), 4.48-3.97 (4H, m), 3.12-2.86 (2H, m), 2.71-2.54 (3H, m), 2.26-2.14 (2H, m), 1.85-1.12 (6H, m), 0.42 (2H, t, J = 8.1 Hz).
123	Reference Example 105		LCMS:[M+H]+/Rt=404.1/0.84minB 1H-NMR (CD_3OD) δ: 7.18 (1H, d, J = 8.2 Hz), 6.41-6.31 (1H, m), 5.20-5.10 (1H, m), 4.81-4.64 (1H, m), 4.58-4.42 (2H, m), 4.38-4.25 (1H, m), 4.18-4.05 (1H, m), 3.68-3.50 (2H, m), 3.38-3.26 (1H, m), 2.85-2.67 (3H, m), 2.16-2.06 (1H, m), 1.06 (2H, t, J = 8.1 Hz).
124	Reference Example 100		LCMS:[M+H]+/Rt = 375.2/0.89minB 1H-NMR (CD_3OD) δ: 6.77-6.62 (1H, m), 6.00-5.85 (1H, m), 4.99-4.91 (1H, m), 4.57-4.44 (1H, m), 4.35-4.16 (2H, m), 4.04-3.92 (1H, m), 3.10-2.81 (3H, m), 2.62-2.40 (4H, m), 2.29-2.19 (2H, m), 2.10-1.96 (1H, m), 1.56-1.37 (1H, m), 0.48-0.36 (2H, m).
125	Reference Example 101		LCMS:[M+H]+/Rt = 375.1/0.92minB 1H-NMR (CD_3OD) δ: 6.75-6.64 (1H, m), 5.99-5.88 (1H, m), 5.01-4.89 (1H, m), 4.59-4.42 (1H, m), 4.37-4.15 (2H, m), 4.03-3.90 (1H, m), 3.12-2.84 (3H, m), 2.61-2.39 (4H, m), 2.31-2.17 (2H, m), 2.11-1.95 (1H, m), 1.59-1.40 (1H, m), 0.47-0.32 (2H, m).
126	Reference Example 102		LCMS:[M+H]+/Rt = 375.1/0.99minB 1H-NMR (CD_3OD) δ: 6.77-6.65 (1H, m), 5.96-5.86 (1H, m), 4.97-4.84 (1H, m), 4.56-3.94 (4H, m), 3.41-3.26 (1H, m), 3.09-2.75 (2H, m), 2.62-2.49 (2H, m), 2.37-2.23 (2H, m), 2.09-1.70 (3H, m), 1.47-1.25 (1H, m), 0.49-0.33 (2H, m).

[Table 3-24]

127	Reference Example 103		LCMS:[M+H]+/Rt = 375.0/0.93min[B] ^{1}H-NMR (CD_3OD) δ: 6.69 (1H, d, J = 8.2 Hz), 5.91 (1H, d, J = 8.2 Hz), 4.98-4.85 (1H, m), 4.56-4.46 (1H, m), 4.35-4.17 (2H, m), 4.05-3.94 (1H, m), 3.38-3.26 (1H, m), 3.03-2.73 (2H, m), 2.61-2.49 (2H, m), 2.37-2.26 (2H, m), 2.03-1.88 (1H, m), 1.85-1.67 (2H, m), 1.46-1.24 (1H, m), 0.46-0.37 (2H, m).

[0596]

The names of the compounds of Examples 97 to 127 are described below.

8-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 97)

4,4-dihydroxy-8-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 98)

4,4-dihydroxy-8-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 99)

4,4-dihydroxy-8-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 100)

4,4-dihydroxy-8-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 101)

8-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 102)

8-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 103)

4,4-dihydroxy-8-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 104)

8-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-

triene-7-carboxylic acid disodium salt (Example 105)

4,4-dihydroxy-8-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 106)

4,4-dihydroxy-8-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 107)

4,4-dihydroxy-8-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 108)

4,4-dihydroxy-8-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 109)

4,4-dihydroxy-8-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 110)

4,4-dihydroxy-8-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 111)

8-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 112)

4,4-dihydroxy-8-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 113)

4,4-dihydroxy-8-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 114)

4,4-dihydroxy-8-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 115)

8-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 116)

8-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-

4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 117)

4,4-dihydroxy-8-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 118)

7-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid dihydrochloride (Example 119)

7-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 120)

8-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 121)

4,4-dihydroxy-8-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 122)

7-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 123)

4,4-dihydroxy-8-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 124)

4,4-dihydroxy-8-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 125)

4,4-dihydroxy-8-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid disodium salt (Example 126)

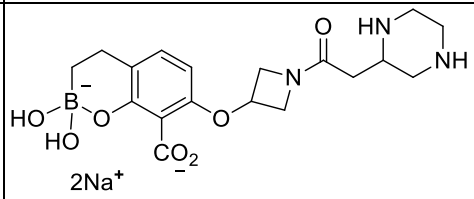
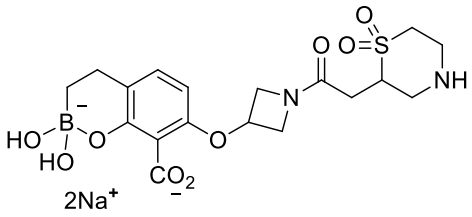
4,4-dihydroxy-8-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic

acid disodium salt (Example 127)

[0597]

The following Example compounds 128 and 129 were obtained by performing a reaction, work-up, and purification using the compounds of Reference Examples 61 and 126, respectively, as the starting materials by the same method described in Example 36, further dissolving the resulting crude product in water, adding an aqueous 2 N sodium hydroxide solution, and purifying by reversed phase chromatography.

[Table 3-25]

Example	Starting material	Structural formula	NMR and/or LCMS
128	Reference Example 61		LCMS:$[M+H]^+$/Rt=389.96/0.446min[F] ^{1}H-NMR (D_2O) δ: 6.90 (1H, d, J = 8.2 Hz), 6.07 (1H, d, J = 8.2 Hz), 5.01 (1H, m), 4.60 (1H, m), 4.28-4.40 (2H, m), 4.05 (1H, m), 2.94-3.09 (4H, m), 2.58-2.81 (4H, m), 2.45 (1H, m), 2.22-2.31 (2H, m), 0.38 (2H, m).
129	Reference Example 126		LCMS:$[M+H]^+$/Rt=438.95/0.555min[F] ^{1}H-NMR (D_2O) δ: 6.90 (1H, d, J = 8.2 Hz), 6.07 (1H, d, J = 8.2 Hz), 5.03 (1H, m), 4.65 (1H, m), 4.42-4.32 (2H, m), 4.08 (1H, m), 3.60 (1H, m), 3.47-3.12 (5H, m), 2.96-2.79 (2H, m), 2.60 (2H, m), 2.40 (1H, m), 0.39 (2H, m).

[0598]

The names of the compounds of Examples 128 and 129 are described below.

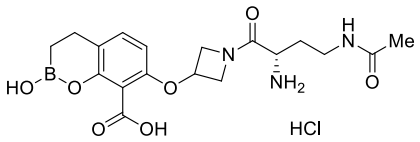
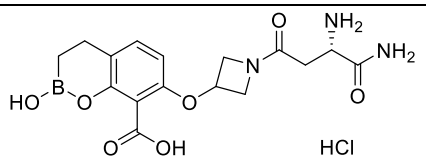
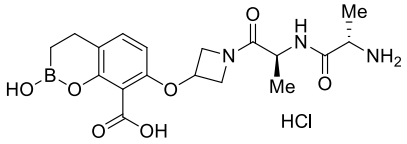
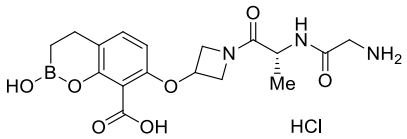
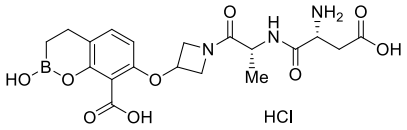
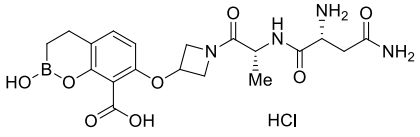
4,4-dihydroxy-8-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 128)

8-({1-[(1,1-dioxo-1λ^6-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid disodium salt (Example 129)

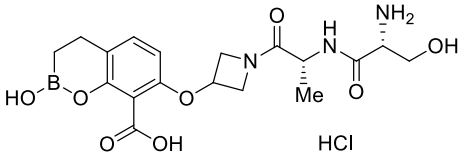
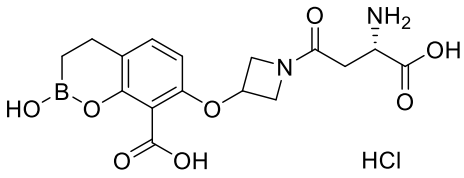
[0599]

The following Example compounds 130 to 137 were obtained by performing a reaction, work-up, and purification using the compounds of Reference Examples 128 and 131 to 137 as the starting materials (corresponding starting materials are not in order) by the same method described in Example 38, purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-26]

Example	Starting material	Structural formula	NMR and/or LCMS
130	Reference Example 131		LCMS:[M+H]+/Rt=406.1/0.86min[B] 1H-NMR (CD_3OD) δ: 7.19-7.11 (1H, m), 6.36-6.14 (1H, m), 5.16-4.99 (1H, m), 4.74-4.65 (1H, m), 4.54-4.27 (2H, m), 4.12-3.96 (2H, m), 3.42-3.20 (2H, m), 2.73-2.54 (2H, m), 2.11-1.89 (5H, m), 1.09-0.68 (2H, m).
131	Reference Example 132		LCMS:[M+H]+/Rt=378.1/0.54min[B] 1H-NMR (CD_3OD) δ: 7.19-7.11 (1H, m), 6.34-6.10 (1H, m), 5.13-4.99 (1H, m), 4.66-4.52 (1H, m), 4.47-4.01 (4H, m), 2.94-2.50 (4H, m), 1.09-0.64 (2H, m).
132	Reference Example 133		LCMS:[M+H]+/Rt=406.1/0.94min[B] 1H-NMR (CD_3OD) δ: 7.18-7.10 (1H, m), 6.64-6.09 (1H, m), 5.14-5.03 (1H, m), 4.80-4.66 (1H, m), 4.46-4.27 (3H, m), 4.04-3.87 (2H, m), 2.80-2.52 (2H, m), 1.51-1.46 (3H, m), 1.36-1.33 (3H, m), 1.09-0.65 (2H, m).
133	Reference Example 135		LCMS:[M+H]+/Rt=392.1/0.88min[B] 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.1 Hz), 6.39-6.28 (1H, m), 5.17-5.06 (1H, m), 4.99-4.80 (1H, m), 4.73-3.94 (4H, m), 3.74-3.67 (2H, m), 2.70 (2H, t, J = 8.1 Hz), 1.34 (3H, d, J = 8.1 Hz), 1.06 (2H, t, J = 8.1 Hz).
134	Reference Example 136		LCMS:[M+H]+/Rt=450.1/0.92min[B] 1H-NMR (CD_3OD) δ: 8.67-8.56 (1H, m), 7.18-7.10 (1H, m), 6.34-6.10 (1H, m), 5.13-5.05 (1H, m), 4.93-4.66 (1H, m), 4.52-4.27 (3H, m), 4.23-4.13 (1H, m), 4.04-3.95 (1H, m), 3.08-2.52 (4H, m), 1.36-1.33 (3H, m), 1.09-0.66 (2H, m).
135	Reference Example 134		LCMS:[M+H]+/Rt=449.1/0.85min[B] 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.1 Hz), 6.38-6.28 (1H, m), 5.15-5.05 (1H, m), 4.92-4.64 (1H, m), 4.47-4.27 (3H, m), 4.22-4.15 (1H, m), 4.03-3.95 (1H, m), 2.96-2.86 (1H, m), 2.76-2.65 (3H, m), 1.34 (3H, d, J = 5.4 Hz), 1.07 (2H, t, J = 8.1 Hz).

[Table 3-27]

136	Reference Example 128	 HCl	LCMS:[M+H]+/Rt=422.1/0.88minB 1H-NMR (CD_3OD) δ: 8.84-8.56 (1H, m), 7.18-7.10 (1H, m), 6.34-6.09 (1H, m), 5.13-4.59 (2H, m), 4.51-4.26 (3H, m), 4.13-3.77 (4H, m), 2.79-2.51 (2H, m), 1.37-1.33 (3H, m), 1.09-0.64 (2H, m).
137	Reference Example 137	 HCl	LCMS:[M+H]+/Rt=379.0/0.71minB 1H-NMR (CD_3OD) δ: 7.17 (1H, d, J = 8.2 Hz), 6.78-6.32 (1H, m), 5.14-5.04 (1H, m), 4.67-4.61 (1H, m), 4.47-4.38 (1H, m), 4.31-4.22 (2H, m), 4.05-3.61 (1H, m), 3.00-2.78 (2H, m), 2.70 (2H, t, J = 8.1 Hz), 1.06 (2H, t, J = 8.1 Hz).

[0600]

The names of the compounds of Examples 130 to 137 are described below.

7-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 130)

7-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 131)

7-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 132)

7-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 133)

N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine hydrochloride (Example 134)

N^1-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide hydrochloride (Example 135)

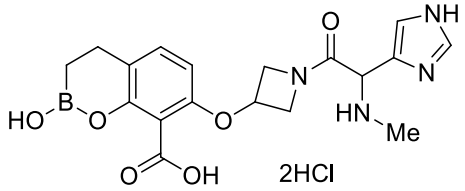
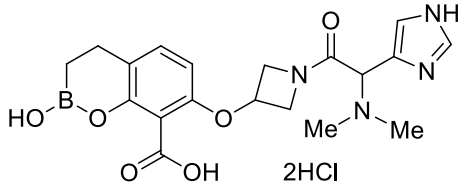
N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide hydrochloride (Example 136)

7-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 137)

[0601]

The compounds of Reference Examples 138 and 139 were used as the starting materials to perform a reaction and work-up by the same method described in Example 4. Each of Example compounds 138 and 139 were obtained from purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-28]

Example	Starting material	Structural formula	NMR and/or LCMS
138	Reference Example 138		LCMS:[M+H]+/Rt=401.26/0.58min 1H-NMR (500 MHz, CD_3OD) δ: 9.10-9.07 (1H, m), 7.93 (brs, 1H), 7.15 (1H,d, *J* = 8.0 Hz), 6.37-6.22 (1H, m), 5.61-5.54 (1H, m), 5.16-4.75 (2H, m), 4.61-3.76 (3H, m), 2.74-2.69 (5H, m), 1.06(2H, t, *J* = 8.0 Hz).
139	Reference Example 139		LCMS:[M+H]+/Rt=415.25/1.03min 1H-NMR (500 MHz, CD_3OD) δ: 8.91 (1H, brs), 7.95 (1H, brs), 7.14 (1H, d, *J* = 8.0 Hz), 6.38-6.23 (1H, m), 5.75-5.58 (1H, m), 5.16-3.94 (6H, m), 3.01-3.81 (5H, m), 2.75-2.65 (5H, m), 1.06 (2H, t, *J* = 8.0 Hz).

[0602]

The names of the compounds of Examples 138 and 139 are described below.

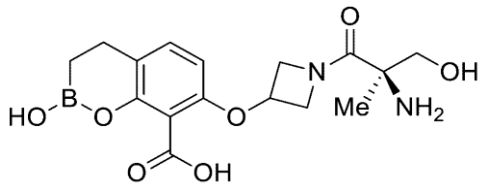
2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid dihydrochloride (Example 138)

2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid dihydrochloride (Example 139)

[0603]

Example 140: 2-hydroxy-7-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 826]



A reaction, work-up, and purification were performed using the compound of Reference Example 140 (245 mg, 0.317 mmol) as the starting material by the same method described in Example 36 to obtain the title compound (21.8 mg) as a white solid.

[0604]

^{1}H-NMR (0.1M HCl in CD_3OD) δ: 7.18 (1H, d, J = 8.5 Hz), 6.35 (1H, d, J = 8.5 Hz), 5.14-5.10 (2H, m), 4.50-4.43 (2H, m), 4.12-4.04 (1H, m), 3.91 (1H, d, J = 12.2 Hz), 3.72 (1H, d, J = 12.2 Hz), 2.70 (2H, t, J = 7.6 Hz), 1.52 (3H, s), 1.05 (2H, t, J = 7.6 Hz).

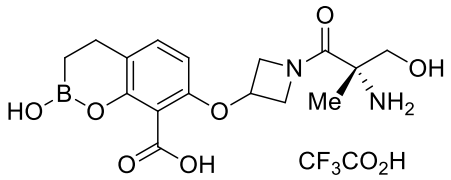
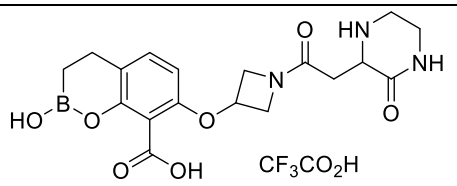
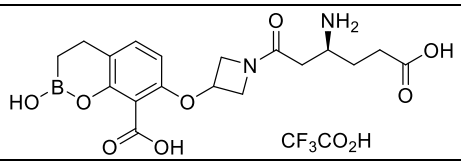
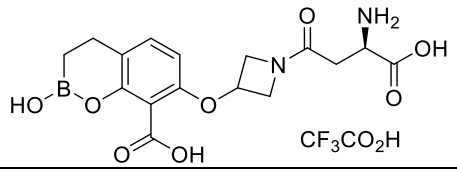
[0605]

LCMS: $[M+H]^+$/Rt = 365.09/0.447 min[C]

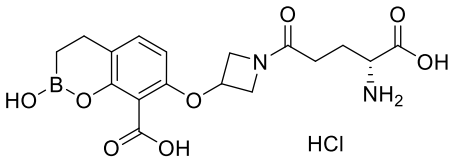
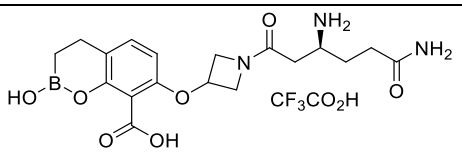
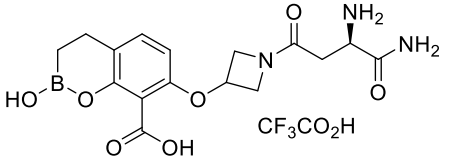
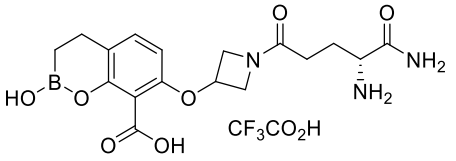
[0606]

The following Example compounds 141 to 148 were obtained by performing a reaction using the compounds of Reference Examples 141, 143, and 150 to 155, respectively, as the starting materials by the same method described in Example 36, followed by, as a work-up, concentrating a reaction mixture under reduced pressure and then purifying the mixture by reversed phase chromatography (Column: YMC-Actus pro C18, solution A: 0.05% TFA/water, solution B: 0.03% TFA/acetonitrile). However, if hydrochloride is the final product (Example 145), the hydrochloride was obtained from purifying the compound by reversed phase chromatography, followed by addition of hydrochloric acid and concentration.

[Table 3-29]

Example	Starting material	Structural formula	NMR and/or LCMS
141	Reference Example 141		LCMS:[M+H]+/Rt=365/1.414min[G] ^{1}H-NMR (D_2O) δ: 7.08-6.89 (1H, m), 6.14-5.94 (1H, m), 4.96-4.67 (2H, m), 4.36-4.29 (2H, m), 4.02-3.92 (1H, m), 3.81-3.73 (1H, m), 3.63-3.56 (1H, m), 2.52-2.25 (2H, m), 1.38-1.33 (3H, m), 0.92-0.43 (2H, m).
142	Reference Example 143		LCMS:[M+H]+/Rt=404/1.400min[G] ^{1}H-NMR (D_2O) δ: 7.11-6.91 (1H, m), 6.15-5.89 (1H, m), 4.95-4.81 (1H, m), 4.48-4.38 (1H, m), 4.32-3.84 (4H, m), 3.57-3.39 (3H, m), 3.36-3.29 (1H, m), 2.99-2.67 (2H, m), 2.53-2.36 (2H, m), 0.94-0.45 (2H, m).
143	Reference Example 150		LCMS:[M+H]+/Rt=407/1.175min[G] ^{1}H-NMR (D_2O) δ: 7.09-6.89 (1H, m), 6.15-5.91 (1H, m), 4.94-4.63 (2H, m), 4.50-3.84 (4H, m), 2.53-2.33 (6H, m), 1.92-1.74 (2H, m), 0.93-0.43 (2H, m).
144	Reference Example 151		LCMS:[M+H]+/Rt=379/1.400min[G] ^{1}H-NMR (D_2O) δ: 6.94-6.80 (1H, m), 5.98-5.78 (1H, m), 4.35-3.36 (6H, m), 2.67 (2H, s), 2.35-2.20 (2H, m), 0.91-0.60 (2H, m).

[Table 3-30]

145	Reference Example 152		LCMS:[M+H]+/Rt=393/1.217min[G] ^{1}H-NMR (D_2O) δ: 7.05-6.84 (1H, m), 6.13-5.85 (1H, m), 4.91-4.71 (1H, m), 4.47-3.87 (5H, m), 2.52-2.21 (4H, m), 2.01 (2H, brs), 0.91-0.40 (2H, m).
146	Reference Example 153		LCMS:[M+H]+/Rt=406/1.223min[G] ^{1}H-NMR (D_2O) δ: 7.05-6.82 (1H, m), 6.14-5.87 (1H, m), 4.92-4.74 (1H, m), 4.28-4.03 (4H, m), 3.46 (1H, brs), 2.50-1.74 (8H, m), 0.92-0.39 (2H, m).
147	Reference Example 154		LCMS:[M+H]+/Rt=378/1.208min[G] ^{1}H-NMR (D_2O) δ: 7.02-6.82 (1H, m), 6.08-5.83 (1H, m), 4.88-4.71 (1H, m), 4.39-3.83 (5H, m), 2.68 (2H, brs), 2.52-2.16 (2H, m), 0.70-0.37 (2H, m).
148	Reference Example 155		LCMS:[M+H]+/Rt=392/1.171min[G] ^{1}H-NMR (D_2O) δ: 7.07-6.81 (1H, m), 6.10-5.84 (1H, m), 4.78-4.67 (1H, m), 4.42-3.80 (5H, m), 2.50-2.33 (2H, m), 2.17 (2H, brs), 1.98-1.96 (2H, m), 0.91-0.38 (2H, m).

[0607]

The names of the compounds of Examples 141 to 148 are described below.

2-hydroxy-7-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 141)

2-hydroxy-7-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 142)

7-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 143)

7-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 144)

7-({1-[(4R)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 145)

7-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 146)

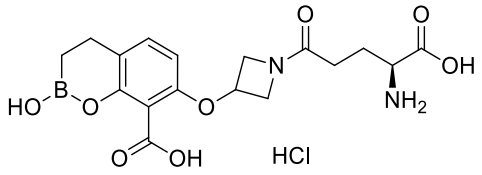
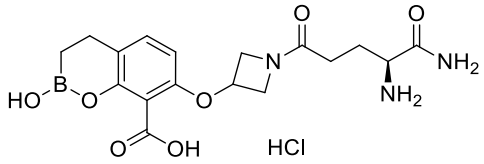
7-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 147)

7-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid trifluoroacetate (Example 148)

[0608]

The following Example compounds 149 and 150 were obtained by performing a reaction and work-up using the compounds of Reference Examples 146 and 147, respectively, as the starting materials by the same method described in Example 38, and purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-31]

Example	Starting material	Structural formula	NMR and/or LCMS
149	Reference Example 146		LCMS:[M+H]+/Rt=393.1/0.86min[B] 1H-NMR (CD3OD) δ: 7.22-7.08 (1H, m), 6.38-6.06 (1H, m), 5.13-5.01 (1H, m), 4.67-4.52 (1H, m), 4.47-4.32 (1H, m), 4.28-4.18 (1H, m), 4.11-3.92 (2H, m), 2.76-2.62 (2H, m), 2.53-2.38 (2H, m), 2.28-2.04 (2H, m), 1.13-0.61 (2H, m).
150	Reference Example 147		LCMS:[M+H]+/Rt=392.1/0.86min[B] 1H-NMR (CD3OD) δ: 7.24-7.08 (1H, m), 6.41-6.07 (1H, m), 5.14-5.00 (1H, m), 4.67-4.51 (1H, m), 4.46-4.32 (1H, m), 4.29-4.16 (1H, m), 4.08-3.88 (2H, m), 2.81-2.50 (2H, m), 2.49-2.34 (2H, m), 2.21-2.02 (2H, m), 1.14-0.64 (2H, m).

[0609]

The names of the compounds of Examples 149 and 150 are described below.

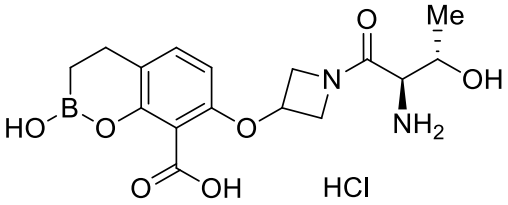
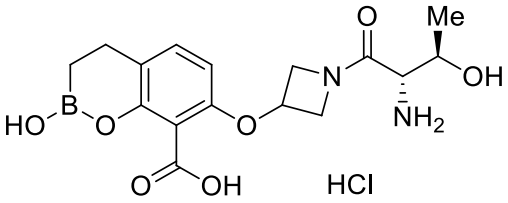
7-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 149)

7-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 150)

[0610]

The following Example compounds 151 and 152 were obtained by performing a reaction and work-up using the compounds of Reference Examples 148 and 149, respectively, as the starting materials by the same method described in Example 4 and purifying the compound by reversed phase chromatography without sodium hydroxide treatment, followed by addition of hydrochloric acid and concentration.

[Table 3-32]

Example	Starting material	Structural formula	NMR and/or LCMS
151	Reference Example 148		LCMS:$[M+H]^+$/Rt=365.24/1.27 min[l]. ^{1}H-NMR (500 MHz, $CDCl_3$) δ:7.18-7.09 (1H, s), 6.32 (1 H, brs), 5.13-5.07 (1H, m), 4.78-4.69 (1H, m), 4.50-4.2 9 (2H, m), 4.10—3.96 (2H, m), 3.81-3.78 (1H, m), 2.67 (2H, t, *J* = 7.4 Hz), 1.26 (3H, t, *J* = 5.7 Hz), 1.03 (2 H, t, *J* = 8.1 Hz).
152	Reference Example 149		LCMS:$[M+H]^+$/Rt=365.24/1.23 min[l]. ^{1}H-NMR (500 MHz, $CDCl_3$) δ:7.17-7.10 (1H, s), 6.33 (1 H, brs), 5.12-5.07 (1H, m), 4.76-4.70 (1H, m), 4.51-4.3 0 (2H, m), 4.09-3.78 (3H, m), 2.67 (2H, brs), 1.26 (3 H, t, *J* = 6.3 Hz), 1.03 (2H, t, *J* = 8.0 Hz).

[0611]

The names of the compounds of Examples 151 and 152 are described below.

2-hydroxy-7-[(1-D-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 151)

2-hydroxy-7-[(1-L-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid hydrochloride (Example 152)

[0612]

Pharmacological testing methods and results thereof for representative compounds of the invention are shown hereinafter, but the present invention is not limited to the Test Examples.

[0613]

Test Example 1: Evaluation of minimum inhibitory concentration (MIC) of MEPM against β-lactamase producing bacteria

To evaluate the β-lactamase inhibitory activity of test compounds, the effect of combination of a test compound and a β-lactam agent against β-lactamase producing bacteria was

evaluated. Meropenem (MEPM) was used as a β-lactam antimicrobial agent. The minimum inhibitory concentration (MIC) of MEPM against β-lactamase producing bacteria when a test compound was added at a fixed concentration (4 μg/ mL) was measured by broth microdilution method (common ratio: 2). MIC of MEPM decreasing to less than 1/32 in combination with a test compound is indicated by A, decreasing from 1/32 to 1/16 is indicated by B, decreasing from 1/8 to 1/4 is indicated by C, and decreasing to 1/2 or others are indicated by D. "-" represents untested cases.

[Table 4]

Example number	***E. coli* ATCC BAA-2340 (KPC)**	***K. pneumoniae* ATCC BAA-2344 (KPC)**	***K. pneumoniae* ATCC BAA-2524 (OXA-48)**
1	A	A	B
2	A	A	B
3	A	A	B
4	A	A	A
5	A	B	C
6	A	A	B
7	A	A	B
8	A	A	B
9	A	A	A
10	A	A	B
11	A	B	B
12	A	A	B
13	A	A	B
14	A	A	B
15	A	A	B
16	A	-	B
17	A	B	B
18	A	A	B
19	A	A	B
20	A	B	B
21	A	B	C
22	A	A	B
23	-	A	B
24	A	A	B
25	A	A	B
26	A	A	A
27	-	A	B
28	A	A	B
29	-	A	B
30	-	A	B
31	-	A	B
32	-	A	B
33	-	A	B
34	-	A	B
35	A	A	B

[0614]

Test Example 2: Evaluation of minimum inhibitory concentration (MIC) of MEPM against β-lactamase producing

bacteria

In the same manner as Test Example 1, E. coli ATCC BAA-2469 (NDM-1), K. pneumomiae ATCC BAA-2470 (NDM-1), K. pneumomiae NCTC 13439 (VIM-1), K. pneumomiae NCTC 13440 (VIM-1), E. coli NCTC 13476 (IMP), and the like can be used to evaluate metallo-β-lactamase inhibitory activity of test compounds.

[0615]

Test Example 3: Evaluation of minimum inhibitory concentration (MIC) of MEPM against β-lactamase producing bacteria

To evaluate the β-lactamase inhibitory activity of test compounds, the effect of combination of a test compound and a β-lactam agent against β-lactamase producing bacteria was evaluated. Meropenem (MEPM) was used as a β-lactam antimicrobial agent. The minimum inhibitory concentration (MIC) of MEPM against β-lactamase producing bacteria when a test compound was added at a fixed concentration (4 μg/ mL) was measured by broth microdilution method (common ratio: 2).

The numerical value of (MIC of MEPM in combination with a test compound)/(MIC of MEPM alone) are shown below ("-" represents untested cases).

[Table 5-1]

Example number	E. coli ATCC BAA-2340 (KPC)	K. pneumoniae ATCC BAA-2344 (KPC)	K. pneumoniae ATCC BAA-2524 (OXA-48)
1	0.031/8	0.063/32	0.063/1
2	0.031/8	0.031/32	0.063/1
3	0.031/8	0.063/32	0.063/1
4	0.016/4	0.031/32	0.031/2
5	0.125/8	2/32	0.125/1
6	0.031/4	0.125/32	0.063/1
7	0.031/4	0.031/32	0.063/1
8	0.031/8	0.063/32	0.063/2
9	0.016/4	0.063/32	0.031/2
10	0.031/4	0.063/32	0.063/2
11	0.063/4	2/32	0.063/1
12	0.031/4	0.063/32	0.063/1
13	0.031/8	0.063/32	0.063/2
14	0.031/8	0.125/32	0.063/2
15	0.031/8	0.063/32	0.063/1
16	0.031/8	0.125/32	0.063/1
17	0.031/8	2/32	0.063/1
18	0.016/8	0.031/32	0.063/2
19	0.016/8	0.031/32	0.063/2
20	0.031/8	2/32	0.063/1
21	0.125/8	2/32	0.125/1
22	0.016/8	0.031/32	0.063/2
23	-	0.063/32	0.063/2
24	0.016/8	0.5/32	0.063/2
25	0.016/8	0.063/32	0.063/2
26	0.016/8	0.063/32	0.031/2
27	-	0.063/32	0.063/2
28	0.016/8	0.031/32	0.063/2
29	-	0.063/32	0.063/2
30	-	0.125/32	0.125/2
31	-	0.063/32	0.063/2
32	-	0.063/32	0.063/2
33	-	≦0.063/32	≦0.063/1
34	-	0.063/32	0.063/2
35	0.031/4	0.063/32	0.063/1
36	-	≦0.063/16	≦0.063/1
37	-	≦0.031/16	≦0.031/1
38	-	≦0.063/16	≦0.063/2
39	-	1/16	≦0.063/2
40	-	≦0.063/16	≦0.063/1
41	-	≦0.063/16	≦0.063/1
42	-	≦0.063/16	≦0.063/2
43	-	≦0.063/16	≦0.063/1

[Table 5-2]

44	-	≦0.063/16	≦0.063/1
45	-	≦0.063/16	≦0.063/2
46	-	≦0.063/16	≦0.063/2
47	-	≦0.063/16	≦0.063/2
48	-	≦0.063/16	≦0.063/2
49	-	≦0.063/16	≦0.063/2
50	-	≦0.063/16	≦0.063/1
51	-	≦0.063/32	≦0.063/2
52	-	≦0.063/16	≦0.063/1
53	-	0.25/16	≦0.063/1
54	-	0.25/16	≦0.063/2
55	-	≦0.031/32	≦0.031/1
56	-	0.125/32	≦0.031/1
57	-	≦0.063/16	≦0.063/1
58	-	≦0.063/16	≦0.063/2
59	-	≦0.063/32	≦0.063/2
60	-	0.125/32	≦0.063/2
61	-	≦0.063/16	≦0.063/2
62	-	≦0.063/16	≦0.063/2
63	-	≦0.063/16	≦0.063/2
64	-	≦0.063/16	≦0.063/2
65	-	≦0.063/16	≦0.063/2
66	-	≦0.063/16	≦0.063/2
67	-	≦0.063/16	≦0.063/2
68	-	≦0.063/16	≦0.063/1
69	-	≦0.063/16	≦0.063/1
70	-	≦0.063/16	≦0.063/2
71	-	≦0.063/16	≦0.063/1
72	-	≦0.063/16	≦0.063/1
73	-	≦0.063/16	≦0.063/2
74	-	0.25/32	0.125/1
75	-	1/32	≦0.063/1
76	-	4/32	0.25/1
77	-	≦0.063/16	≦0.063/2
78	-	≦0.063/16	≦0.063/1
79	-	≦0.063/16	≦0.063/1
80	-	≦0.063/16	≦0.063/1
81	-	≦0.063/16	≦0.063/1
82	-	≦0.063/16	≦0.063/1
83	-	≦0.063/32	≦0.063/2
84	-	≦0.063/32	≦0.063/2
85	-	≦0.063/32	≦0.063/2
86	-	≦0.063/32	≦0.063/2
87	-	≦0.063/16	≦0.063/1
88	-	≦0.063/32	≦0.063/2
89	-	≦0.063/16	≦0.063/1
90	-	≦0.063/16	≦0.063/1
91	-	≦0.063/16	≦0.063/1

[Table 5-3]

92	-	≦0.063/16	≦0.063/2
93	-	≦0.063/16	≦0.063/2
94	-	≦0.063/16	≦0.063/1
95	-	≦0.063/16	≦0.063/1
96	-	≦0.063/16	≦0.063/1
97	-	≦0.063/16	≦0.063/2
98	-	≦0.063/16	≦0.063/2
99	-	≦0.063/16	≦0.063/2
100	-	≦0.063/16	≦0.063/2
101	-	≦0.063/16	≦0.063/2
102	-	≦0.063/16	≦0.063/2
103	-	≦0.063/16	≦0.063/2
104	-	≦0.063/32	≦0.063/2
105	-	≦0.063/32	≦0.063/2
106	-	≦0.063/16	≦0.063/2
107	-	≦0.063/16	≦0.063/2
108	-	≦0.063/16	≦0.063/2
109	-	≦0.063/16	≦0.063/2
110	-	≦0.063/16	≦0.063/2
111	-	≦0.063/16	≦0.063/2
112	-	≦0.063/16	≦0.063/2
113	-	≦0.063/16	≦0.063/2
114	-	≦0.063/16	≦0.063/2
115	-	≦0.063/16	≦0.063/2
116	-	≦0.063/16	≦0.063/2
117	-	≦0.063/16	≦0.063/2
118	-	≦0.063/16	≦0.063/2
119	-	0.125/16	≦0.063/1
120	-	≦0.063/16	≦0.063/1
121	-	≦0.063/16	≦0.063/2
122	-	≦0.063/16	≦0.063/2
123	-	≦0.063/32	≦0.063/2
124	-	≦0.063/16	≦0.063/2
125	-	≦0.063/16	≦0.063/2
126	-	≦0.063/16	≦0.063/2
127	-	≦0.063/16	≦0.063/2
128	-	≦0.063/16	≦0.063/1
129	-	≦0.063/16	≦0.063/1
130	-	≦0.063/16	≦0.063/1
131	-	≦0.063/16	≦0.063/1
132	-	≦0.063/16	≦0.063/1
133	-	≦0.063/16	≦0.063/1
134	-	≦0.063/16	≦0.063/1
135	-	≦0.063/16	≦0.063/1
136	-	≦0.063/16	≦0.063/1
137	-	≦0.063/32	≦0.063/2
138	-	≦0.063/16	≦0.063/2
139	-	≦0.063/16	≦0.063/2

[Table 5-4]

140	-	≦0.063/64	≦0.063/2
141	-	≦0.063/64	≦0.063/2
142	-	≦0.063/64	≦0.063/2
143	-	≦0.063/64	≦0.063/2
144	-	≦0.063/64	≦0.063/2
145	-	≦0.063/64	≦0.063/2
146	-	≦0.063/64	≦0.063/2
147	-	≦0.063/64	≦0.063/2
148	-	≦0.063/64	≦0.063/2
149	-	0.125/64	≦0.063/2
150	-	≦0.063/64	≦0.063/2
151	-	≦0.063/64	≦0.063/2
152	-	≦0.063/64	≦0.063/2

[0616]

As disclosed above, the present invention is exemplified by the use of its preferred embodiments. However, it is understood that the scope of the present invention should be interpreted based solely on the Claims. It is also understood that any patent, any patent application, and any other references cited herein should be incorporated herein by reference in the same manner as the contents are specifically described herein.

[Industrial Applicability]

[0617]

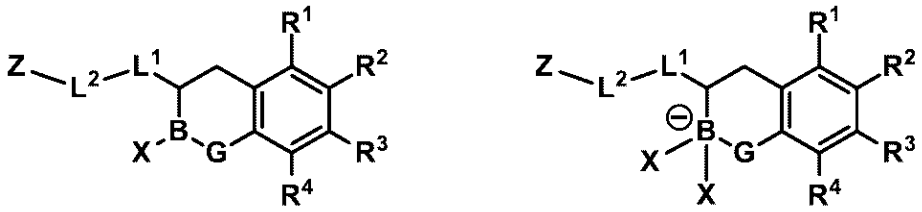
The compound of the invention exhibits a potent inhibitory action against β-lactamase and is useful as a therapeutic agent and/or prophylactic agent for sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, urinary tract infection, genital infection, eye infection, or odontogenic infection.

[Claims]

[Claim 1]

A compound represented by formula (1a) or (1b):

[Chemical Formula 827]



(1a) (1b)

or a pharmaceutically acceptable salt thereof,

wherein

G is an oxygen atom, a sulfur atom, or $-NR^{a1}-$,

X is a hydroxyl group, an optionally substituted C_{1-6} alkoxy group, or $-NR^{a2}R^{b1}$,

R^{a1}, R^{a2}, and R^{b1} are the same or different, each independently

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl

5) 5- or 6-membered heteroaryl,

6) a 4- to 10-membered non-aryl heterocycle,

7) a C_{1-6} alkylcarbonyl group,

8) a C_{3-10} alicyclic carbonyl group,

9) a C_{6-10} arylcarbonyl group,

10) a 5- or 6-membered heteroarylcarbonyl group,

11) a C_{1-6} alkylsulfonyl group,

12) a C_{3-10} alicyclic sulfonyl group,

13) a C_{6-10} arylsulfonyl group,

14) a 5- or 6-membered heteroarylsulfonyl group, or

15) $-OR^{c1}$,

(wherein each substituent from 2) to 14) is optionally substituted),

wherein R^{a2} and R^{b1} together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl

heterocycle,

R^{c1} is

1) a hydrogen atom,

2) a C_{1-6} alkyl group,

3) a C_{3-10} alicyclic group,

4) C_{6-10} aryl,

5) 5- or 6-membered heteroaryl, or

6) a 4- to 10-membered non-aryl heterocycle,

(wherein each substituent from 2) to 6) is optionally substituted),

L^1 is a single bond, an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-NR^d-$, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group,

Z is

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) a carboxyl group,

5) a C_{3-10} alicyclic group,

6) C_{6-10} aryl,

7) 5- or 6-membered heteroaryl,

8) a 4- to 10-membered non-aryl heterocycle,

9) a C_{1-6} alkoxy group,

10) a C_{3-10} alicyclic oxy group,

11) a C_{6-10} aryloxy group,

12) a 5- or 6-membered heteroaryloxy group,

13) a 4- to 10-membered non-aryl heterocyclyl oxy group,

14) a C_{1-6} alkylthio group,

15) a C_{3-10} alicyclic thio group,

16) a C_{6-10} arylthio group,

17) a 5- or 6-membered heteroarylthio group,

18) a 4- to 10-membered non-aryl heterocyclyl thio group,

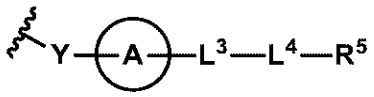
(wherein each substituent from 5) to 18) is optionally substituted),

19) $-SO_2-NR^{e1}R^{f1}$,

20) $-NR^{e1}-C(=O)OR^{f1}$,
21) $-NR^{g1}-C(=O)NR^{e1}R^{f1}$,
22) $-NR^{e1}-C(=S)R^{f1}$,
23) $-NR^{e1}-C(=S)OR^{f1}$,
24) $-NR^{g1}-C(=S)NR^{e1}R^{f1}$,
25) $-NR^{g1}-CR^{e1}(=NR^{f1})$,
26) $-NR^{g1}-CR^{e1}(=N-OR^{f1})$,
27) $-NR^{h1}-C(=NR^{g1})NR^{e1}R^{f1}$,
28) $-NR^{h1}-C(=N-OR^{g1})NR^{e1}R^{f1}$,
29) $-NR^{i1}-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
30) $-NR^{i1}-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
31) $-NR^{e1}-SO_2-R^{f1}$,
32) $-NR^{g1}-SO_2-NR^{e1}R^{f1}$,
33) $-C(=O)OR^{e1}$,
34) $-C(=S)OR^{e1}$,
35) $-C(=S)NR^{e1}R^{f1}$,
36) $-C(=S)NR^{e1}OR^{f1}$,
37) $-C(=S)NR^{g1}-NR^{e1}R^{f1}$,
38) $-C(=NR^{e1})R^{f1}$,
39) $-C(=N-OR^{e1})R^{f1}$,
40) $-C(=NR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
41) $-C(=N-OR^{h1})NR^{g1}-NR^{e1}R^{f1}$,
42) $-NR^{e1}R^{f1}$,
43) $-NR^{g1}-NR^{e1}R^{f1}$,
44) $-NR^{e1}OR^{f1}$,
45) $-NR^{e1}-C(=O)R^{f1}$,
46) $-C(=O)NR^{e1}R^{f1}$,
47) $-C(=O)NR^{e1}OR^{f1}$,
48) $-C(=O)NR^{g1}-NR^{e1}R^{f1}$,
49) $-C(=O)R^{e1}$,
50) $-C(=NR^{g1})NR^{e1}R^{f1}$, or
51) $-C(=N-OR^{h1})NR^{e1}R^{f1}$,

one of R^1, R^2, and R^3 is a group represented by formula (2):

[Chemical Formula 828]



(2)

wherein

Y is an oxygen atom, a sulfur atom, or $-NR^j-$,

ring A is an optionally substituted 4- to 20-membered non-aryl heterocycle,

L^3 is $-C(=O)-$, $-S(=O)-$, or $-S(=O)_2-$,

L^4 is

1) a single bond,
2) a C_{1-6} alkylene group,
3) a C_{3-10} cycloalkylene group,
4) a C_{6-10} arylene group,
5) a 5- or 6-membered heteroarylene group,
6) a 4- to 10-membered non-aryl heterocyclylene group, or
7) $-C(=N-OR^{h1})-$,

(wherein each substituent from 2) to 6) is optionally substituted), and

R^5 is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) a 4- to 10-membered non-aryl heterocycle,
5) C_{6-10} aryl,
6) 5- or 6-membered heteroaryl,
7) a C_{1-6} alkylthio group,

(wherein each substituent from 2) to 7) is optionally substituted), or

8) $-NR^{e1}OH$,

the remaining two (without the structure of formula (2) among R^1, R^2, and R^3) are the same or different, each independently a hydrogen atom, a halogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{1-6} alkoxy group, an optionally substituted C_{1-6}

alkylthio group, an optionally substituted 5- or 6-membered heteroaryl, or $-NR^{a3}R^{b2}$,

R^{d}, R^{e1}, R^{e2}, R^{f1}, R^{f2}, R^{g1}, R^{g2}, R^{h1}, R^{h2}, R^{i1}, R^{i2}, and R^{j} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{3-10} alicyclic group, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, or an optionally substituted 4- to 10-membered non-aryl heterocycle,

a combination of R^{e1} and R^{f1} or R^{e2} and R^{f2}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{4} is

1) $-C(=O)R^{8}$,

2) $-SO_2-L^{6}-R^{8}$,

(wherein R^{8} in 1) and 2) is $-NR^{a5}R^{b4}$, $-NR^{a5}-L^{7}-B(OR^{m1})_2$, $-OR^{m1}$, or an optionally substituted C_{1-6} alkyl group, and L^{6} is a single bond or $-NR^{a6}-$),

3) $-NR^{a4}R^{b3}$,

4) $-B(OR^{m1})_2$,

5) $-PO(OR^{m1})(OR^{m2})$,

6) optionally substituted 5-membered heteroaryl,

7) an optionally substituted 5-membered non-aryl heterocycle, or

8) a bioisostere of one of 1) to 7),

(wherein the formulas of 2), 4), 5), and 6) include a carboxylic acid isostere, and 8) may include them in duplicates),

R^{a3}, R^{a4}, R^{a5}, R^{a6}, R^{b2}, R^{b3}, and R^{b4} are the same or different, each independently having the same definition as R^{a1}, R^{a2}, and R^{b1}, wherein a combination of R^{a3} and R^{b2}, R^{a4} and R^{b3}, or R^{a5} and R^{b4}, when attached to the same nitrogen atom, together may form an optionally substituted 4- to 10-membered nitrogen-containing non-aryl heterocycle,

R^{m1} is

1) a hydrogen atom,
2) a C_{1-6} alkyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl, or
6) a 4- to 10-membered non-aryl heterocycle,
(wherein each substituent from 2) to 6) is optionally substituted),

wherein if R^{m1} is attached to a boron atom via an oxygen atom, two R^{m1}, as C_{2-4} alkylene, together with the boron atom and two oxygen atoms, may form a 5- to 7-membered non-aryl heterocycle (wherein an alkylene moiety is optionally substituted in the non-aryl heterocycle),

R^{m2} is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group, and

L^7 is an optionally substituted C_{1-3} alkylene group.

[Claim 2]

The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein

L^1 is a single bond, a sulfur atom, $-NR^dC(=O)-$, or $-NR^dSO_2-$,

L^2 is a single bond or an optionally substituted C_{1-6} alkylene group, and

Z is
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{3-10} alicyclic group,
4) C_{6-10} aryl,
5) 5- or 6-membered heteroaryl,
6) a 4- to 10-membered non-aryl heterocycle,
7) $-C(=N-OR^{e1})R^{f1}$, or
8) $-NR^{e1}R^{f1}$.

[Claim 3]

The compound or the pharmaceutically acceptable salt thereof according to claim 1 or 2, wherein

$Z\text{-}L^2\text{-}L^1$ is a hydrogen atom, an optionally substituted $C_{1\text{-}6}$ alkyl group, or an optionally substituted $C_{1\text{-}6}$ alkylthio group.

[Claim 4]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 3, wherein $Z\text{-}L^2\text{-}L^1$ is a hydrogen atom.

[Claim 5]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 4, wherein G is an oxygen atom.

[Claim 6]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 5, wherein X is a hydroxyl group or an optionally substituted $C_{1\text{-}6}$ alkoxy group.

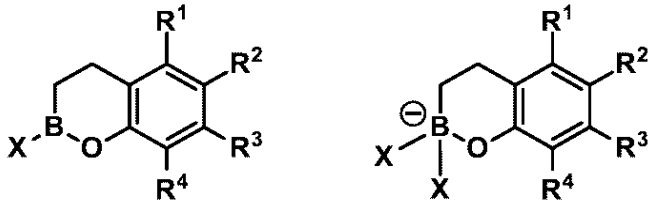
[Claim 7]

The compound or the pharmaceutically acceptable salt thereof according to any one of the preceding claims, wherein X is a hydroxyl group.

[Claim 8]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 7, wherein the compounds of formulas (1a) and (1b) are represented by formulas (3a) and (3b), respectively:

[Chemical Formula 829]



(3a) (3b)

wherein X, R^1, R^2, and R^3 are defined the same as any one of claims 1 to 7, and

R^4 is selected from the group consisting of

1) $-COOR^{m1}$ (wherein R^{m1} is a hydrogen atom, a C_{1-6} alkyl group, a C_{3-10} alicyclic group, C_{6-10} aryl, 5- or 6-membered heteroaryl, or a 4- to 10-membered non-aryl heterocycle, wherein the C_{1-6} alkyl group, the C_{3-10} alicyclic group, the C_{6-10} aryl, the 5- or 6-membered heteroaryl, and the 4- to 10-membered non-aryl heterocycle are each optionally substituted), and

2) a bioisostere of 1).

[Claim 9]

The compound or the pharmaceutically acceptable salt thereof according to claim 8, wherein R^4 is

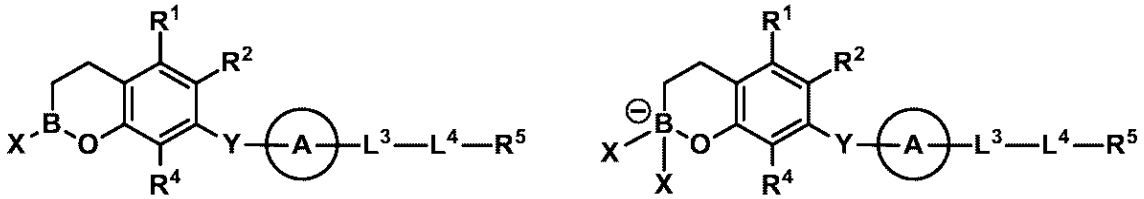
1) –COOH (i.e., a carboxyl group), or

2) a carboxylic acid isostere.

[Claim 10]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 9, wherein the compounds of formulas (1a) and (1b) or the compounds of formulas (3a) and (3b) are represented by formulas (4a) and (4b), respectively:

[Chemical Formula 830]



(4a) (4b)

wherein X, R^4, Y, ring A, L^3, L^4, and R^5 are defined the same as any one of claims 1 to 9, and

R^1 and R^2 are the same or different, each independently a hydrogen atom, a halogen atom, a C_{1-6} alkyl group, or a C_{1-6} alkoxy group (wherein the C_{1-6} alkyl group and the C_{1-6} alkoxy group are optionally substituted with 1 to 5 halogen atoms).

[Claim 11]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 10, wherein

ring A is an optionally substituted 4- to 10-membered non-aryl heterocycle.

[Claim 12]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 11, wherein ring A is an optionally substituted 4- to 7-membered non-aryl heterocycle.

[Claim 13]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, wherein Y is an oxygen atom or a sulfur atom.

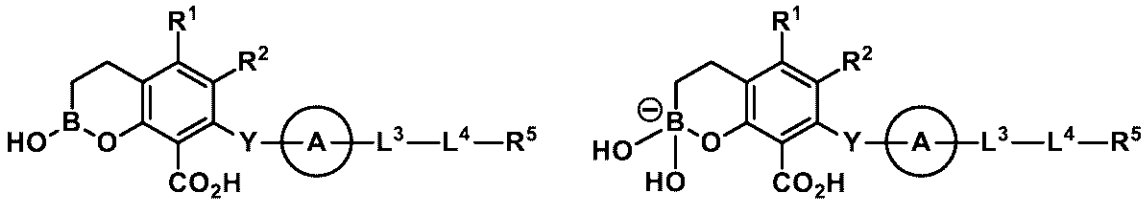
[Claim 14]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 13, wherein Y is an oxygen atom.

[Claim 15]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 14, wherein the compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), or the compounds of formulas (4a) and (4b) are represented by formulas (5a) and (5b), respectively:

[Chemical Formula 831]



(5a) (5b)

wherein ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Claim 16]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 15, wherein L^3 is $-C(=O)-$ or $-S(=O)_2-$.

[Claim 17]

The compound or the pharmaceutically acceptable salt thereof according to any one claims 1 to 16, wherein L^3 is -C(=O)-.

[Claim 18]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 17, wherein L^4 is a single bond, -C(=N-OR^{h1})-, or an optionally substituted C_{1-6} alkylene group, wherein R^{h1} is an optionally substituted C_{1-6} alkyl group.

[Claim 19]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 18, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom,
3) a C_{1-6} alkyl group,
4) a C_{1-6} alkoxy group, and
5) a C_{1-6} alkylthio group,

(wherein each substituent from 3) to 5) is optionally substituted).

[Claim 20]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 19, wherein R^1 and R^2 are the same or different, each independently selected from the group consisting of

1) a hydrogen atom,
2) a halogen atom, and
3) an optionally substituted C_{1-6} alkyl group.

[Claim 21]

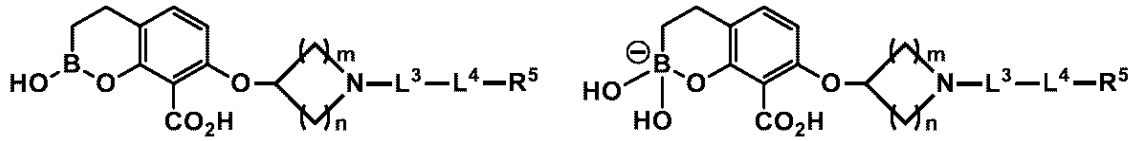
The compound or the pharmaceutically acceptable salt thereof according to any one claims 1 to 20, wherein R^1 and R^2 are both hydrogen atoms.

[Claim 22]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 21, wherein the

compounds of formulas (1a) and (1b), the compounds of formulas (3a) and (3b), the compounds of formulas (4a) and (4b), or the compounds of formulas (5a) and (5b) are represented by formulas (6a) and (6b), respectively:

[Chemical Formula 832]



(6a) (6b)

wherein L^3, L^4, and R^5 are defined the same as any one of claims 1 to 18,

m is an integer 1, 2, or 3,

n is an integer 1, 2, or 3, and

m + n is 2, 3, or 4.

[Claim 23]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 22, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Claim 24]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 23, wherein m is 1 and n is 1.

[Claim 25]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, wherein L^4 is a single bond, or a C_{1-6} alkylene group optionally substituted with $-NR^{21}R^{22}$ or $=NOR^{23}$, wherein R^{21}, R^{22}, and R^{23} are each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted 4- to 10-membered non-aryl heterocyclyl carbonyl group.

[Claim 26]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 25, wherein L^4 is a single bond, $-CH_2-$, $-CH(NH_2)-$, or $-CH(NH_2)-CH_2-$, wherein if an amino group is present in L^4, carbon that

attaches to the amino group attaches to L^3.

[Claim 27]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 25, wherein L^4 is a single bond, $-CH_2-$, $-CMe(NH_2)-$, $-CH(NHMe)-$, $-CD(NH_2)-$ (wherein D represents a heavy hydrogen atom), $-CH(NH_2)-$, or $-CH_2CH_2-$.

[Claim 28]

The compound or the pharmaceutically acceptable salt thereof according to claim 27, wherein L^4 is a single bond, $-CH_2-$, or $-CH(NH_2)-$.

[Claim 29]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 28, wherein R^5 is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted 4- to 10-membered non-aryl heterocycle, optionally substituted C_{6-10} aryl, optionally substituted 5- or 6-membered heteroaryl, an optionally substituted C_{1-6} alkylthio group, or $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Claim 30]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 29, wherein R^5 is optionally substituted 5- or 6-membered heteroaryl or optionally substituted C_{6-10} aryl.

[Claim 31]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 29, wherein R^5 is optionally substituted 5- or 6-membered heteroaryl.

[Claim 32]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 28, wherein R^5 is an optionally substituted 4- to 10-membered non-aryl heterocycle.

[Claim 33]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 28, wherein L^4 is a single bond, and R^5 is $-NR^{e1}OH$, wherein R^{e1} is a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Claim 34]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, wherein L^4 is

1) $-(CH_2)_p-CR^{10}(NHR^{11})-$,

2) $-(CH_2)_q-CR^{12}R^{13}-$, or

3) $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CR^{12}R^{13}-$ (wherein p and q are independently 0 or 1),

R^{10} is

1) a hydrogen atom,

2) a carboxyl group, or

3) $-C(=O)NR^{10a}R^{10b}$,

R^{11} is

1) a hydrogen atom,

2) $-C(=O)R^{11a}$, or

3) an optionally substituted 5- or 6-membered non-aryl heterocyclyl carbonyl group,

wherein if R^{10} is $-C(=O)NR^{10a}R^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$,

R^{12} is

1) a hydrogen atom, or

2) an optionally substituted C_{1-4} alkyl group,

R^{13} is

1) a hydrogen atom,

2) a hydroxyl group,

3) an optionally substituted C_{1-4} alkyl group,

4) a sulfanyl group,

5) a carboxyl group,

6) an optionally substituted C_{1-4} alkylthio group,

7) $-NR^{13a}R^{13b}$,

8) $-NR^{13a}-C(=O)R^{13b}$,

9) an optionally substituted 5- or 6-membered non-aryl

heterocyclyl carbonylamino group,

10) $-NR^{13a}-C(=O)NR^{13b}R^{13c}$,

11) $-C(=O)NR^{13a}R^{13b}$,

12) $-C(=O)NR^{13a}OR^{13b}$,

13) $-S(=O)_2-R^{13a}$,

14) $-S(=O)_2-NR^{13a}R^{13b}$,

15) $-C(=O)NR^{13a}-S(=O)_2-R^{13b}$, or

16) $-C(=O)NR^{13a}-S(=O)_2-NR^{13b}R^{13c}$, and

R^{10a}, R^{10b}, R^{11a}, R^{13a}, R^{13b}, and R^{13c} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Claim 35]

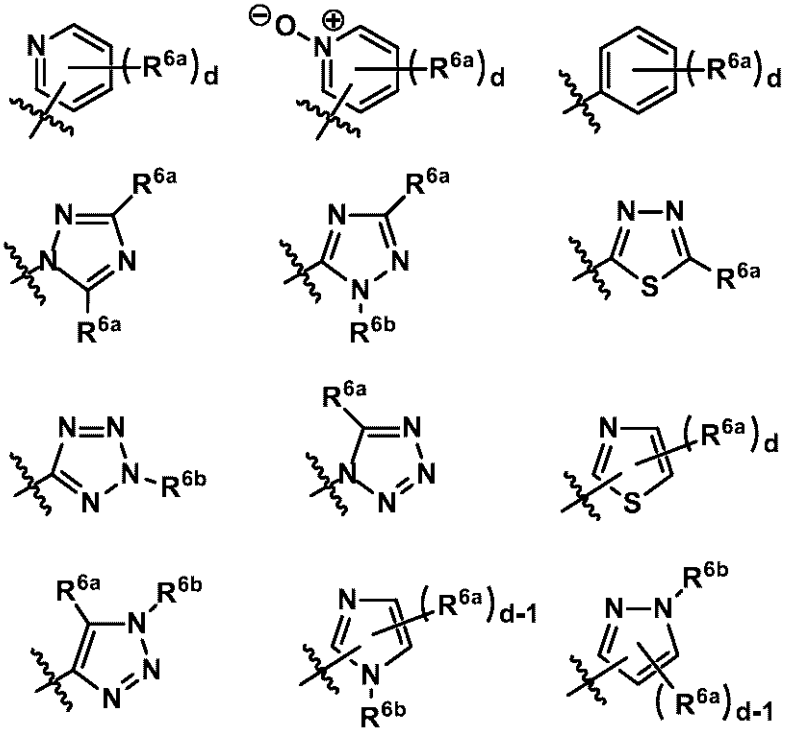
The compound or the pharmaceutically acceptable salt thereof according to claim 34, wherein R^5 is a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Claim 36]

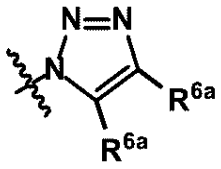
The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 31, wherein

R^5 is selected from the group consisting of

[Chemical Formula 833]



[Chemical Formula 834]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) a nitro group,

5) halogen,

6) a C_{1-4} alkyl group,

7) a C_{3-10} alicyclic group,

8) a C_{1-4} alkoxy group,

9) a C_{3-10} alicyclic oxy group,

10) a C_{6-10} aryloxy group,

11) a 5- or 6-membered heteroaryloxy group,

12) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 6) to 12) is optionally substituted),

13) $-SO_2-NR^{e2}R^{f2}$,

14) $-NR^{g2}-CR^{e2}(=NR^{f2})$,

15) $-NR^{g2}-CR^{e2}(=N-OR^{f2})$,

16) $-NR^{h2}-C(=NR^{g2})NR^{e2}R^{f2}$,

17) $-NR^{h2}-C(=N-OR^{g2})NR^{e2}R^{f2}$,

18) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

19) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

20) $-C(=NR^{e2})R^{f2}$,

21) $-C(=N-OR^{e2})R^{f2}$,

22) $-C(=NR^{h2})-NR^{e2}R^{f2}$,

23) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

24) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,

25) $-NR^{e2}R^{f2}$,

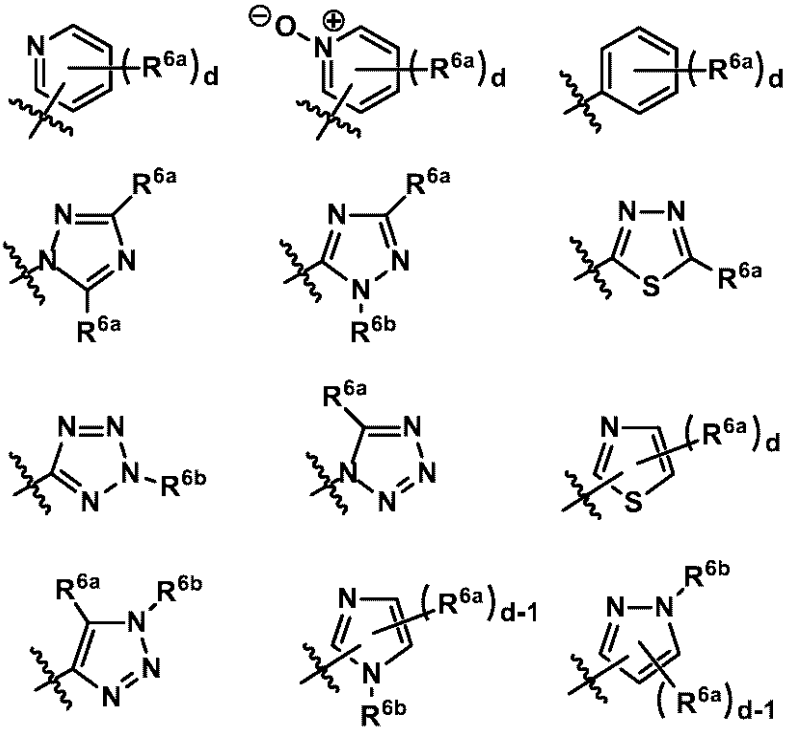
26) $-NR^{g2}-NR^{e2}R^{f2}$,
27) $-NR^{e2}OR^{f2}$,
28) $-NR^{e2}-C(=O)R^{f2}$,
29) $-C(=O)NR^{e2}R^{f2}$,
30) $-C(=O)NR^{e2}OR^{f2}$,
31) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,
32) $-C(=O)R^{e2}$,
33) $-C(=O)OR^{e2}$, and
34) $-C(=N-OR^{h2})NR^{e2}R^{f2}$, and

each R^{6b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted)
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e2})R^{f2}$,
6) $-C(=N-OR^{e2})R^{f2}$,
7) $-SO_2-NR^{e2}R^{f2}$,
8) $-C(=NR^{h2})-NR^{e2}R^{f2}$,
9) $-C(=NR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
10) $-C(=N-OR^{h2})NR^{g2}-NR^{e2}R^{f2}$,
11) $-C(=O)NR^{e2}R^{f2}$,
12) $-C(=O)NR^{e2}OR^{f2}$,
13) $-C(=O)NR^{g2}-NR^{e2}R^{f2}$,
14) $-C(=O)R^{e2}$, and
15) $-C(=N-OR^{h2})NR^{e2}R^{f2}$.

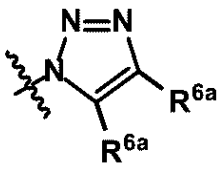
[Claim 37]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 31 and 36, wherein R^5 is 5- or 6-membered aryl or heteroaryl selected from the group consisting of

[Chemical Formula 835]



[Chemical Formula 836]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{6a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f2}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e2}R^{f2}$, and

7) $-C(=O)OR^{e2}$, and

each R^{6b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e2}R^{f2}$, $-C(=O)NR^{e2}R^{f2}$, $-C(=O)OR^{f2}$, or a hydroxyl group).

[Claim 38]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 31, 36, and 37, wherein R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or an optionally substituted C_{3-10} alicyclic group.

[Claim 39]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 31 and 36 to 38, wherein R^{e2} and R^{f2} are the same or different, each independently a hydrogen atom or an optionally substituted C_{1-6} alkyl group.

[Claim 40]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 31 and 36 to 39, wherein R^{e2} and R^{f2} are hydrogen atoms.

[Claim 41]

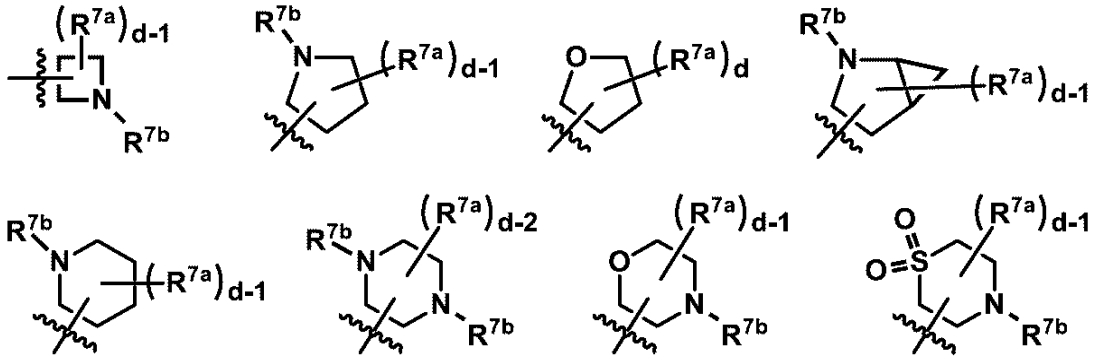
The compound or the pharmaceutically acceptable salt thereof according to any one of claims 36 to 39, wherein R^{6a} is $-NR^{e2}R^{f2}$, and one of R^{e2} and R^{f2} is a hydrogen atom and the other is a C_{1-4} alkyl group (wherein the alkyl group is optionally substituted with an amino group or a hydroxyl group).

[Claim 42]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 29 and 32, wherein R^5 is a 4- to 6-membered non-aryl heterocycle

selected from the group consisting of

[Chemical Formula 837]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) a cyano group,

4) halogen,

5) a C_{1-4} alkyl group,

6) a C_{3-10} alicyclic group,

7) a C_{1-4} alkoxy group,

8) a C_{3-10} alicyclic oxy group,

9) a C_{6-10} aryloxy group,

10) a 5- or 6-membered heteroaryloxy group,

11) a 4- to 10-membered non-aryl heterocyclyl oxy group,

(wherein each substituent from 5) to 11) is optionally substituted),

12) $-SO_2-NR^{e3}R^{f3}$,

13) $-NR^{g2}-CR^{e3}(=NR^{f3})$,

14) $-NR^{g2}-CR^{e3}(=N-OR^{f3})$,

15) $-NR^{h2}-C(=NR^{g2})NR^{e3}R^{f3}$,

16) $-NR^{h2}-C(=N-OR^{g2})NR^{e3}R^{f3}$,

17) $-NR^{i2}-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,

18) $-NR^{i2}-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,

19) $-C(=NR^{e3})R^{f3}$,

20) $-C(=N-OR^{e3})R^{f3}$,

21) $-C(=NR^{h2})-NR^{e3}R^{f3}$,
22) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
23) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
24) $-NR^{e3}R^{f3}$,
25) $-NR^{g2}-NR^{e3}R^{f3}$,
26) $-NR^{e3}OR^{f3}$,
27) $-NR^{e3}-C(=O)R^{f3}$,
28) $-C(=O)NR^{e3}R^{f3}$,
29) $-C(=O)NR^{e3}OR^{f3}$,
30) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,
31) $-C(=O)R^{e3}$,
32) $-C(=O)OR^{e3}$, and
33) $-C(=N-OR^{h2})NR^{e3}R^{f3}$,

each R^{7b} is independently selected from the group consisting of
1) a hydrogen atom,
2) a hydroxyl group,
3) a C_{1-4} alkyl group
(wherein the alkyl group is optionally substituted),
4) a C_{3-10} alicyclic group
(wherein the alicyclic group is optionally substituted),
5) $-C(=NR^{e3})R^{f3}$,
6) $-C(=N-OR^{e3})R^{f3}$,
7) $-SO_2-NR^{e3}R^{f3}$,
8) $-C(=NR^{h2})-NR^{e3}R^{f3}$,
9) $-C(=NR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
10) $-C(=N-OR^{h2})NR^{g2}-NR^{e3}R^{f3}$,
11) $-C(=O)NR^{e3}R^{f3}$,
12) $-C(=O)NR^{e3}OR^{f3}$,
13) $-C(=O)NR^{g2}-NR^{e3}R^{f3}$,
14) $-C(=O)R^{e3}$, and
15) $-C(=N-OR^{h2})NR^{e3}R^{f3}$, and

R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to claim 1.

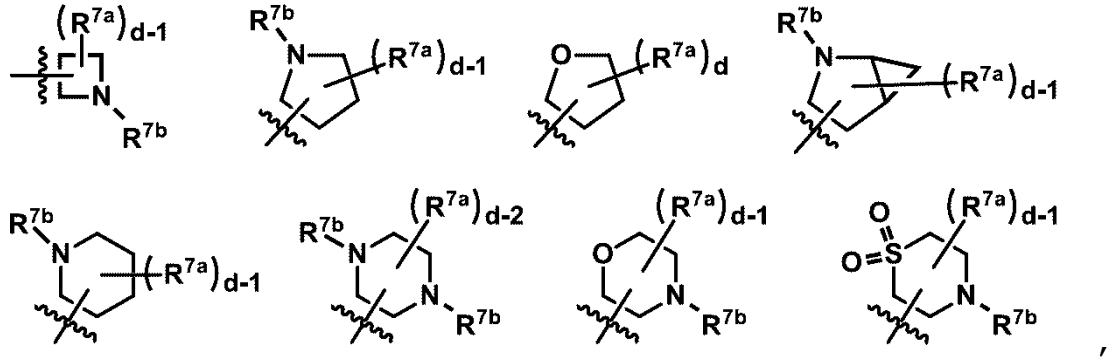
[Claim 43]

The compound or the pharmaceutically acceptable salt

thereof according to any one of claims 1 to 29, 32, and 42, wherein

R^5 is a 4- to 6-membered non-aryl heterocycle selected from the group consisting of

[Chemical Formula 838]



,

subscript d is the number of substitutable positions on a ring of R^5,

each R^{7a} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group,

3) halogen,

4) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e3}R^{f3}$, a 5- or 6-membered non-aryl heterocycle, $-C(=O)OR^{f3}$, or a hydroxyl group),

5) a C_{1-4} alkoxy group

6) $-NR^{e3}R^{f3}$,

7) $-C(=O)OR^{e3}$,

8) C_{6-10} aryl, and

9) $-C(=O)NR^{e3}R^{f3}$,

each R^{7b} is independently selected from the group consisting of

1) a hydrogen atom,

2) a hydroxyl group, and

3) a C_{1-4} alkyl group

(wherein the alkyl group is optionally substituted with $NR^{e3}R^{f3}$, $-C(=O)OR^{f3}$, or a hydroxyl group), and

R^{e3} and R^{f3} are defined the same as R^{e2} and R^{f2} according to any one of claims 38 to 40.

[Claim 44]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CH(NH_2)-CHR^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom, and

R^{13} is

1) $-NH-C(=O)CH_3$,
2) $-NH-C(=O)NH_2$,
3) $-NH-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
4) $-NH-C(=O)CH_2-NH_2$,
5) $-NH-C(=O)CH(NH_2)-CH_2OH$, or
6) a pyrrolidin-2-ylcarbonylamino group.

[Claim 45]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein L^4 is $-CH(NH_2)-CR^{12}R^{13}-$, wherein carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom or methyl,

R^{12} is a hydrogen atom or methyl, and

R^{13} is a benzylthio group or a sulfanyl group.

[Claim 46]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CH(NH_2)-(CH_2)_q-CHR^{13}-$, wherein q is 0 or 1, and carbon that attaches to the NH_2 attaches to L^3,

R^5 is a hydrogen atom, and

R^{13} is

1) a carboxyl group,
2) $-C(=O)NH_2$,
3) $-C(=O)NH(CH_3)$,
4) $-C(=O)N(CH_3)_2$,

5) $-C(=O)NH-(CH_2)_2-OH$,
6) $-C(=O)NH-(CH_2)_2-NH_2$,
7) $-C(=O)NH-S(=O)_2-CH_3$,
8) $-C(=O)NHOH$,
9) $-S(=O)_2-NH_2$,
10) $-S(=O)_2-CH_3$, or
11) a hydroxyl group.

[Claim 47]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CH(NHR^{11})-CH_2-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,

R^5 is hydrogen, and

R^{11} is

1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
2) $-C(=O)CH_2-NH_2$,
3) $-C(=O)CH(CH_3)-NH_2$,
4)- $C(=O)CH(NH_2)-CH_2OH$, or
5) pyrrolidin-2-ylcarbonyl.

[Claim 48]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CH(NHR^{11})-CH(COOH)-$, wherein carbon that attaches to the NHR^{11} attaches to L^3,

R^5 is hydrogen, and

R^{11} is

1) $-C(=O)CH(NH_2)-CH_2C(=O)NH_2$,
2) $-C(=O)CH_2-NH_2$,
3) $-C(=O)CH(CH_3)-NH_2$,
4) $-C(=O)CH(NH_2)-CH_2OH$, or
5) pyrrolidin-2-ylcarbonyl.

[Claim 49]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35,

wherein

L^4 is $-CHR^{13}-$ or $-CH_2-CHR^{13}-$,

R^5 is hydrogen, and

R^{13} is $-C(=O)NH_2$ or $-C(=O)NHOH$.

[Claim 50]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CH_2-CR^{10}(NH_2)-$, wherein the CH_2 attaches to L^3,

R^5 is hydrogen, and

R^{10} is a carboxy group or $-C(=O)NH_2$.

[Claim 51]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$ or $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$, wherein q is 0 or 1,

R^5 is hydrogen,

(1) if L^4 is $-CHR^{13}-(CH_2)_q-CR^{10}(NHR^{11})-(CH_2)_p-$,

carbon of the $-CHR^{13}-$ group attaches to L^3,

p is 0,

R^{10} is a hydrogen atom, a carboxyl group, or $-C(=O)NHR^{10b}$,

R^{11} is a hydrogen atom,

R^{10b} is a hydrogen atom,

wherein if R^{10} is $-C(=O)NHR^{10b}$, R^{10b} and R^{11} together may form $-CH_2CH_2-$, and

R^{13} is a hydrogen atom, and

(2) if L^4 is $-(CH_2)_p-CR^{10}(NHR^{11})-(CH_2)_q-CHR^{13}-$,

carbon of the $-(CH_2)_p-$ group attaches to L^3,

p is 1,

R^{10} and R^{11} are both hydrogen atoms,

R^{13} is a carboxyl group or $-C(=O)NR^{13a}R^{13b}$, and

R^{13a} and R^{13b} are each independently a hydrogen atom or an optionally substituted C_{1-4} alkyl group.

[Claim 52]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 24, 34, and 35, wherein

L^4 is $-CR^{12}(NH_2)-$,

R^{12} is a hydrogen atom or a methyl group, and

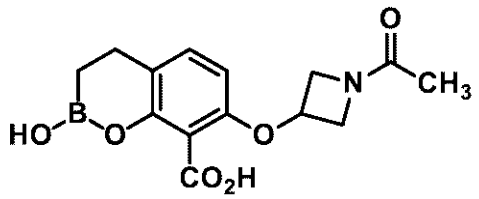
R^5 is a C_{1-4} alkyl group optionally substituted with a hydroxyl group.

[Claim 53]

The compound or the pharmaceutically acceptable salt thereof according to claim 1, represented by the following compound name or structural formula:

7-[(1-acetylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

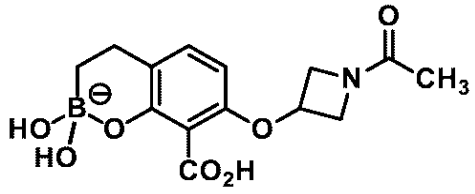
[Chemical Formula 839]



,

8-[(1-acetylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

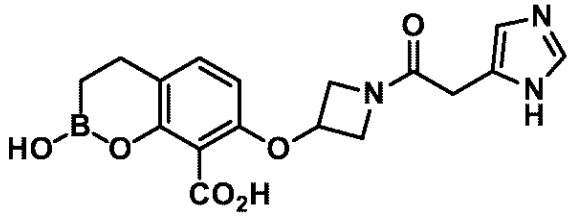
[Chemical Formula 840]



,

2-hydroxy-7-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

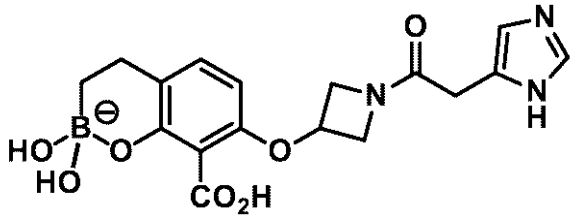
[Chemical Formula 841]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

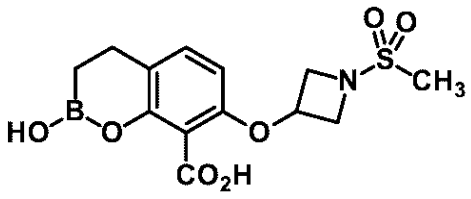
[Chemical Formula 842]



,

2-hydroxy-7-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

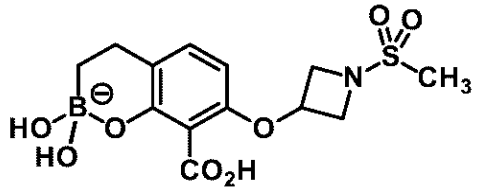
[Chemical Formula 843]



,

4,4-dihydroxy-8-{[1-(methanesulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

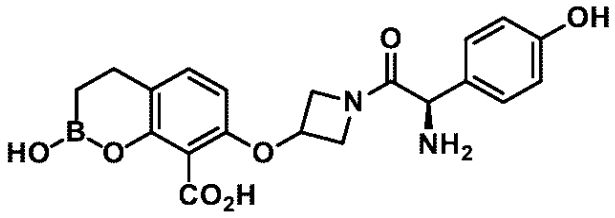
[Chemical Formula 844]



,

7-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

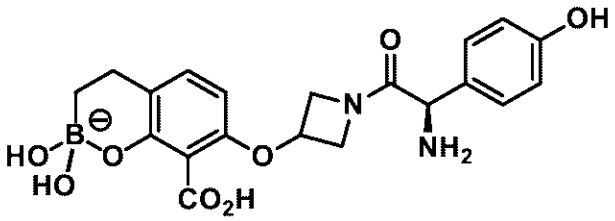
[Chemical Formula 845]



,

8-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

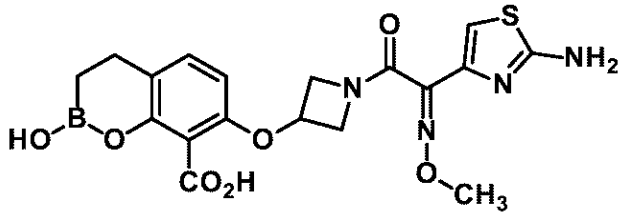
[Chemical Formula 846]



,

7-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

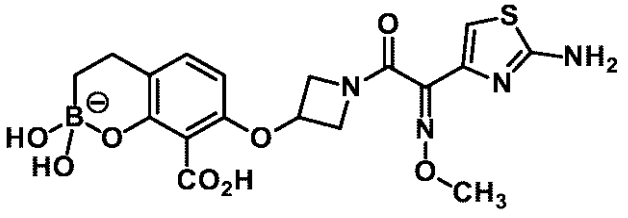
[Chemical Formula 847]



,

8-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

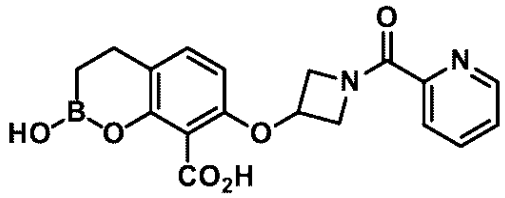
[Chemical Formula 848]



,

2-hydroxy-7-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

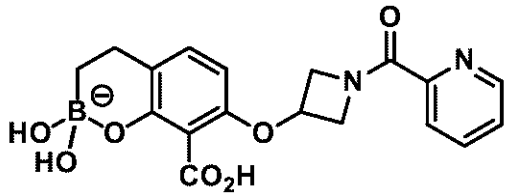
[Chemical Formula 849]



,

4,4-dihydroxy-8-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

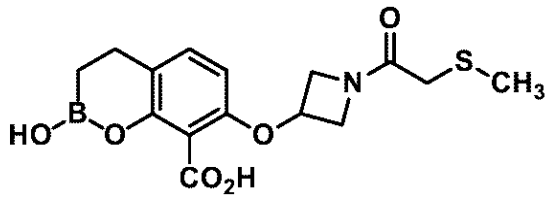
[Chemical Formula 850]



,

2-hydroxy-7-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

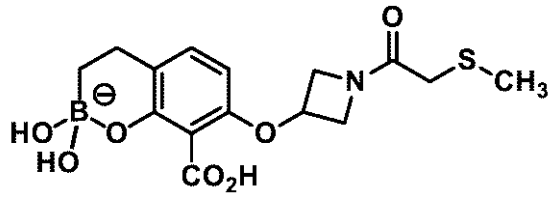
[Chemical Formula 851]



,

4,4-dihydroxy-8-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

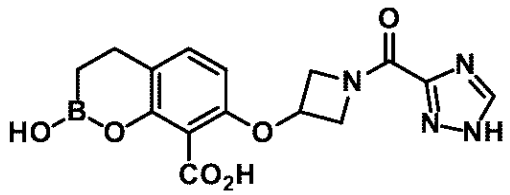
[Chemical Formula 852]



,

2-hydroxy-7-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

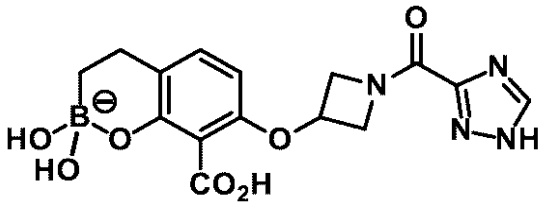
[Chemical Formula 853]



,

4,4-dihydroxy-8-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

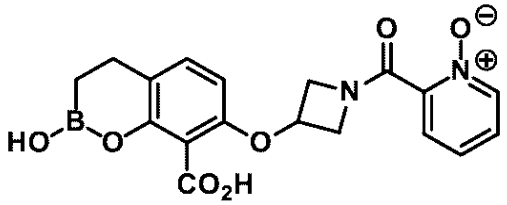
[Chemical Formula 854]



,

2-hydroxy-7-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

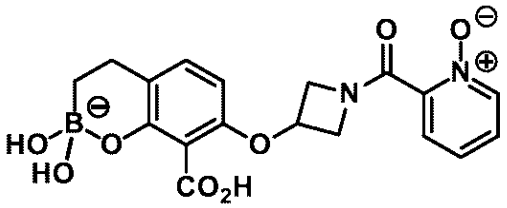
[Chemical Formula 855]



,

4,4-dihydroxy-8-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

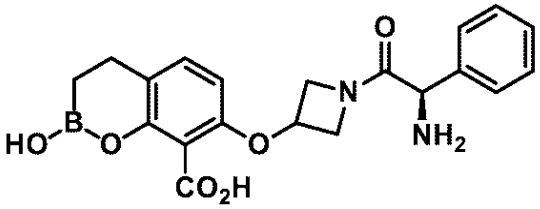
[Chemical Formula 856]



,

7-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

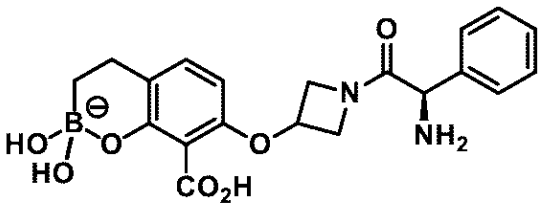
[Chemical Formula 857]



,

8-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

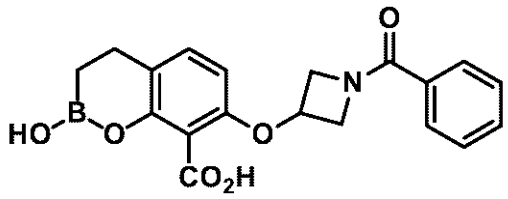
[Chemical Formula 858]



,

7-[(1-benzoylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

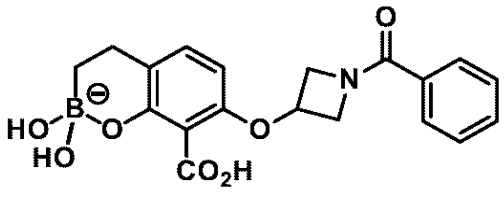
[Chemical Formula 859]



,

8-[(1-benzoylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

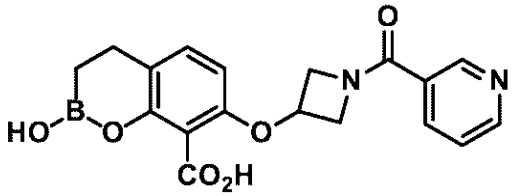
[Chemical Formula 860]



,

2-hydroxy-7-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

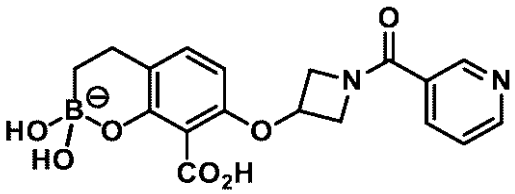
[Chemical Formula 861]



,

4,4-dihydroxy-8-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

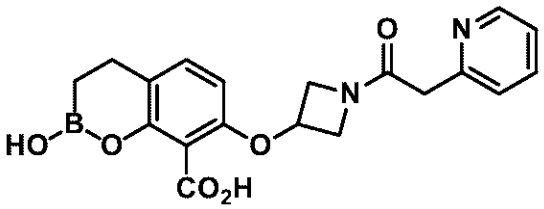
[Chemical Formula 862]



,

2-hydroxy-7-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

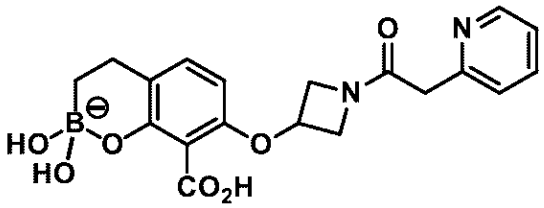
[Chemical Formula 863]



,

4,4-dihydroxy-8-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

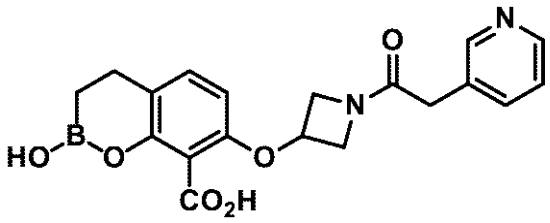
[Chemical Formula 864]



,

2-hydroxy-7-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

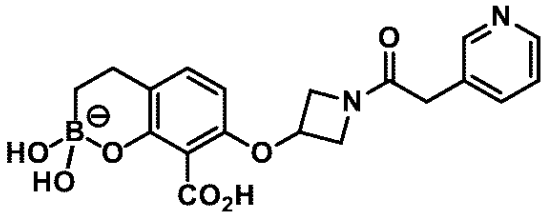
[Chemical Formula 865]



,

4,4-dihydroxy-8-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

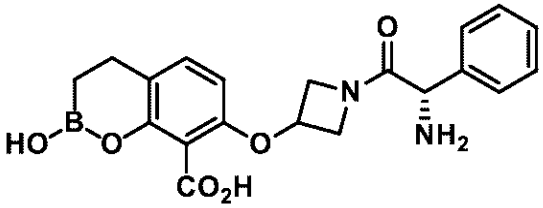
[Chemical Formula 866]



,

7-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

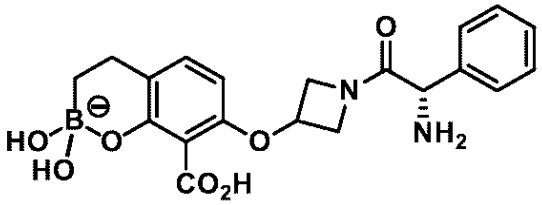
[Chemical Formula 867]



,

8-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

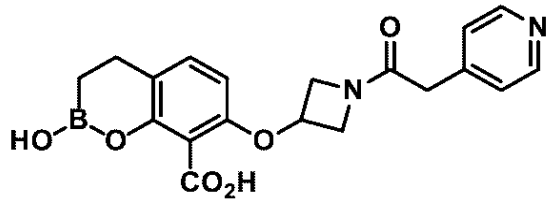
[Chemical Formula 868]



,

2-hydroxy-7-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

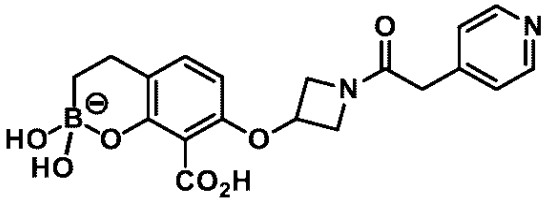
[Chemical Formula 869]



,

4,4-dihydroxy-8-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

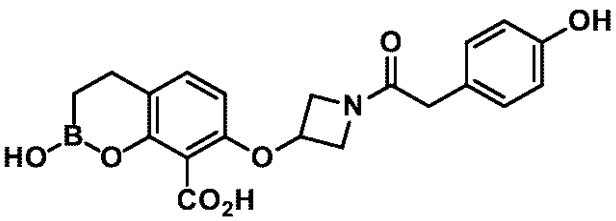
[Chemical Formula 870]



,

2-hydroxy-7-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

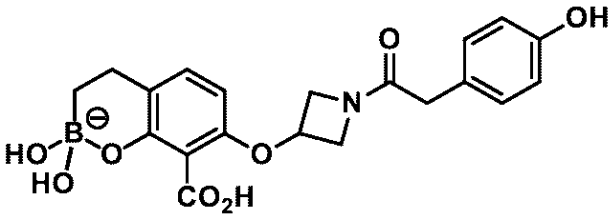
[Chemical Formula 871]



,

4,4-dihydroxy-8-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

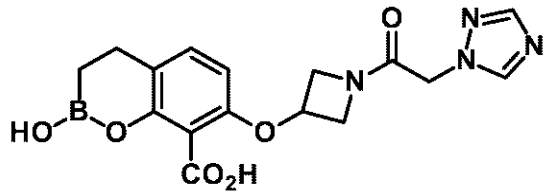
[Chemical Formula 872]



,

2-hydroxy-7-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

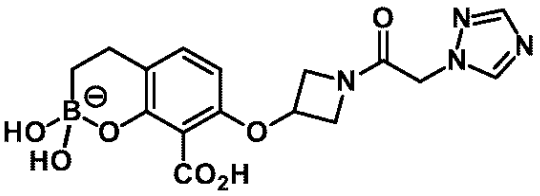
[Chemical Formula 873]



,

4,4-dihydroxy-8-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

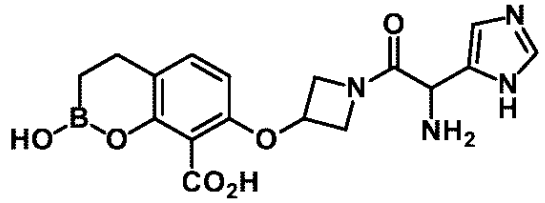
[Chemical Formula 874]



,

7-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

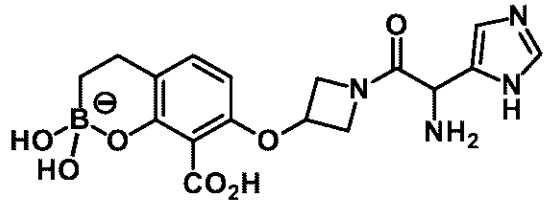
[Chemical Formula 875]



,

8-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

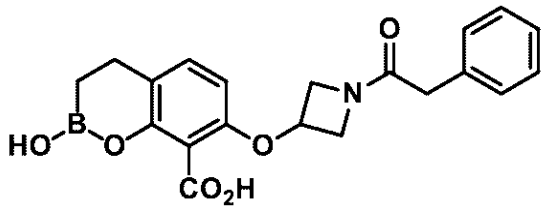
[Chemical Formula 876]



,

2-hydroxy-7-{[1-(phenylacetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

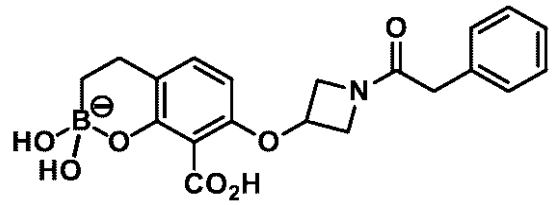
[Chemical Formula 877]



,

4,4-dihydroxy-8-{[1-(phenylacetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

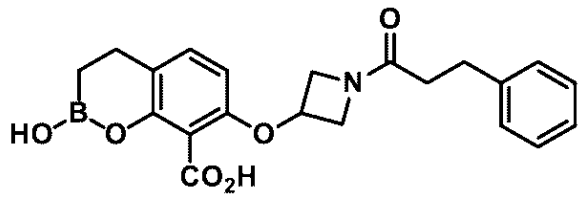
[Chemical Formula 878]



,

2-hydroxy-7-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

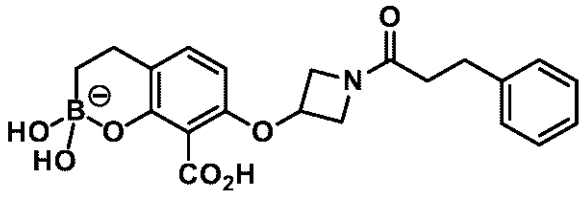
[Chemical Formula 879]



,

4,4-dihydroxy-8-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

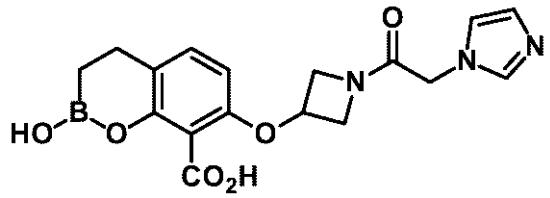
[Chemical Formula 880]



,

2-hydroxy-7-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

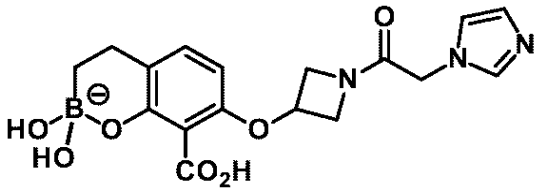
[Chemical Formula 881]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

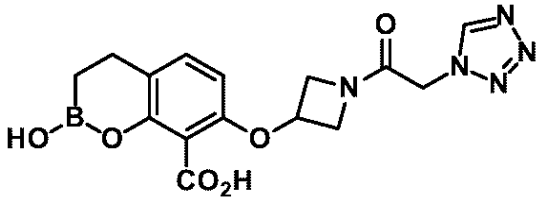
[Chemical Formula 882]



,

2-hydroxy-7-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

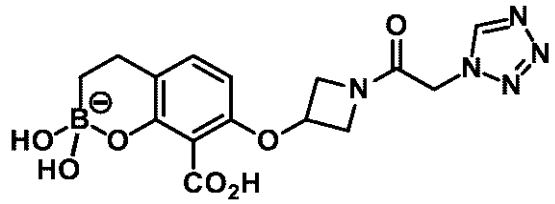
[Chemical Formula 883]



,

4,4-dihydroxy-8-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

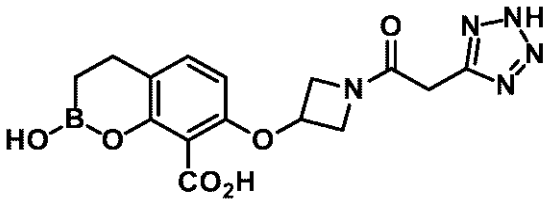
[Chemical Formula 884]



,

2-hydroxy-7-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

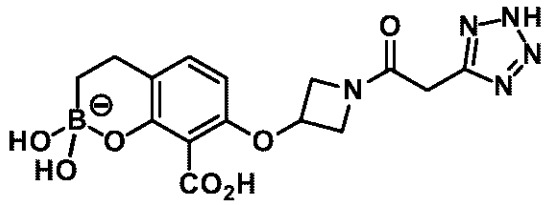
[Chemical Formula 885]



,

4,4-dihydroxy-8-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

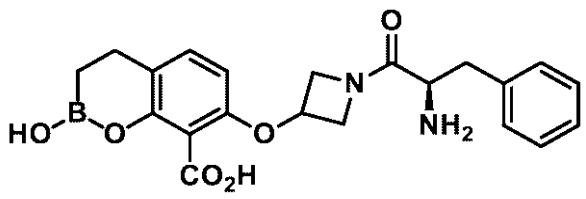
[Chemical Formula 886]



,

2-hydroxy-7-[(1-D-phenylalanylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

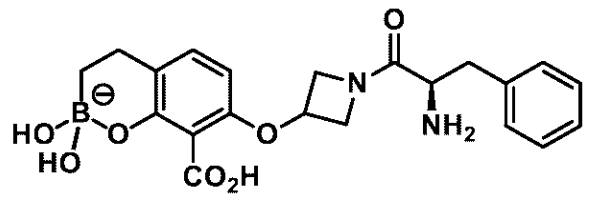
[Chemical Formula 887]



,

4,4-dihydroxy-8-[(1-D-phenylalanylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

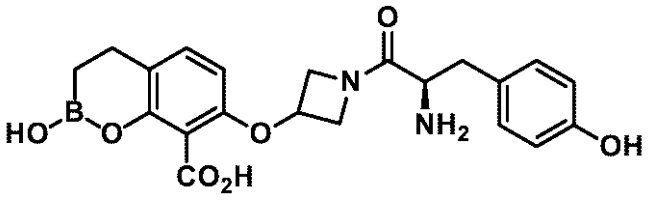
[Chemical Formula 888]



,

2-hydroxy-7-[(1-D-tyrosylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

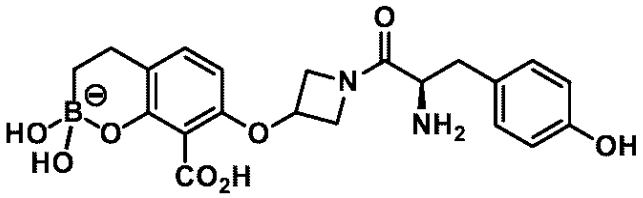
[Chemical Formula 889]



,

4,4-dihydroxy-8-[(1-D-tyrosylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

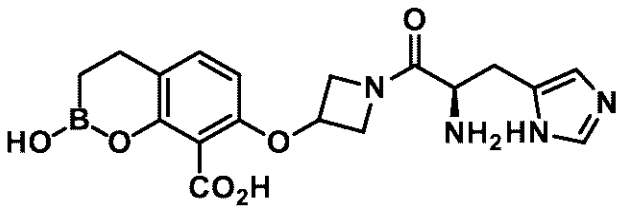
[Chemical Formula 890]



,

7-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

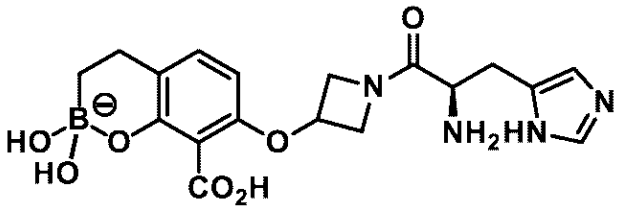
[Chemical Formula 891]



,

8-[(1-D-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

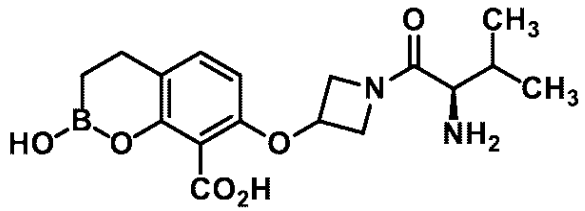
[Chemical Formula 892]



,

2-hydroxy-7-[(1-D-valylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

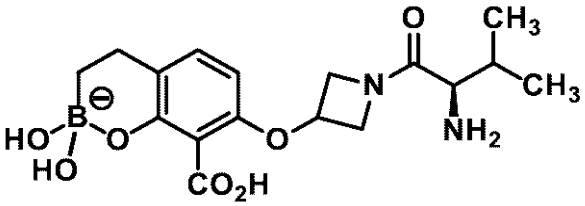
[Chemical Formula 893]



,

4,4-dihydroxy-8-[(1-D-valylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

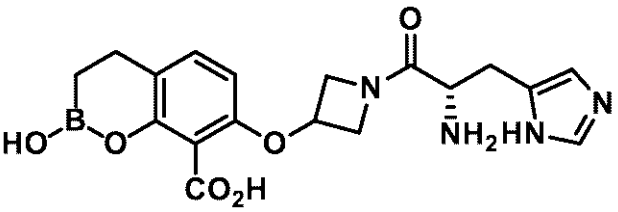
[Chemical Formula 894]



,

7-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

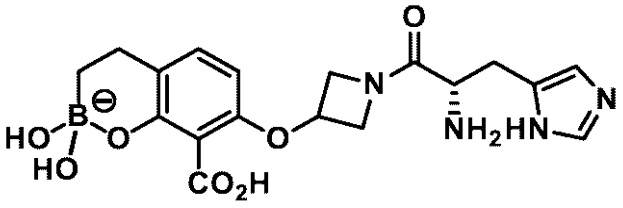
[Chemical Formula 895]



,

8-[(1-L-histidylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

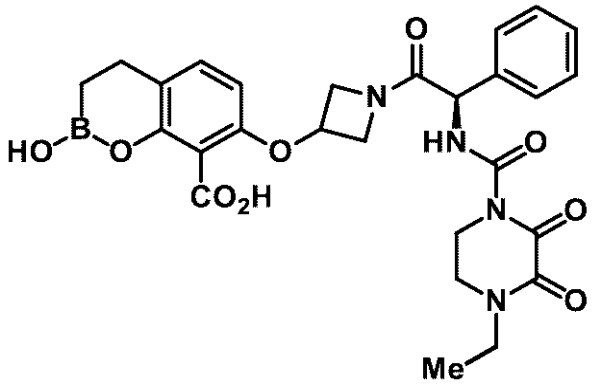
[Chemical Formula 896]



,

7-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

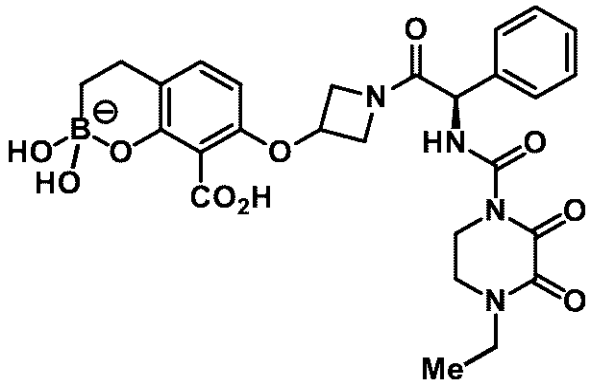
[Chemical Formula 897]



,

8-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

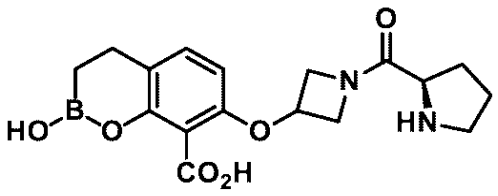
[Chemical Formula 898]



,

2-hydroxy-7-[(1-D-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

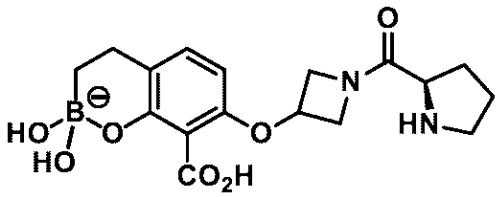
[Chemical Formula 899]



,

4,4-dihydroxy-8-[(1-D-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

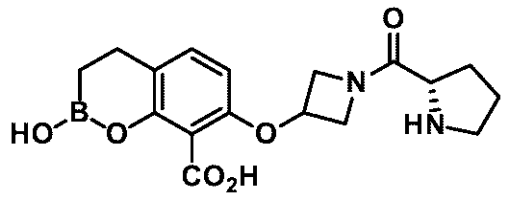
[Chemical Formula 900]



,

2-hydroxy-7-[(1-L-prolylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

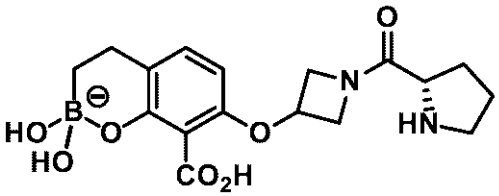
[Chemical Formula 901]



,

4,4-dihydroxy-8-[(1-L-prolylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

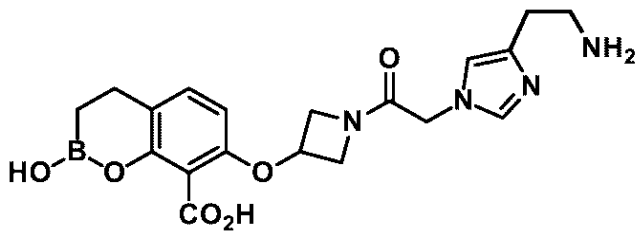
[Chemical Formula 902]



,

7-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 903]

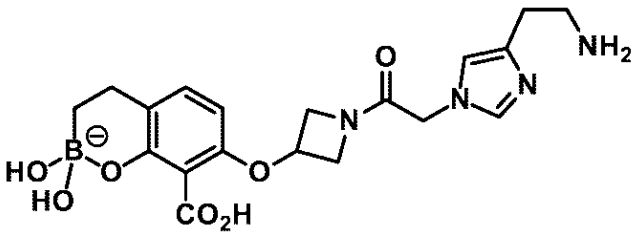


,

8-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic

acid

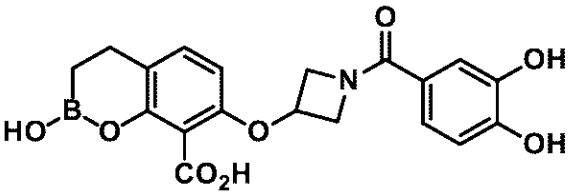
[Chemical Formula 904]



,

7-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

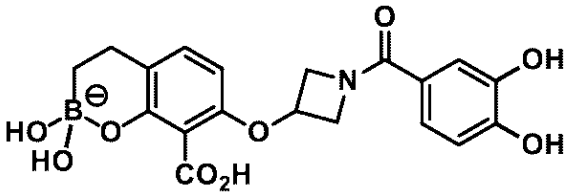
[Chemical Formula 905]



,

8-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

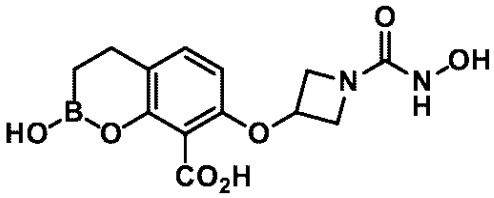
[Chemical Formula 906]



,

2-hydroxy-7-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

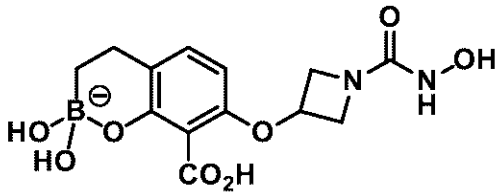
[Chemical Formula 907]



, or

4,4-dihydroxy-8-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 908]



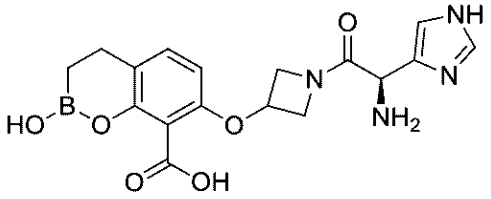
.

[Claim 54]

The compound or the pharmaceutically acceptable salt thereof of claim 1, represented by the following compound name or structural formula:

7-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

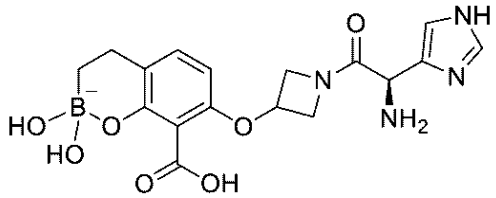
[Chemical Formula 909]



,

8-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

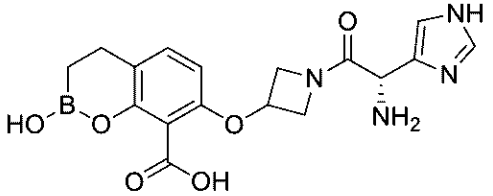
[Chemical Formula 910]



,

7-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

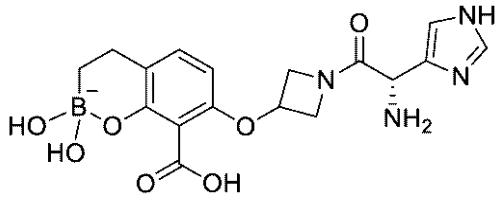
[Chemical Formula 911]



,

8-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

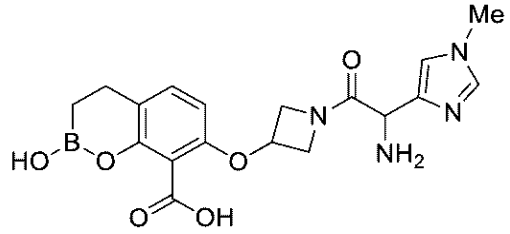
[Chemical Formula 912]



,

7-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

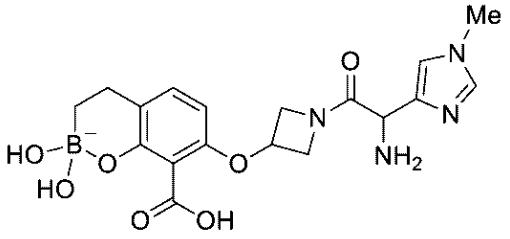
[Chemical Formula 913]



,

8-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 914]

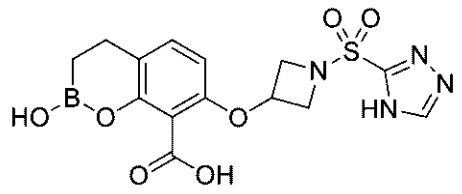


,

2-hydroxy-7-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-

yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

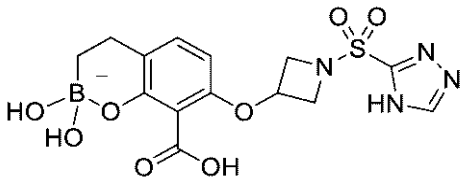
[Chemical Formula 915]



,

4,4-dihydroxy-8-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

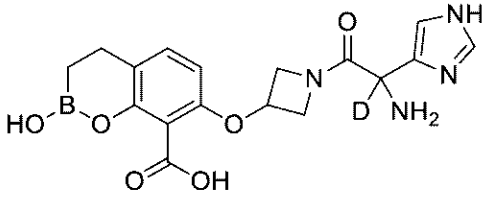
[Chemical Formula 916]



,

7-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

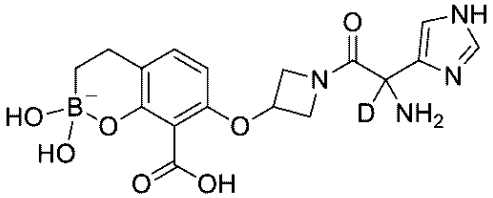
[Chemical Formula 917]



,

8-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 918]

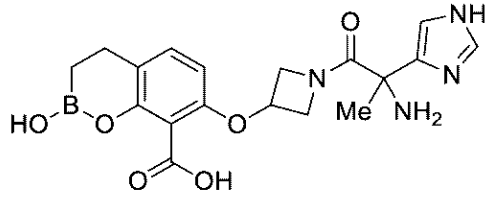


,

7-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-

yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

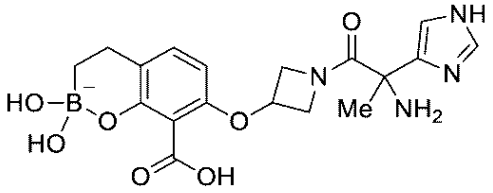
[Chemical Formula 919]



,

8-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

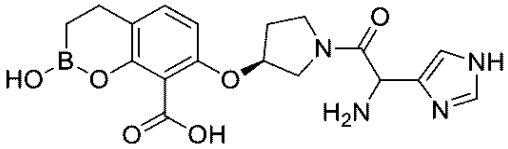
[Chemical Formula 920]



,

7-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

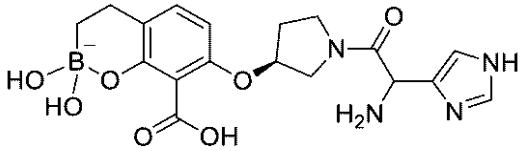
[Chemical Formula 921]



,

8-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

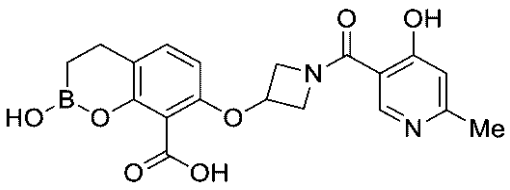
[Chemical Formula 922]



,

2-hydroxy-7-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

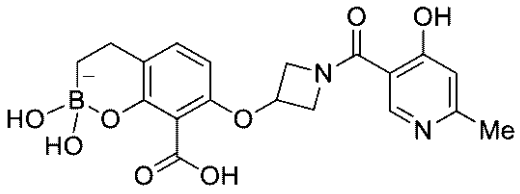
[Chemical Formula 923]



,

4,4-dihydroxy-8-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

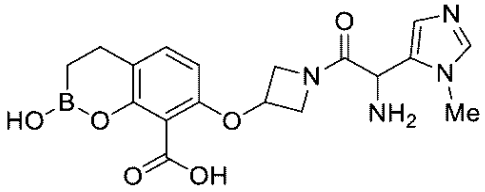
[Chemical Formula 924]



,

7-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

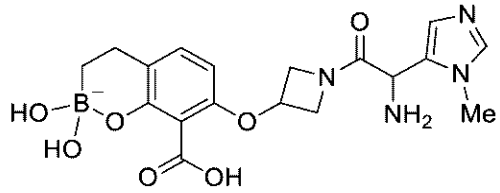
[Chemical Formula 925]



,

8-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

[Chemical Formula 926]

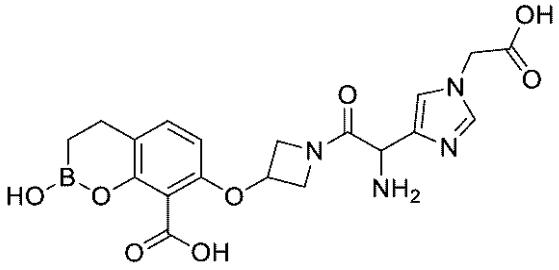


,

7-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-

benzoxaborinine-8-carboxylic acid

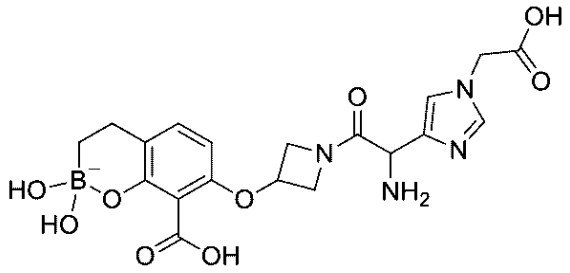
[Chemical Formula 927]



,

8-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

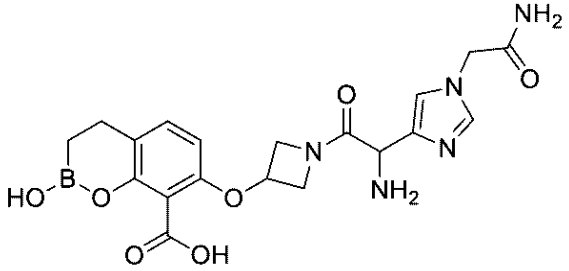
[Chemical Formula 928]



,

7-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

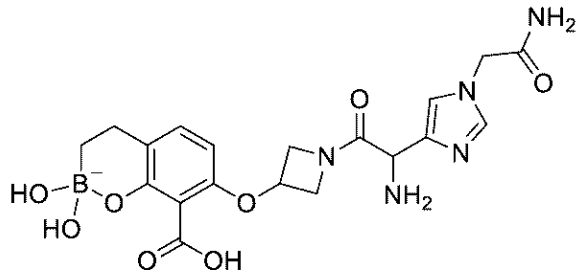
[Chemical Formula 929]



,

8-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

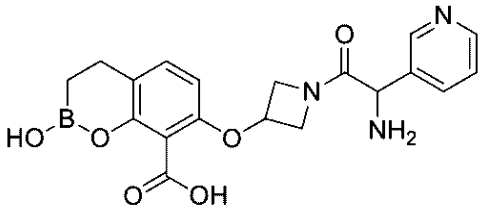
[Chemical Formula 930]



,

7-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

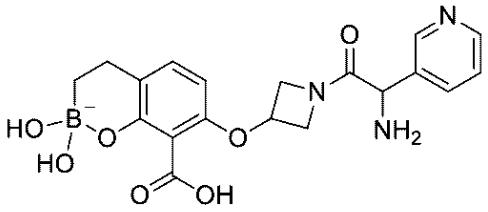
[Chemical Formula 931]



,

8-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

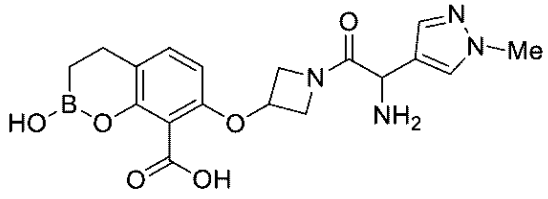
[Chemical Formula 932]



,

7-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 933]

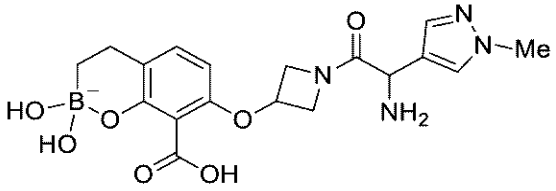


,

8-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-

yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

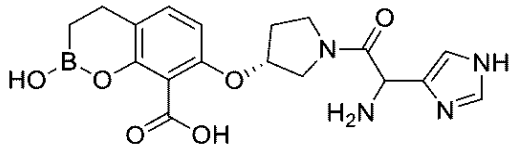
[Chemical Formula 934]



,

7-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

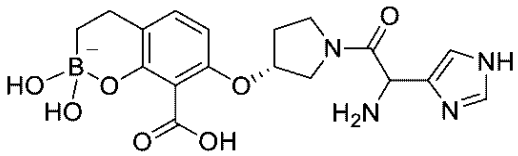
[Chemical Formula 935]



,

8-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

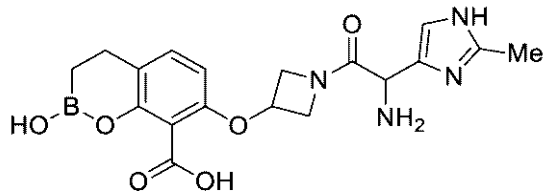
[Chemical Formula 936]



,

7-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

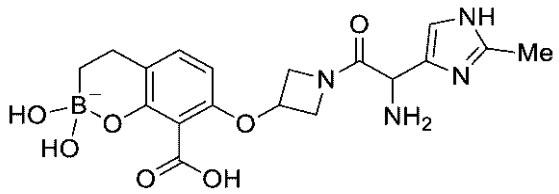
[Chemical Formula 937]



,

8-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

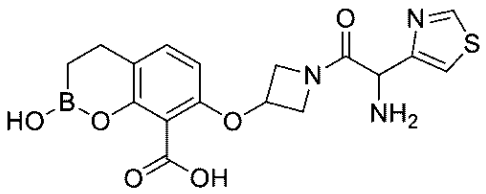
[Chemical Formula 938]



,

7-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

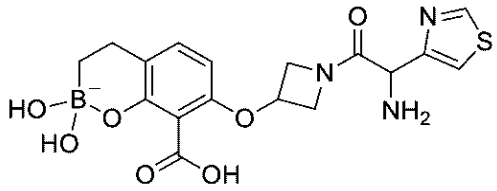
[Chemical Formula 939]



,

8-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

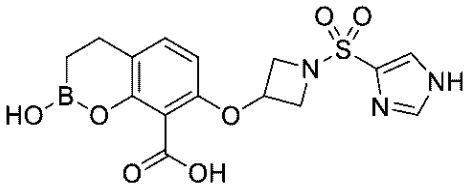
[Chemical Formula 940]



,

2-hydroxy-7-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

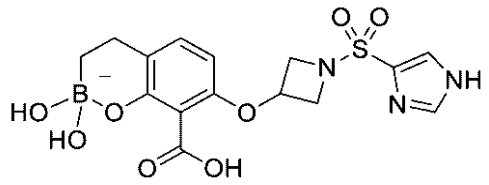
[Chemical Formula 941]



,

4,4-dihydroxy-8-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

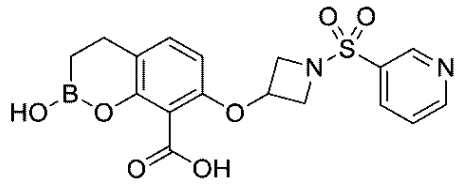
[Chemical Formula 942]



,

2-hydroxy-7-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

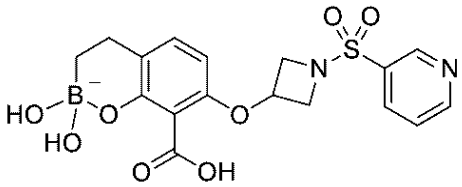
[Chemical Formula 943]



,

4,4-dihydroxy-8-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

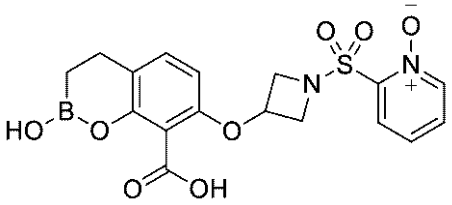
[Chemical Formula 944]



,

2-hydroxy-7-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

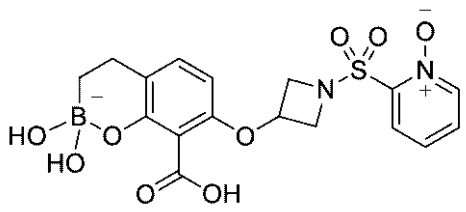
[Chemical Formula 945]



,

4,4-dihydroxy-8-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

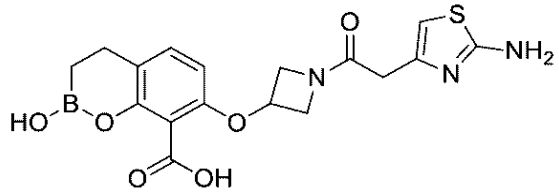
[Chemical Formula 946]



,

7-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

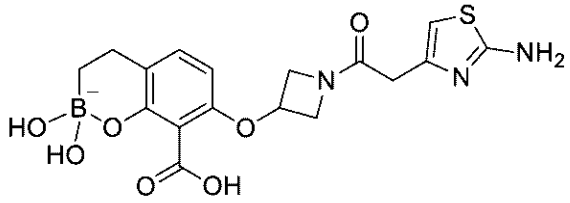
[Chemical Formula 947]



,

8-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

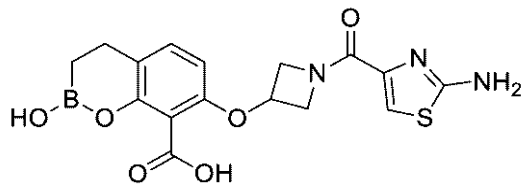
[Chemical Formula 948]



,

7-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

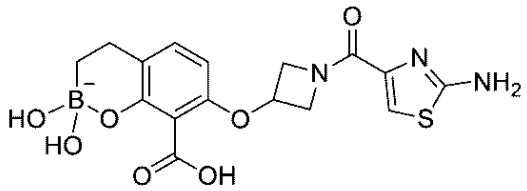
[Chemical Formula 949]



,

8-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

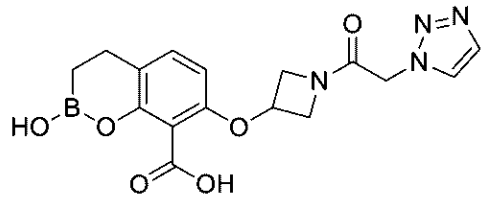
[Chemical Formula 950]



,

2-hydroxy-7-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

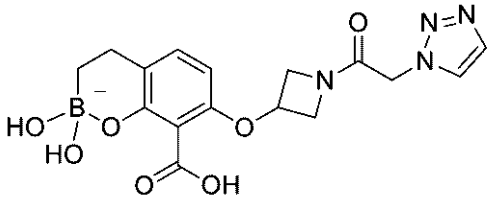
[Chemical Formula 951]



,

4,4-dihydroxy-8-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

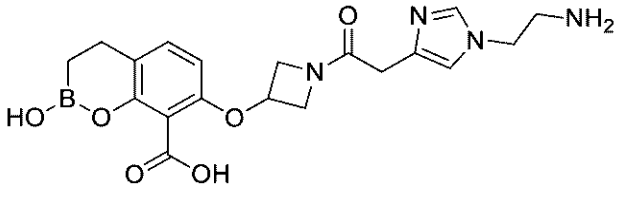
[Chemical Formula 952]



,

7-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 953]

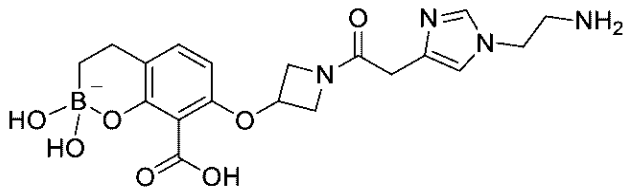


,

8-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-

boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

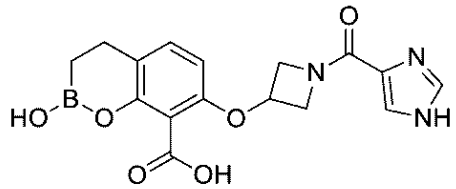
[Chemical Formula 954]



,

2-hydroxy-7-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

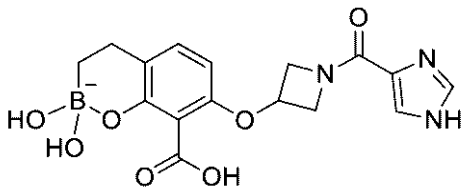
[Chemical Formula 955]



,

4,4-dihydroxy-8-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

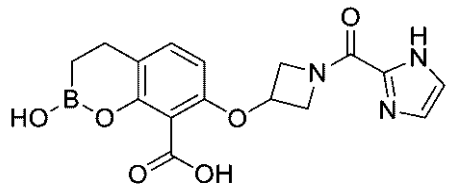
[Chemical Formula 956]



,

2-hydroxy-7-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

[Chemical Formula 957]

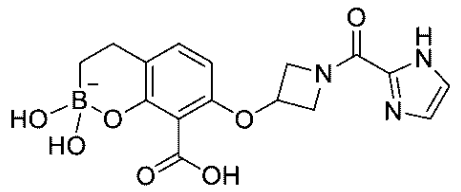


,

4,4-dihydroxy-8-{[1-(1H-imidazole-2-carbonyl)azetidin-3-

yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

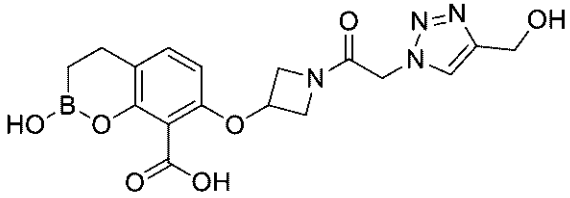
[Chemical Formula 958]



,

2-hydroxy-7-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

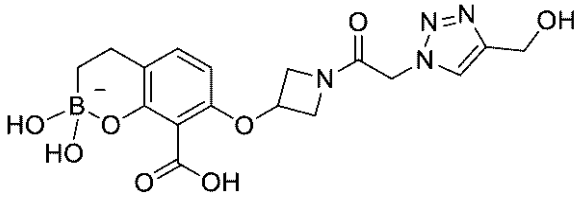
[Chemical Formula 959]



,

4,4-dihydroxy-8-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

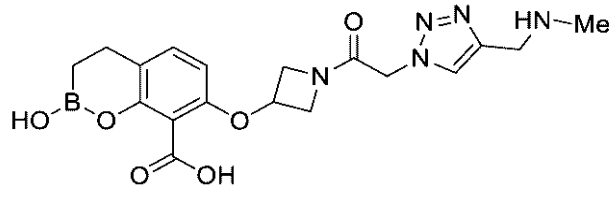
[Chemical Formula 960]



,

2-hydroxy-7-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

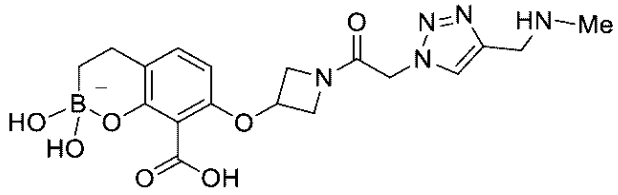
[Chemical Formula 961]



,

4,4-dihydroxy-8-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

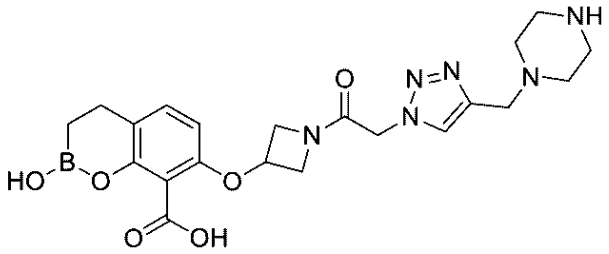
[Chemical Formula 962]



,

2-hydroxy-7-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

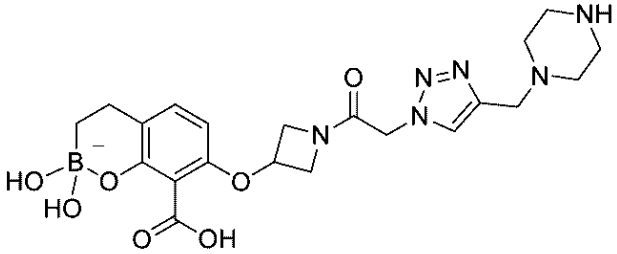
[Chemical Formula 963]



,

4,4-dihydroxy-8-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

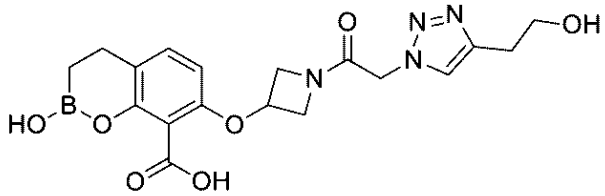
[Chemical Formula 964]



,

2-hydroxy-7-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

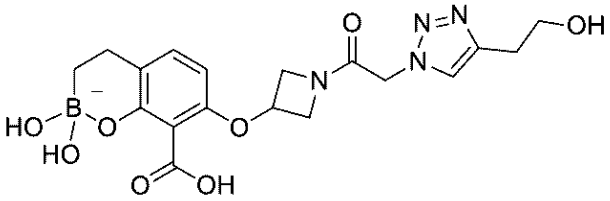
[Chemical Formula 965]



,

4,4-dihydroxy-8-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

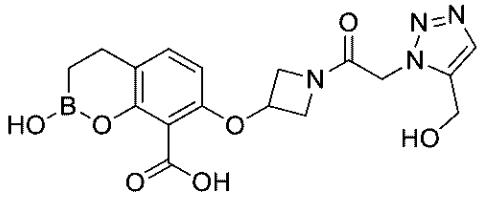
[Chemical Formula 966]



,

2-hydroxy-7-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

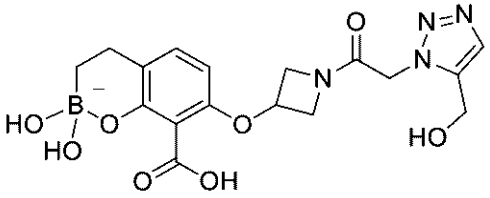
[Chemical Formula 967]



,

4,4-dihydroxy-8-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

[Chemical Formula 968]

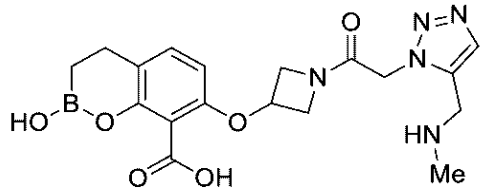


,

2-hydroxy-7-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-

1-yl}acetyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

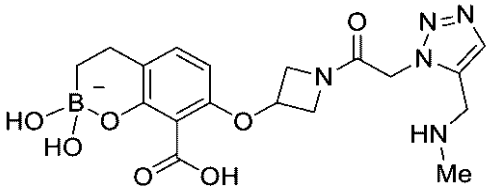
[Chemical Formula 969]



,

4,4-dihydroxy-8-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

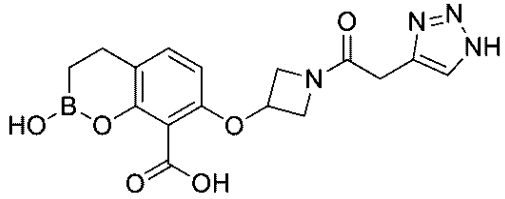
[Chemical Formula 970]



,

2-hydroxy-7-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

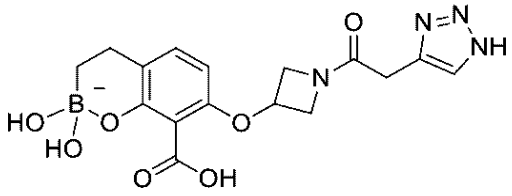
[Chemical Formula 971]



,

4,4-dihydroxy-8-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

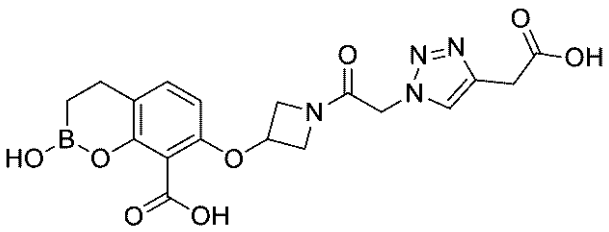
[Chemical Formula 972]



,

7-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

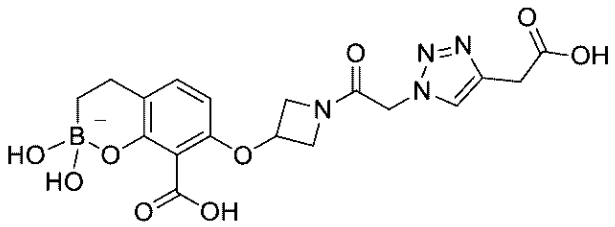
[Chemical Formula 973]



,

8-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

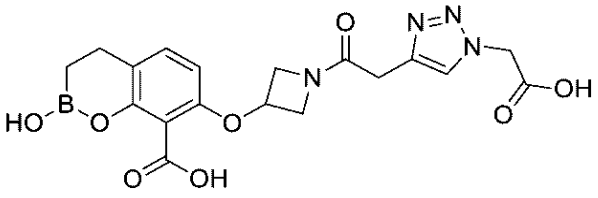
[Chemical Formula 974]



,

7-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

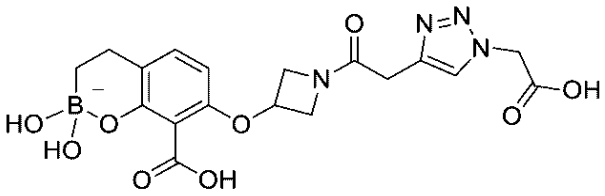
[Chemical Formula 975]



,

8-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

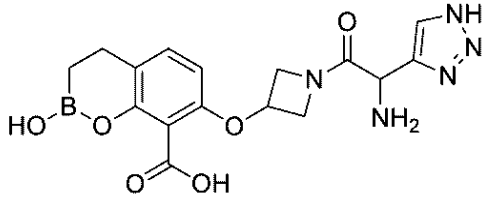
[Chemical Formula 976]



,

7-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

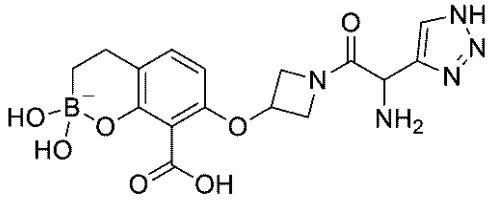
[Chemical Formula 977]



,

8-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

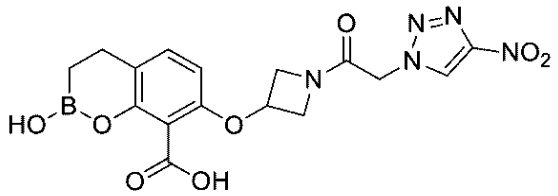
[Chemical Formula 978]



,

2-hydroxy-7-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

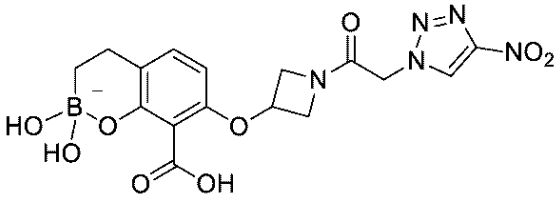
[Chemical Formula 979]



,

4,4-dihydroxy-8-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

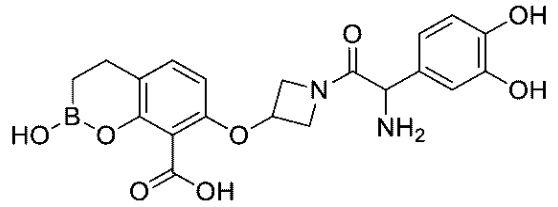
[Chemical Formula 980]



,

7-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

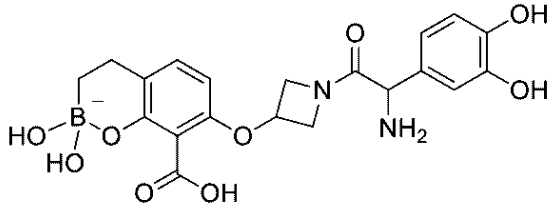
[Chemical Formula 981]



,

8-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

[Chemical Formula 982]

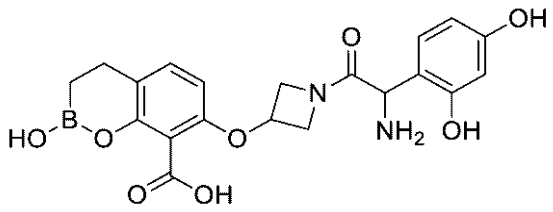


,

7-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic

acid

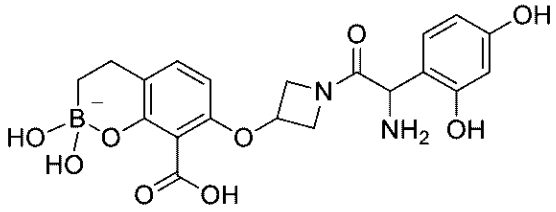
[Chemical Formula 983]



,

8-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

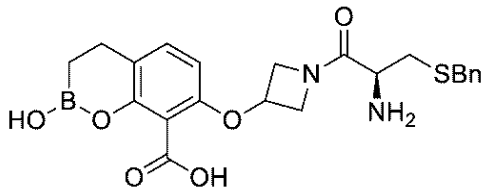
[Chemical Formula 984]



,

7-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

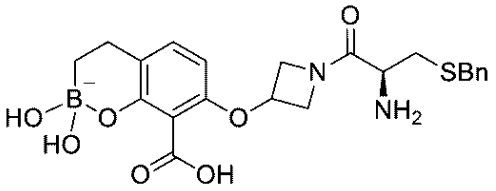
[Chemical Formula 985]



,

8-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

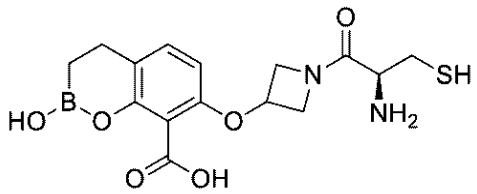
[Chemical Formula 986]



,

7-[(1-D-cysteinylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

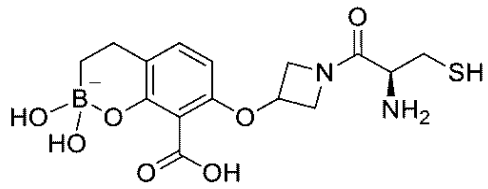
[Chemical Formula 987]



,

7-[(1-D-cysteinylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

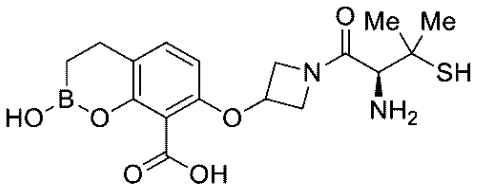
[Chemical Formula 988]



,

2-hydroxy-7-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

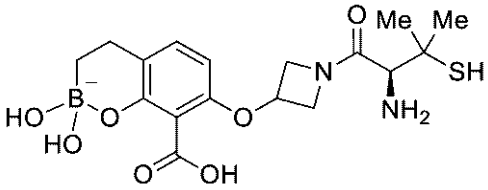
[Chemical Formula 989]



,

4,4-dihydroxy-8-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

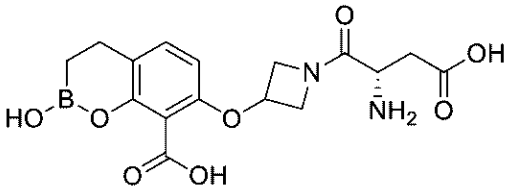
[Chemical Formula 990]



,

7-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

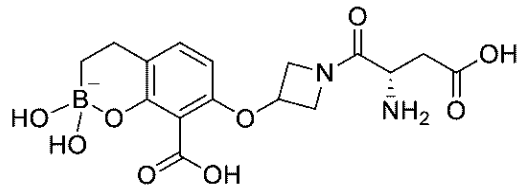
[Chemical Formula 991]



,

8-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

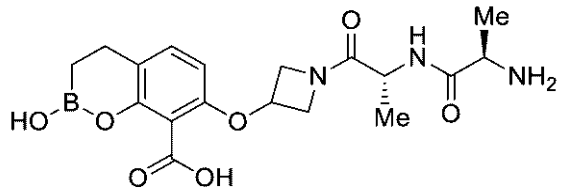
[Chemical Formula 992]



,

7-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

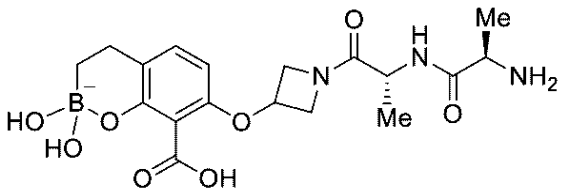
[Chemical Formula 993]



,

8-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

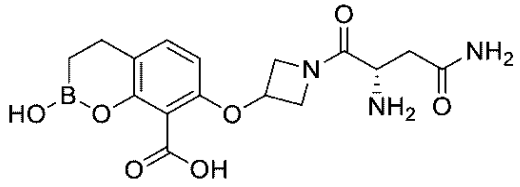
[Chemical Formula 994]



,

7-[(1-L-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

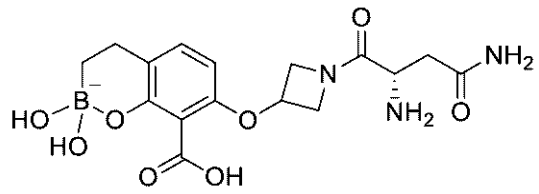
[Chemical Formula 995]



,

8-[(1-L-asparaginylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

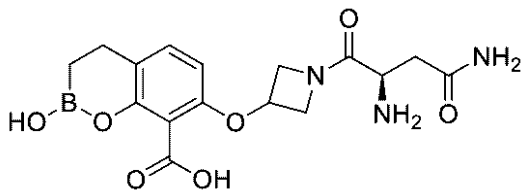
[Chemical Formula 996]



,

7-[(1-D-asparaginylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

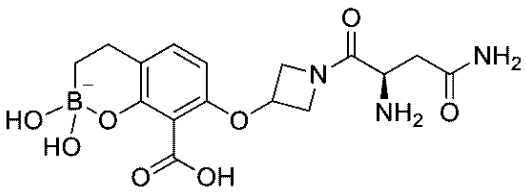
[Chemical Formula 997]



,

8-[(1-D-asparaginylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

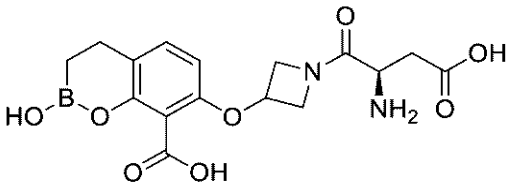
[Chemical Formula 998]



,

7-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

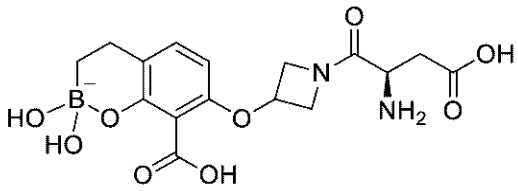
[Chemical Formula 999]



,

8-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

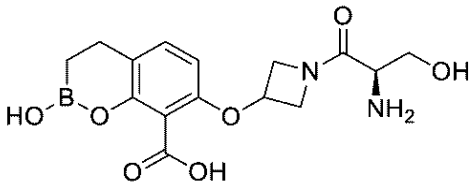
[Chemical Formula 1000]



,

2-hydroxy-7-[(1-D-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

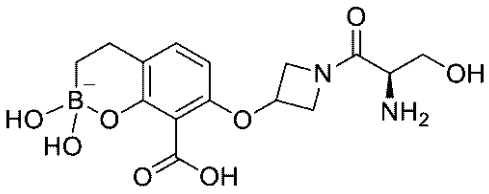
[Chemical Formula 1001]



,

4,4-dihydroxy-8-[(1-D-serylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

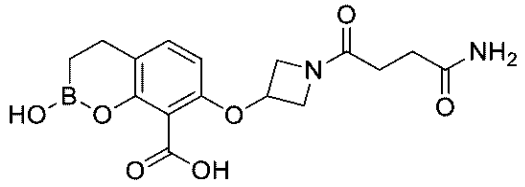
[Chemical Formula 1002]



,

7-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

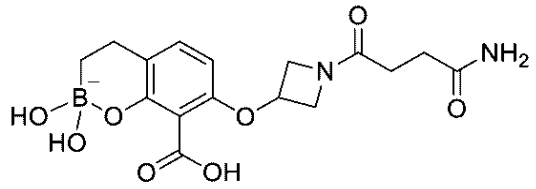
[Chemical Formula 1003]



,

8-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

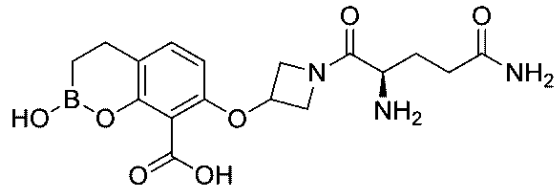
[Chemical Formula 1004]



,

7-[(1-D-glutaminylazetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

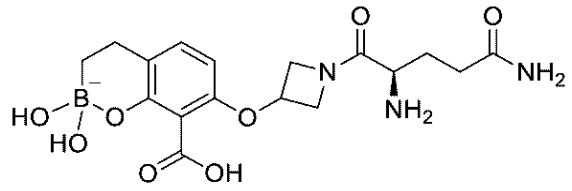
[Chemical Formula 1005]



,

8-[(1-D-glutaminylazetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

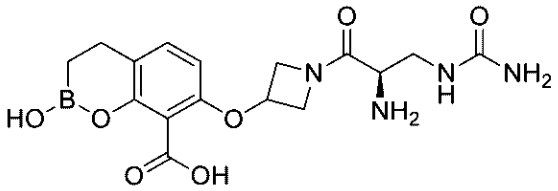
[Chemical Formula 1006]



,

7-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

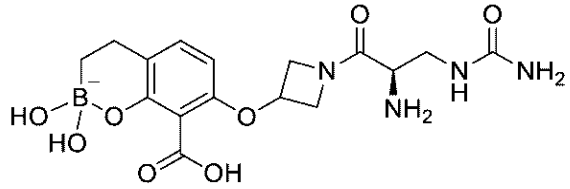
[Chemical Formula 1007]



,

8-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

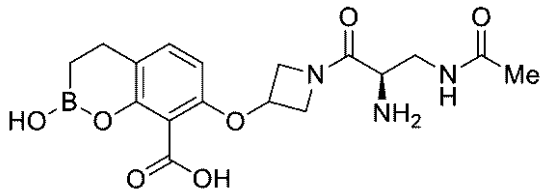
[Chemical Formula 1008]



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7-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

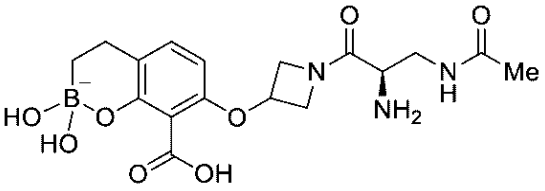
[Chemical Formula 1009]



,

8-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

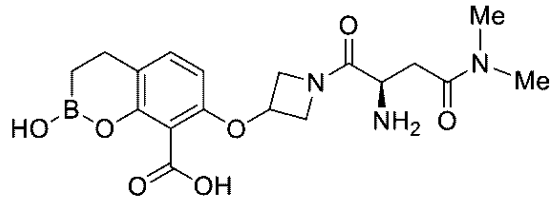
[Chemical Formula 1010]



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7-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

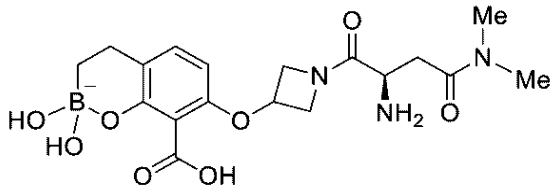
[Chemical Formula 1011]



,

8-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

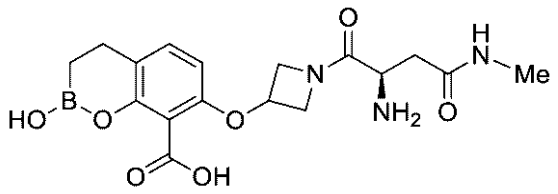
[Chemical Formula 1012]



,

2-hydroxy-7-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

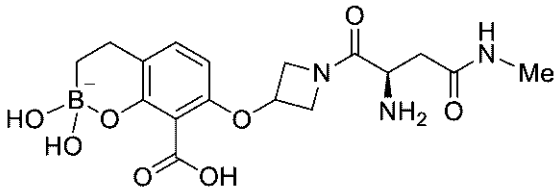
[Chemical Formula 1013]



,

4,4-dihydroxy-8-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

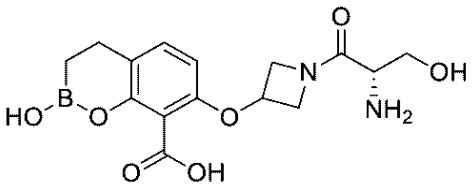
[Chemical Formula 1014]



,

2-hydroxy-7-[(1-L-serylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

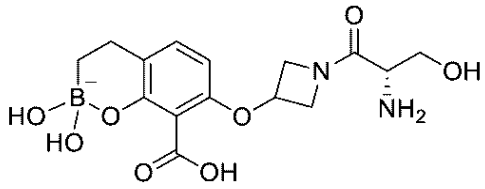
[Chemical Formula 1015]



,

4,4-dihydroxy-8-[(1-L-serylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

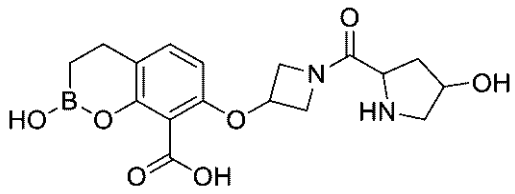
[Chemical Formula 1016]



,

2-hydroxy-7-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

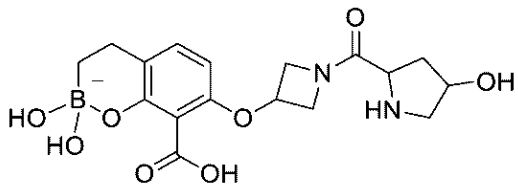
[Chemical Formula 1017]



,

4,4-dihydroxy-8-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

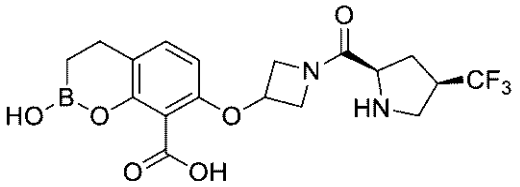
[Chemical Formula 1018]



,

2-hydroxy-7-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

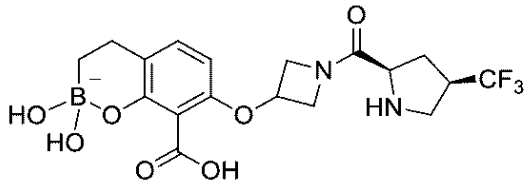
[Chemical Formula 1019]



,

4,4-dihydroxy-8-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

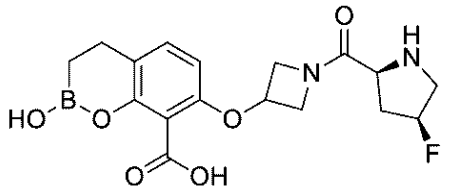
[Chemical Formula 1020]



,

7-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

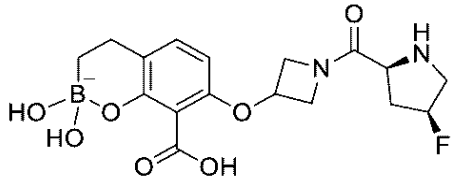
[Chemical Formula 1021]



,

8-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

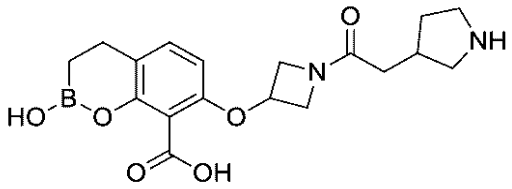
[Chemical Formula 1022]



,

2-hydroxy-7-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

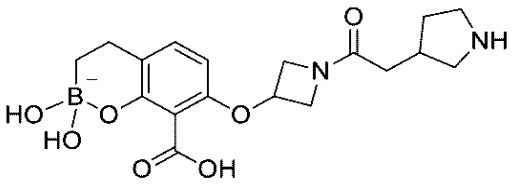
[Chemical Formula 1023]



,

4,4-dihydroxy-8-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

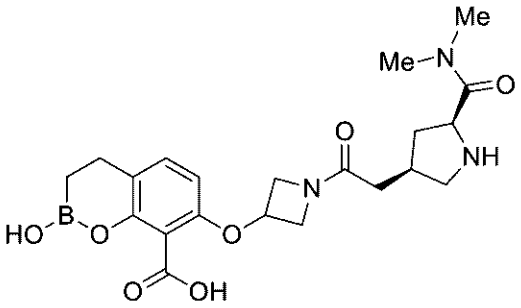
[Chemical Formula 1024]



,

7-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

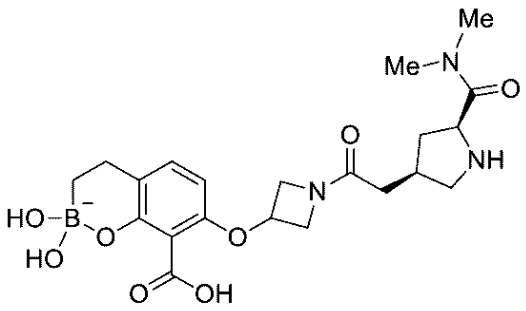
[Chemical Formula 1025]



,

8-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

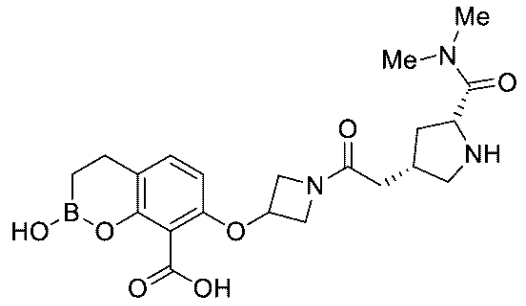
[Chemical Formula 1026]



,

7-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

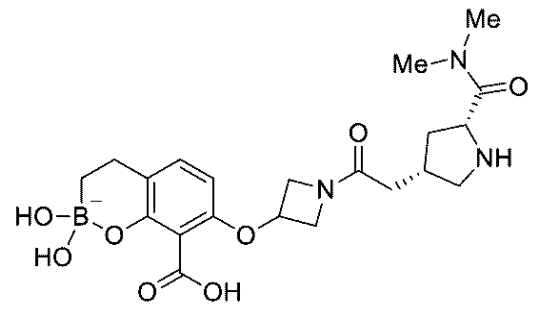
[Chemical Formula 1027]



,

8-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

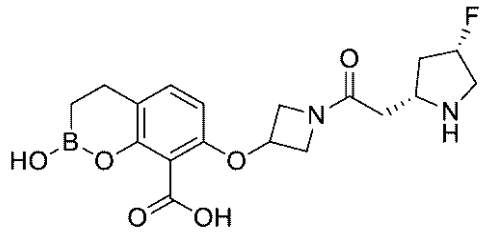
[Chemical Formula 1028]



,

7-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

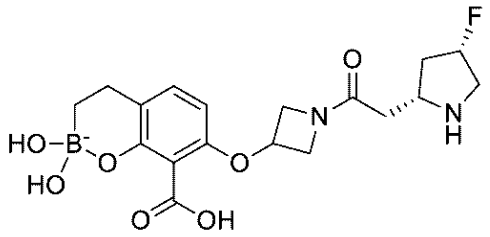
[Chemical Formula 1029]



,

8-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

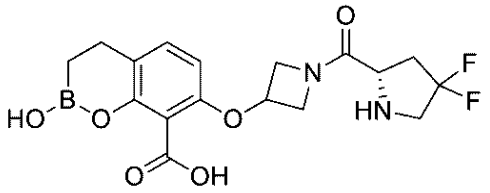
[Chemical Formula 1030]



,

7-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

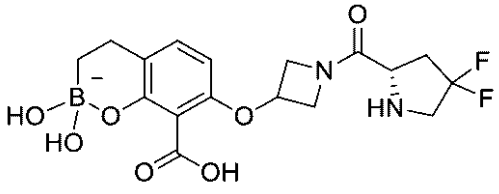
[Chemical Formula 1031]



,

8-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 1032]

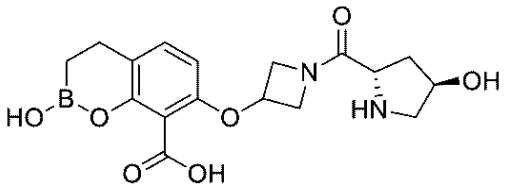


,

2-hydroxy-7-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic

acid

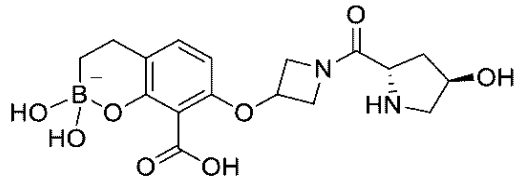
[Chemical Formula 1033]



,

4,4-dihydroxy-8-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

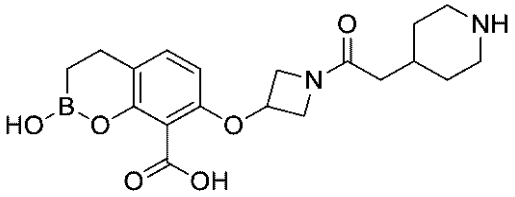
[Chemical Formula 1034]



,

2-hydroxy-7-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

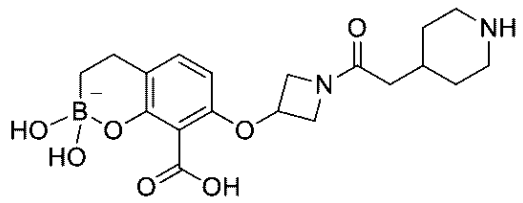
[Chemical Formula 1035]



,

4,4-dihydroxy-8-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

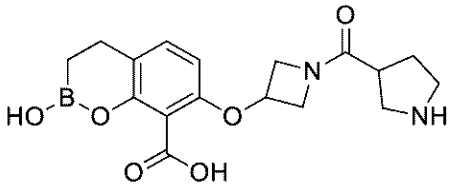
[Chemical Formula 1036]



,

2-hydroxy-7-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

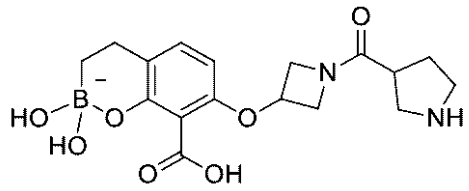
[Chemical Formula 1037]



,

4,4-dihydroxy-8-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

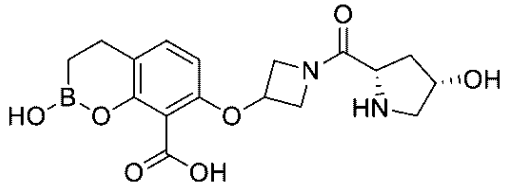
[Chemical Formula 1038]



,

2-hydroxy-7-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

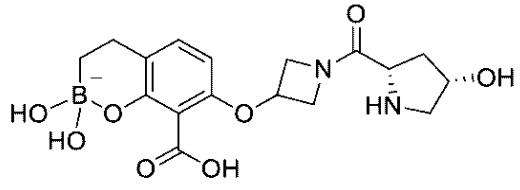
[Chemical Formula 1039]



,

4,4-dihydroxy-8-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

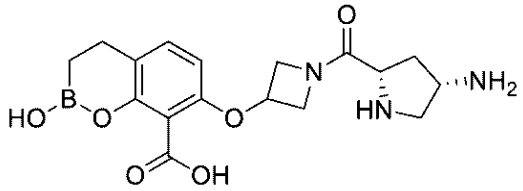
[Chemical Formula 1040]



,

7-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

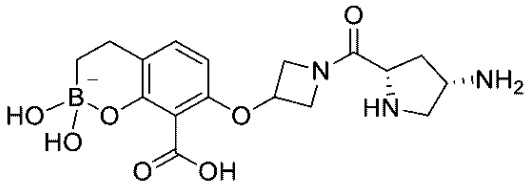
[Chemical Formula 1041]



,

8-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

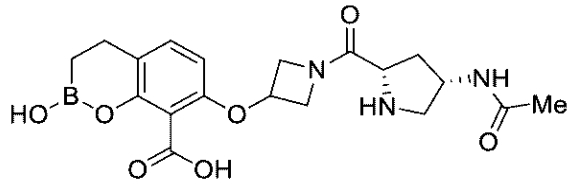
[Chemical Formula 1042]



,

7-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

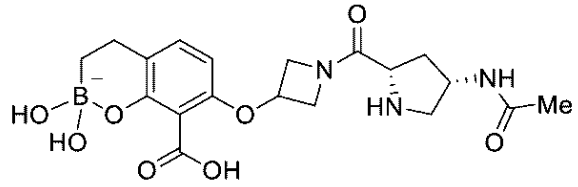
[Chemical Formula 1043]



,

8-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

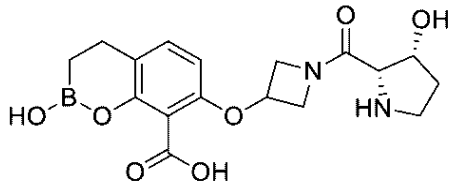
[Chemical Formula 1044]



,

2-hydroxy-7-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

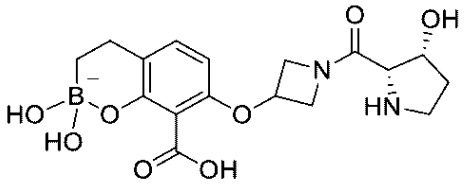
[Chemical Formula 1045]



,

4,4-dihydroxy-8-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

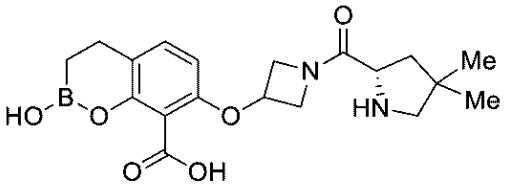
[Chemical Formula 1046]



,

7-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

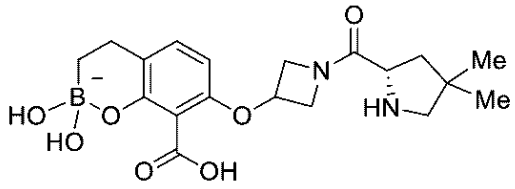
[Chemical Formula 1047]



,

8-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

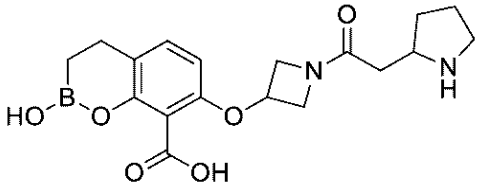
[Chemical Formula 1048]



,

2-hydroxy-7-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

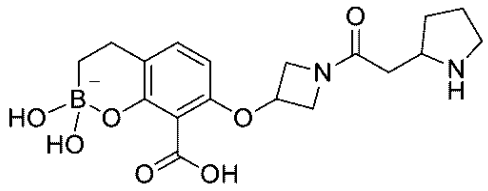
[Chemical Formula 1049]



,

4,4-dihydroxy-8-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

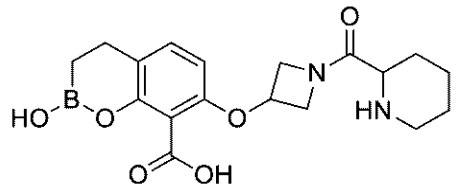
[Chemical Formula 1050]



,

2-hydroxy-7-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

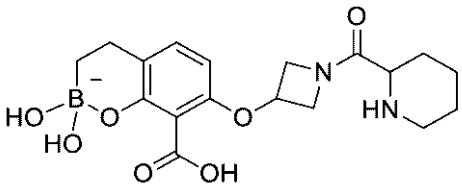
[Chemical Formula 1051]



,

4,4-dihydroxy-8-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

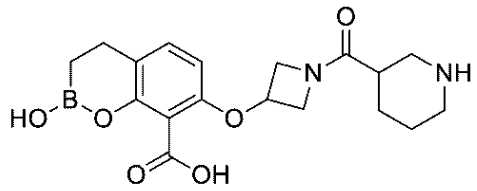
[Chemical Formula 1052]



,

2-hydroxy-7-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

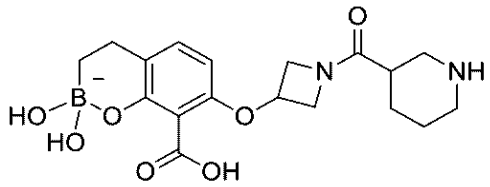
[Chemical Formula 1053]



,

4,4-dihydroxy-8-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

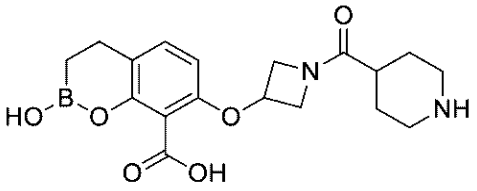
[Chemical Formula 1054]



,

2-hydroxy-7-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

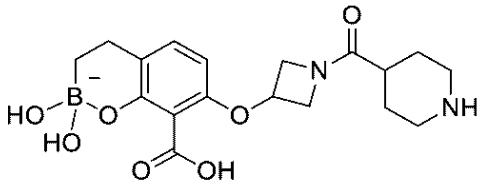
[Chemical Formula 1055]



,

4,4-dihydroxy-8-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

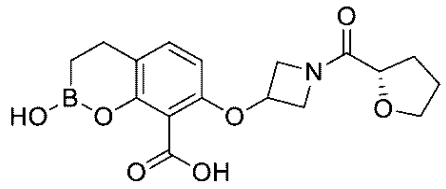
[Chemical Formula 1056]



,

2-hydroxy-7-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

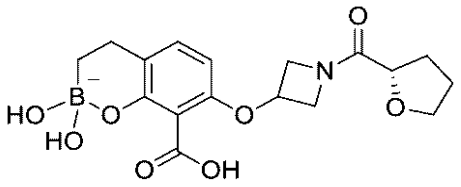
[Chemical Formula 1057]



,

4,4-dihydroxy-8-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

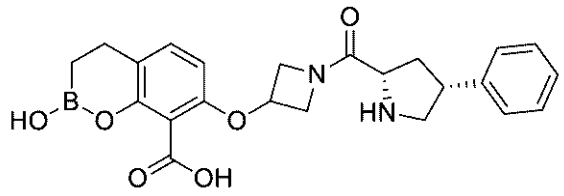
[Chemical Formula 1058]



,

2-hydroxy-7-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

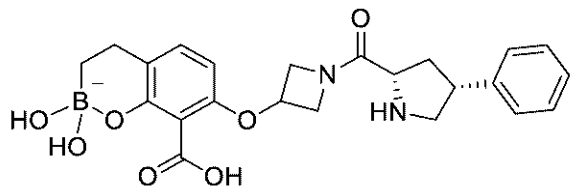
[Chemical Formula 1059]



,

4,4-dihydroxy-8-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

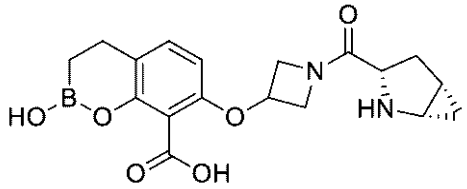
[Chemical Formula 1060]



,

7-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

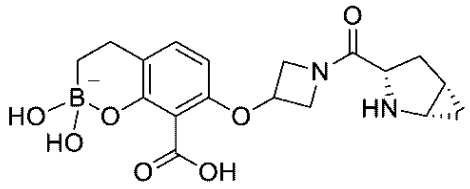
[Chemical Formula 1061]



,

8-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

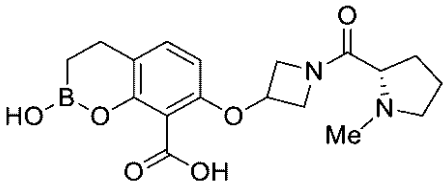
[Chemical Formula 1062]



,

2-hydroxy-7-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

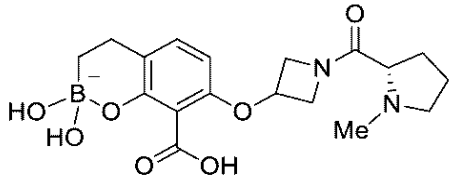
[Chemical Formula 1063]



,

4,4-dihydroxy-8-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

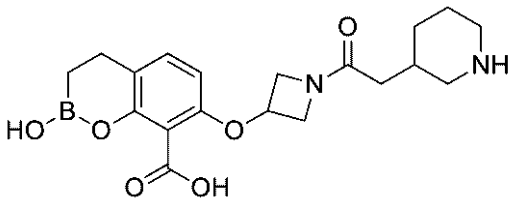
[Chemical Formula 1064]



,

2-hydroxy-7-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

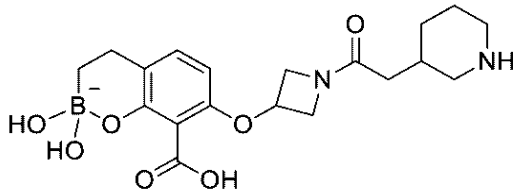
[Chemical Formula 1065]



,

4,4-dihydroxy-8-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

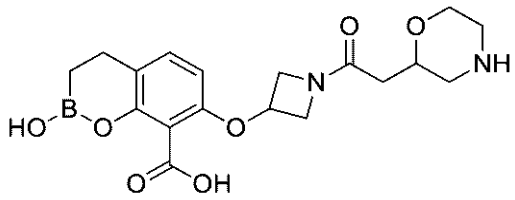
[Chemical Formula 1066]



,

2-hydroxy-7-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

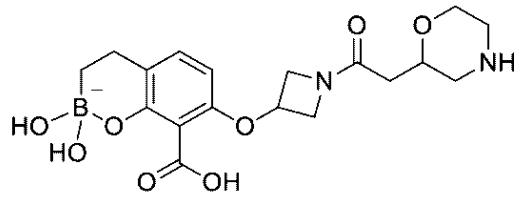
[Chemical Formula 1067]



,

4,4-dihydroxy-8-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

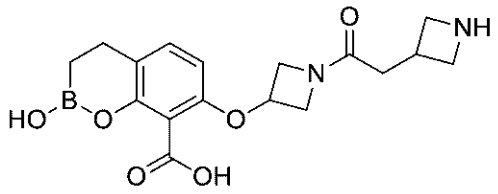
[Chemical Formula 1068]



,

7-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

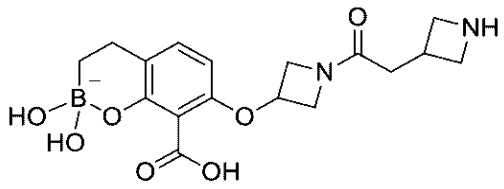
[Chemical Formula 1069]



,

8-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

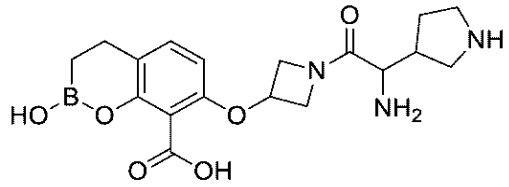
[Chemical Formula 1070]



,

7-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

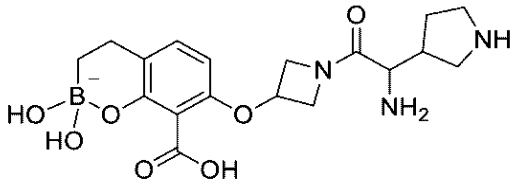
[Chemical Formula 1071]



,

8-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

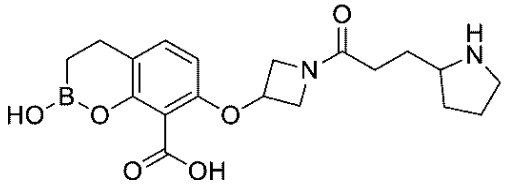
[Chemical Formula 1072]



,

2-hydroxy-7-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

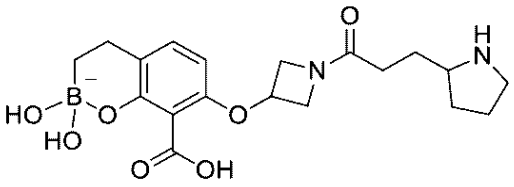
[Chemical Formula 1073]



,

4,4-dihydroxy-8-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

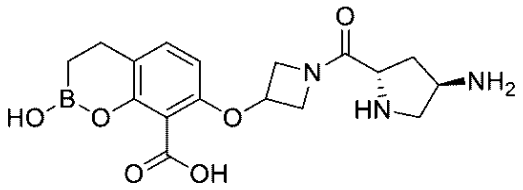
[Chemical Formula 1074]



,

7-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

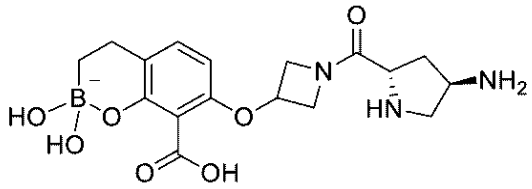
[Chemical Formula 1075]



,

8-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

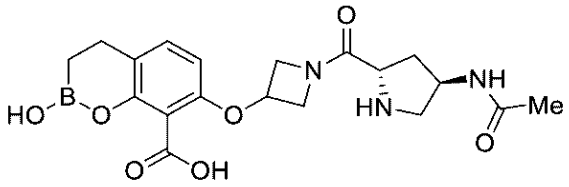
[Chemical Formula 1076]



,

7-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

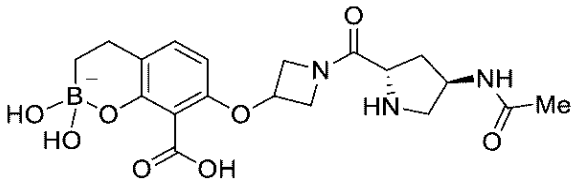
[Chemical Formula 1077]



,

8-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

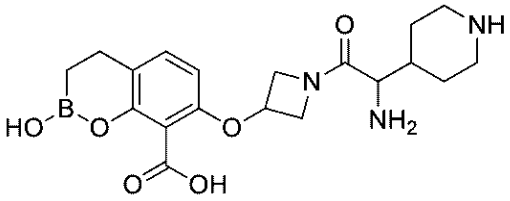
[Chemical Formula 1078]



,

7-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

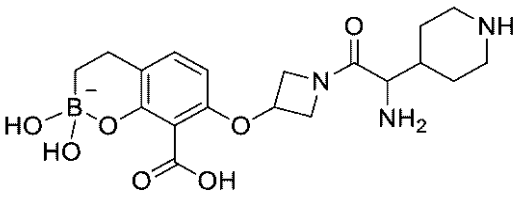
[Chemical Formula 1079]



,

8-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

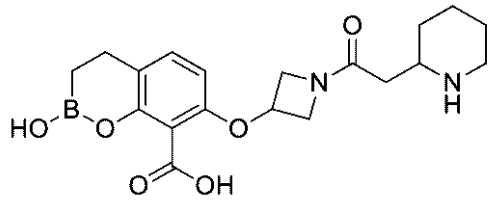
[Chemical Formula 1080]



,

2-hydroxy-7-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

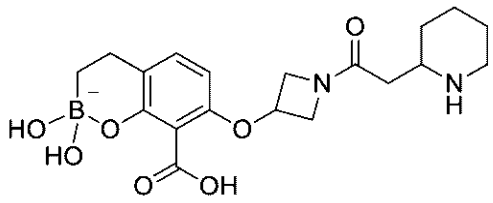
[Chemical Formula 1081]



,

4,4-dihydroxy-8-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

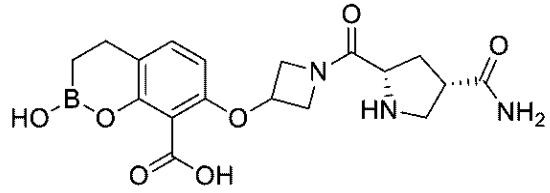
[Chemical Formula 1082]



,

7-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

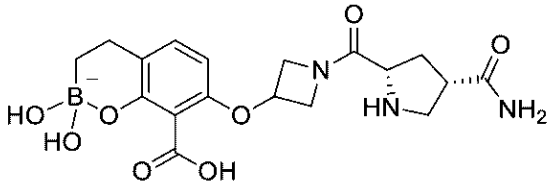
[Chemical Formula 1083]



,

8-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

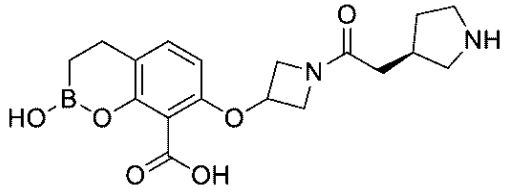
[Chemical Formula 1084]



,

2-hydroxy-7-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

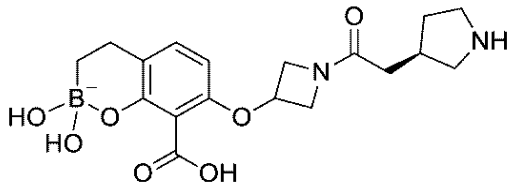
[Chemical Formula 1085]



,

4,4-dihydroxy-8-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

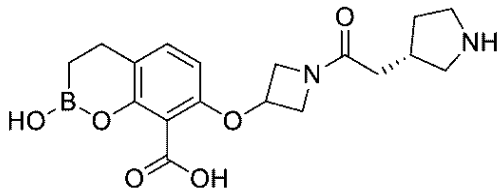
[Chemical Formula 1086]



,

2-hydroxy-7-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

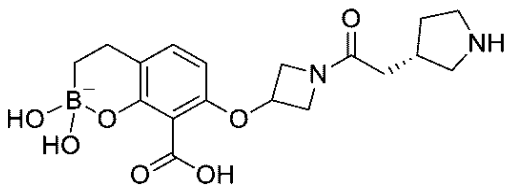
[Chemical Formula 1087]



,

4,4-dihydroxy-8-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

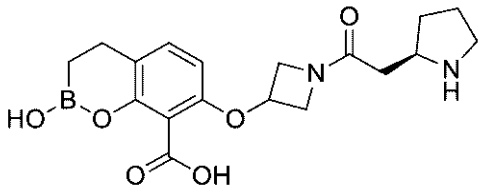
[Chemical Formula 1088]



,

2-hydroxy-7-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

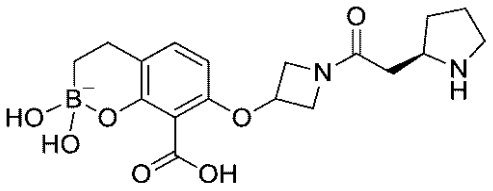
[Chemical Formula 1089]



,

4,4-dihydroxy-8-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

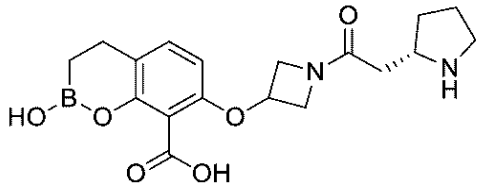
[Chemical Formula 1090]



,

2-hydroxy-7-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborine-8-carboxylic acid

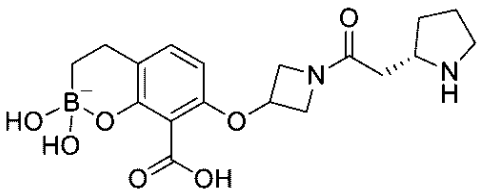
[Chemical Formula 1091]



,

4,4-dihydroxy-8-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

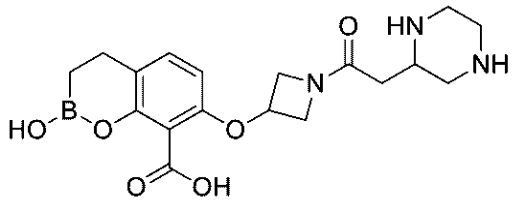
[Chemical Formula 1092]



,

2-hydroxy-7-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

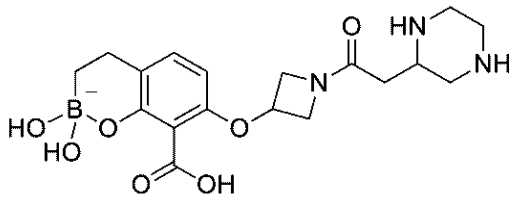
[Chemical Formula 1093]



,

4,4-dihydroxy-8-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

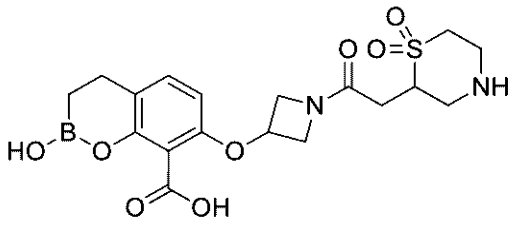
[Chemical Formula 1094]



,

7-({1-[(1,1-dioxo-1λ⁶-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

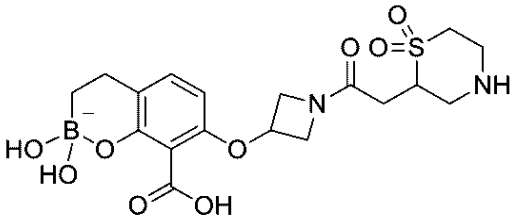
[Chemical Formula 1095]



,

8-({1-[(1,1-dioxo-1λ⁶-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 1096]

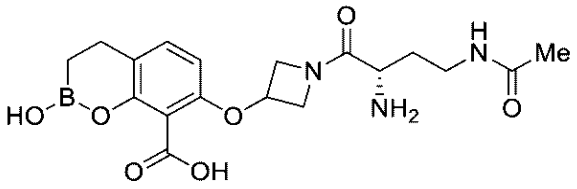


,

7-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-

2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

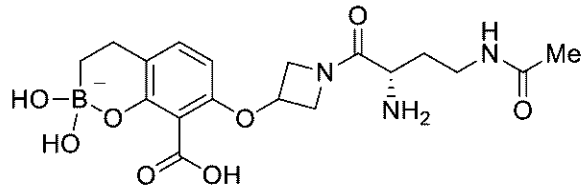
[Chemical Formula 1097]



,

8-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

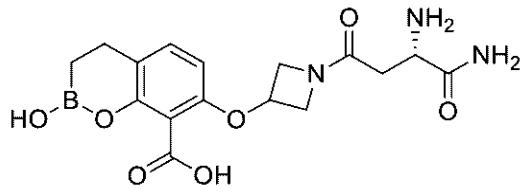
[Chemical Formula 1098]



,

7-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

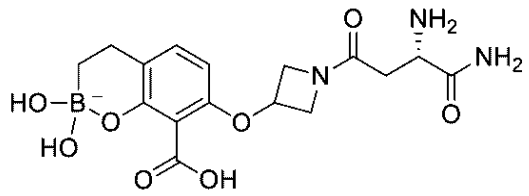
[Chemical Formula 1099]



,

8-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

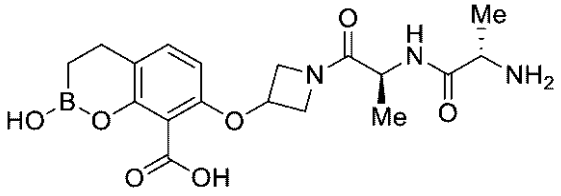
[Chemical Formula 1100]



,

7-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

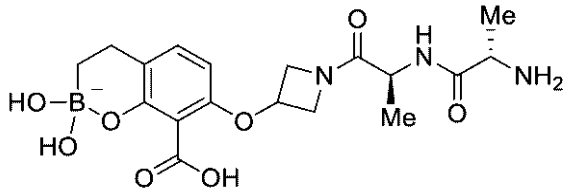
[Chemical Formula 1101]



,

8-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

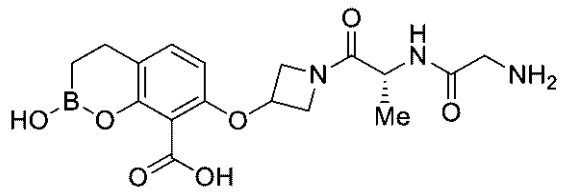
[Chemical Formula 1102]



,

7-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

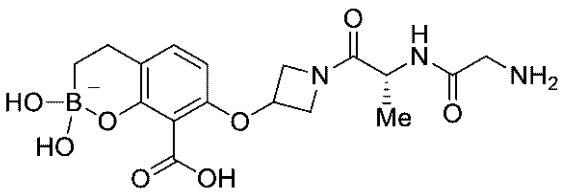
[Chemical Formula 1103]



,

8-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

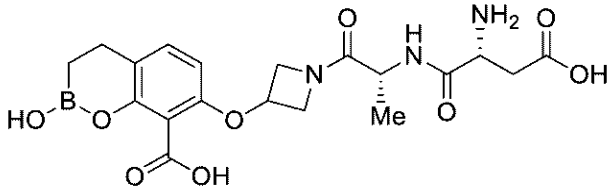
[Chemical Formula 1104]



,

N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

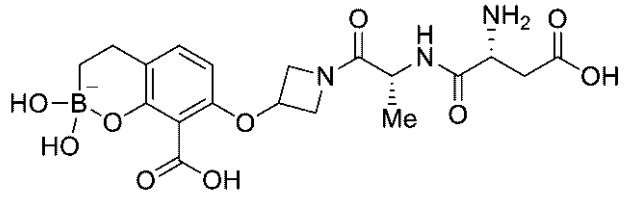
[Chemical Formula 1105]



,

N-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

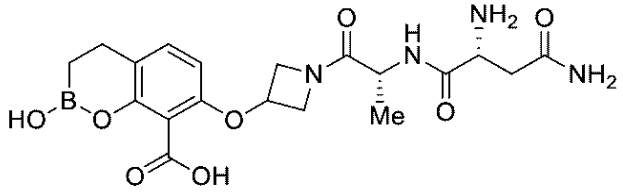
[Chemical Formula 1106]



,

N^1-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

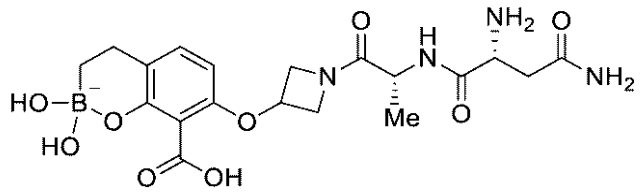
[Chemical Formula 1107]



,

N^1-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

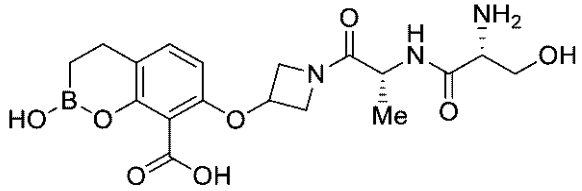
[Chemical Formula 1108]



,

N-[(2R)-1-{3-[(8-carboxy-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-7-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

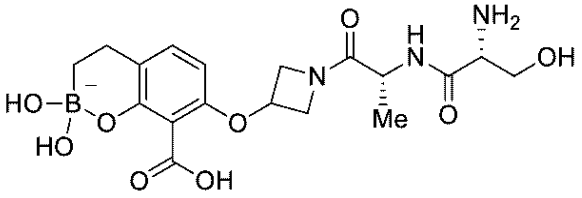
[Chemical Formula 1109]



,

N-[(2R)-1-{3-[(7-carboxy-4,4-hydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-trien-8-yl)oxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

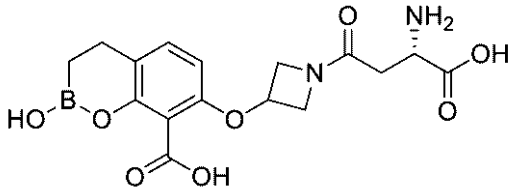
[Chemical Formula 1110]



,

7-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

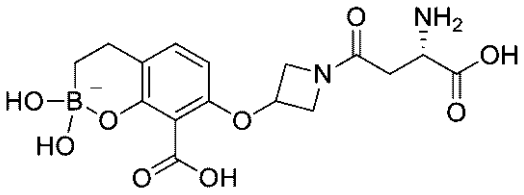
[Chemical Formula 1111]



,

8-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-l(6),7,9-triene-7-carboxylic acid

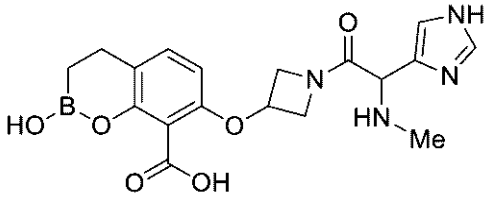
[Chemical Formula 1112]



,

2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

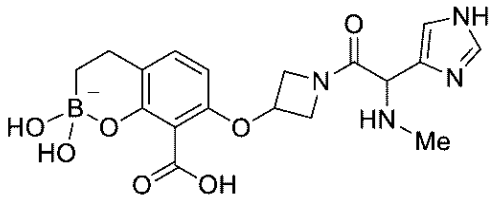
[Chemical Formula 1113]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

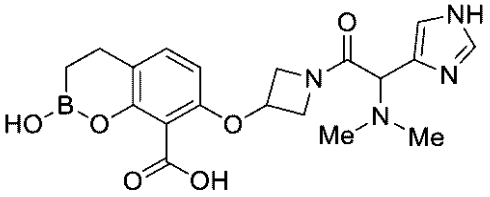
[Chemical Formula 1114]



,

2-hydroxy-7-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

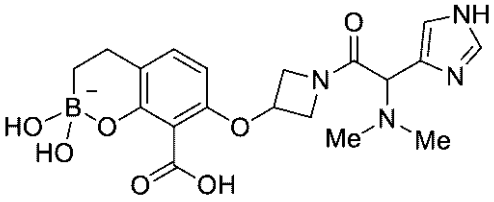
[Chemical Formula 1115]



,

4,4-dihydroxy-8-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 1116]

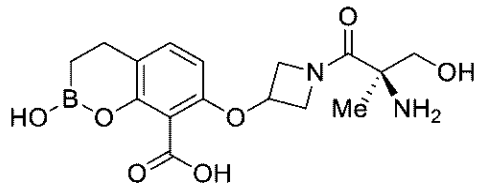


,

2-hydroxy-7-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}-3,4-

dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

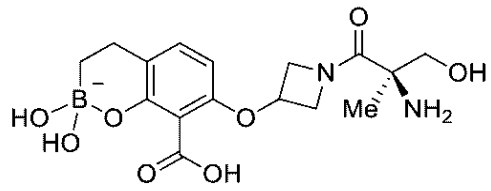
[Chemical Formula 1117]



,

4,4-dihydroxy-8-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

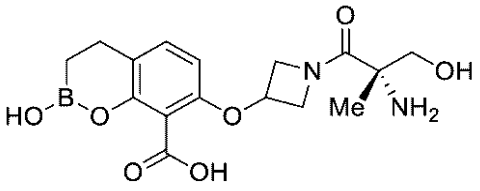
[Chemical Formula 1118]



,

2-hydroxy-7-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

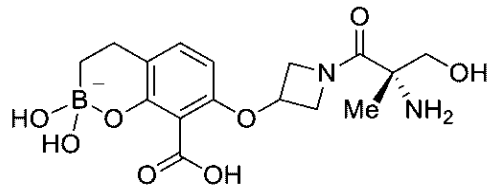
[Chemical Formula 1119]



,

4,4-dihydroxy-8-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

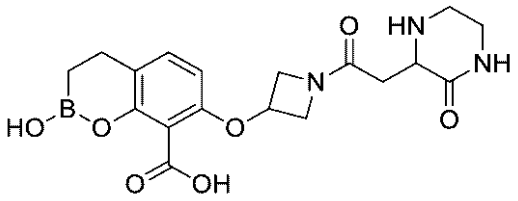
[Chemical Formula 1120]



,

2-hydroxy-7-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

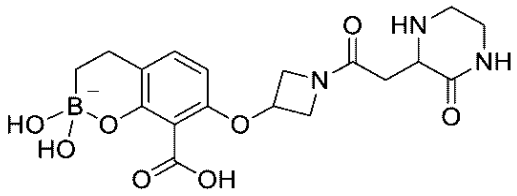
[Chemical Formula 1121]



,

4,4-dihydroxy-8-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

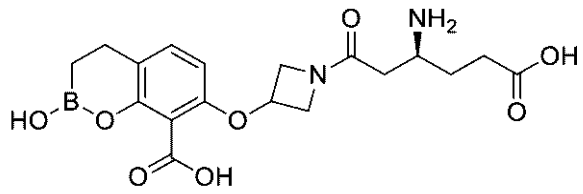
[Chemical Formula 1122]



,

7-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

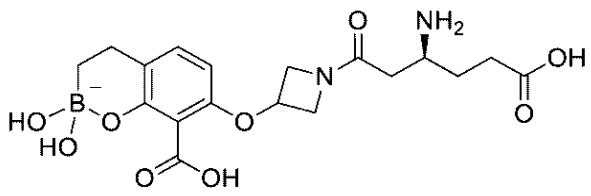
[Chemical Formula 1123]



,

8-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

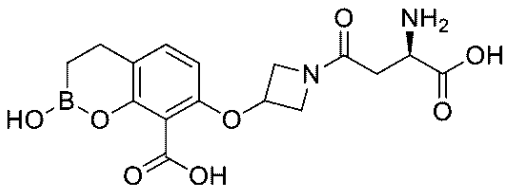
[Chemical Formula 1124]



,

7-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

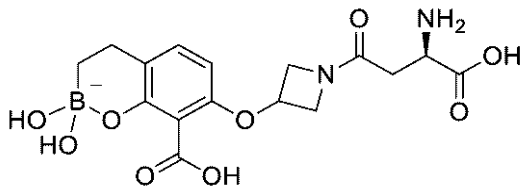
[Chemical Formula 1125]



,

8-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

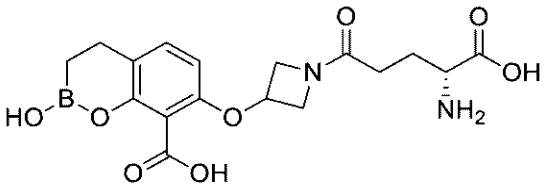
[Chemical Formula 1126]



,

7-({1-[(4R)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

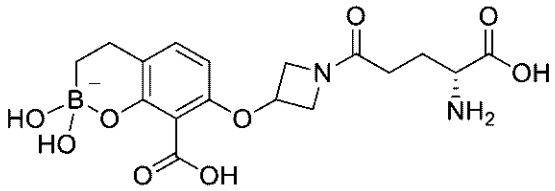
[Chemical Formula 1127]



,

8-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

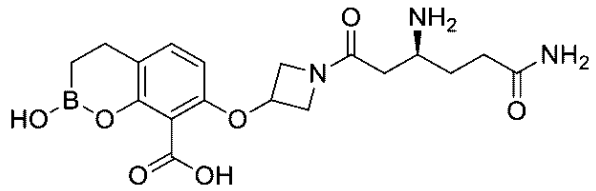
[Chemical Formula 1128]



,

7-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

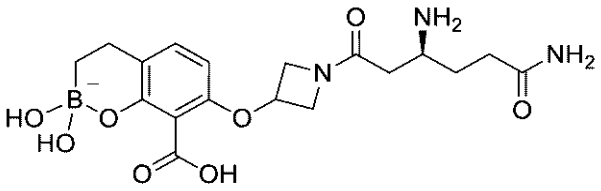
[Chemical Formula 1129]



,

8-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

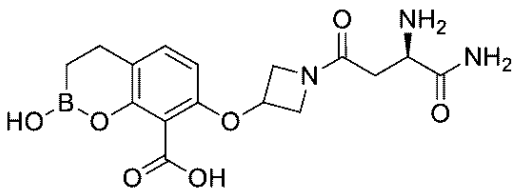
[Chemical Formula 1130]



,

7-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

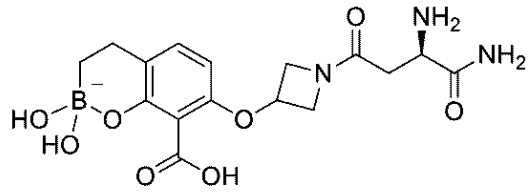
[Chemical Formula 1131]



,

8-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

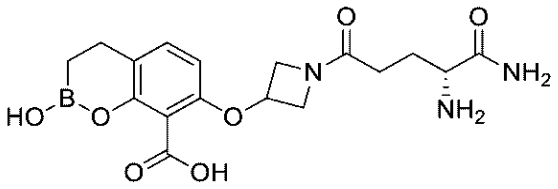
[Chemical Formula 1132]



,

7-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

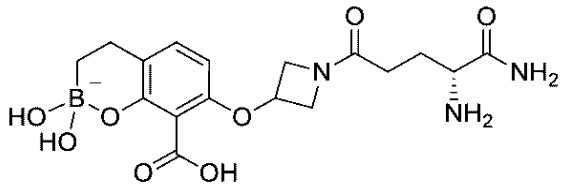
[Chemical Formula 1133]



,

8-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

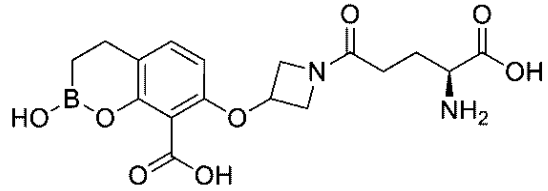
[Chemical Formula 1134]



,

7-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

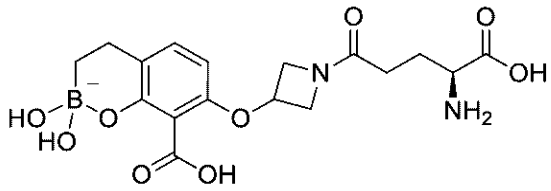
[Chemical Formula 1135]



,

8-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

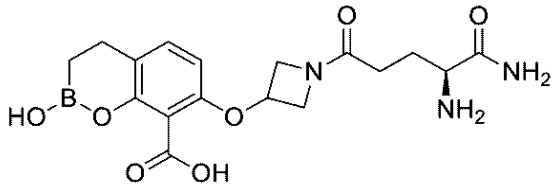
[Chemical Formula 1136]



,

7-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxy-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

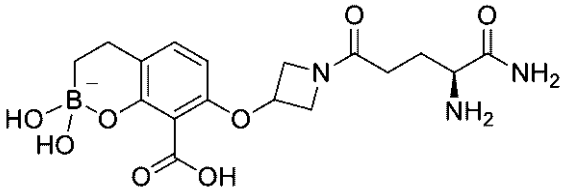
[Chemical Formula 1137]



,

8-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-4,4-dihydroxy-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

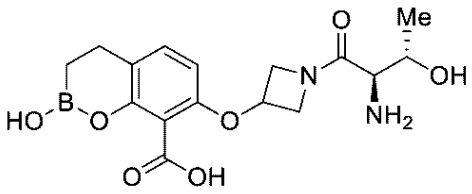
[Chemical Formula 1138]



,

2-hydroxy-7-[(1-D-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

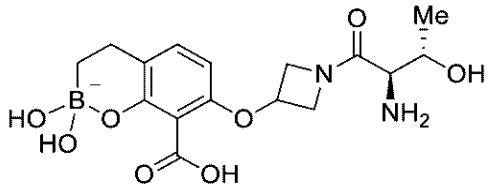
[Chemical Formula 1139]



,

4,4-dihydroxy-8-[(1-D-threonylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

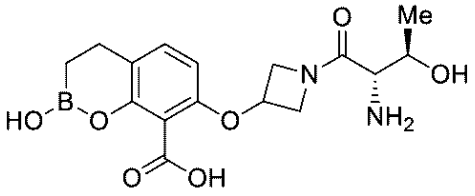
[Chemical Formula 1140]



,

2-hydroxy-7-[(1-L-threonylazetidin-3-yl)oxy]-3,4-dihydro-2H-1,2-benzoxaborinine-8-carboxylic acid

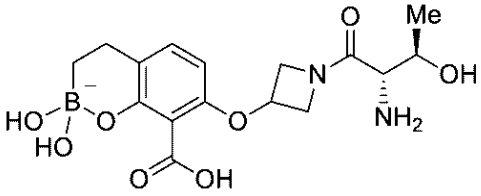
[Chemical Formula 1141]



, or

4,4-dihydroxy-8-[(1-L-threonylazetidin-3-yl)oxy]-5-oxa-4-boranuidabicyclo[4.4.0]deca-1(6),7,9-triene-7-carboxylic acid

[Chemical Formula 1142]

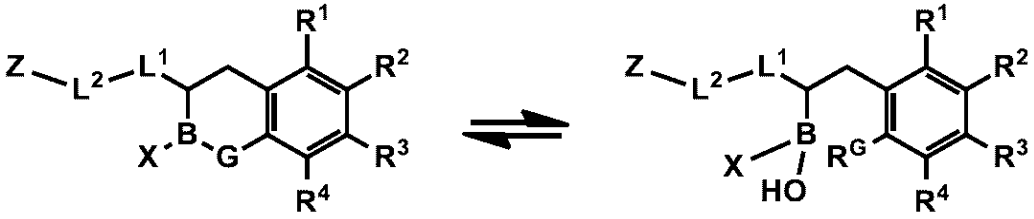


.

[Claim 55]

A compound represented by formula (11):

[Chemical Formula 1143]



(1a) (11)

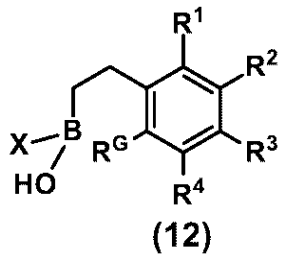
or a pharmaceutically acceptable salt thereof,

wherein R^G is a hydroxyl group, a thiol group, or $-NHR^{a1}$, R^{a1}, Z, L^1, L^2, X, R^1, R^2, R^3, and R^4 are defined the same as the definition according to claim 1, and formula (1a) is defined the same as claim 1.

[Claim 56]

The compound or the pharmaceutically acceptable salt thereof according to claim 55, wherein the compound of formula (11) is represented by formula (12):

[Chemical Formula 1144]



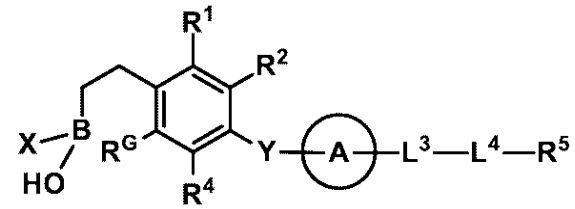
(12)

wherein X, R^1, R^2, R^3, and R^4 are defined the same as the definition according to claim 8.

[Claim 57]

The compound or the pharmaceutically acceptable salt thereof according to claim 55 or 56, wherein the compound of formula (12) is represented by formula (13):

[Chemical Formula 1145]



(13)

wherein X, Y, ring A, L^3, L^4, R^1, R^2, R^4, and R^5 are defined the same as the definition according to any one of claims 10 to 14 and 16 to 21.

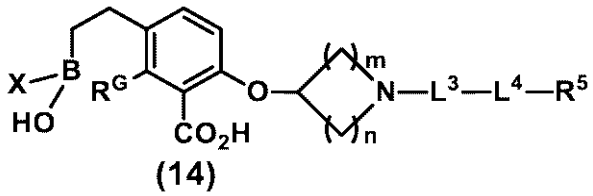
[Claim 58]

The compound or the pharmaceutically acceptable salt thereof according to claim 57, wherein X and R^G are hydroxyl groups, R^4 is a carboxyl group, and ring A is an optionally substituted 4- to 6-membered nitrogen-containing non-aryl heterocycle.

[Claim 59]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 58, wherein the compound of formula (13) is represented by formula (14):

[Chemical Formula 1146]



(14)

wherein X, L^3, L^4, m, n, and R^5 are defined the same as the definition according to claim 22.

[Claim 60]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 59, wherein R^G is a hydroxyl group or a thiol group.

[Claim 61]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 60, wherein R^G is a hydroxyl group.

[Claim 62]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 61, wherein X is a hydroxyl group or a C_{1-6} alkoxy group.

[Claim 63]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 62, wherein X is a hydroxyl group.

[Claim 64]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 59 to 63, wherein m is 1 or 2, n is 1 or 2, and m + n is 2 or 3.

[Claim 65]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 59 to 64, wherein m is 1, and n is 1.

[Claim 66]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 65, wherein L^3 is defined the same as the definition according to claim 16

or 17.

[Claim 67]

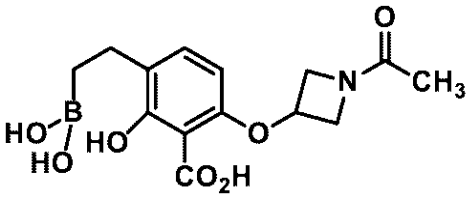
The compound or the pharmaceutically acceptable salt thereof according to any one of claims 55 to 66, wherein L^4 and R^5 are defined the same as the definitions according to any one of claims 18, 25 to 37, and 42 to 52.

[Claim 68]

The compound or the pharmaceutically acceptable salt thereof according to claim 55, selected from the group consisting of the following compounds:

6-[(1-acetylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

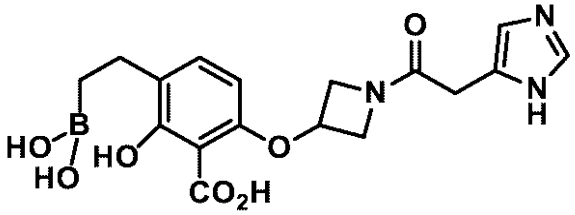
[Chemical Formula 1147]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

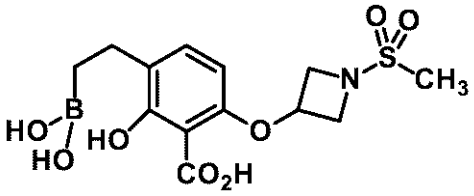
[Chemical Formula 1148]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(methanesulfonyl)azetidin-3-yl]oxy}benzoic acid

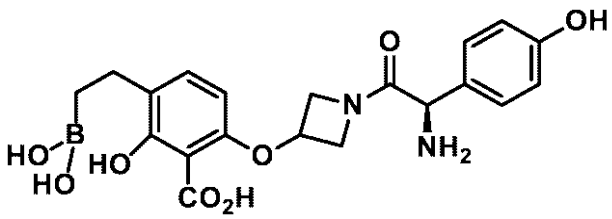
[Chemical Formula 1149]



,

6-({1-[(2R)-2-amino-2-(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

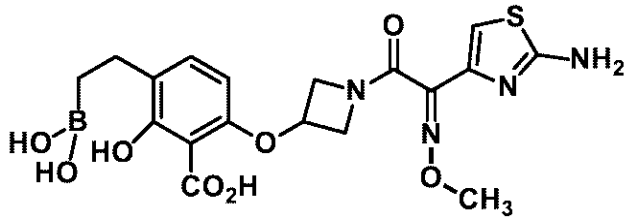
[Chemical Formula 1150]



,

6-({1-[(2-amino-1,3-thiazol-4-yl)(methoxyimino)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

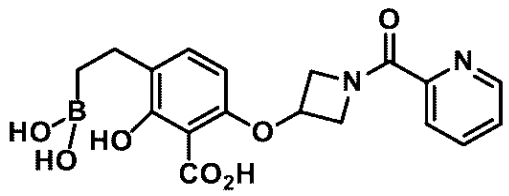
[Chemical Formula 1151]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

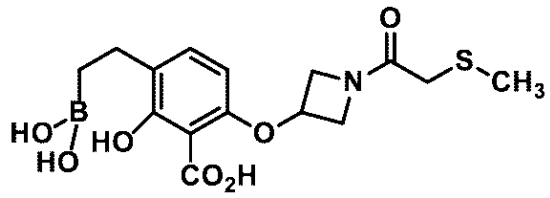
[Chemical Formula 1152]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(methylsulfanyl)acetyl]azetidin-3-yl}oxy)benzoic acid

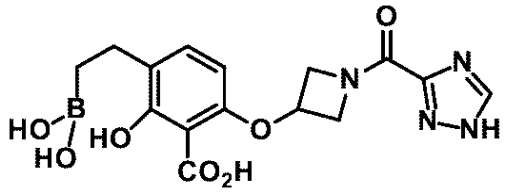
[Chemical Formula 1153]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-1,2,4-triazole-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

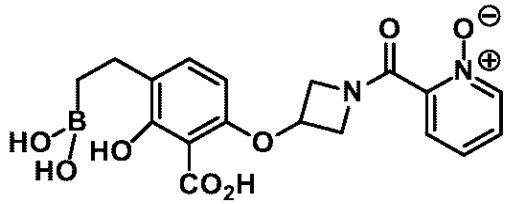
[Chemical Formula 1154]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-oxido-2-pyridinylcarbonyl)azetidin-3-yl]oxy}benzoic acid

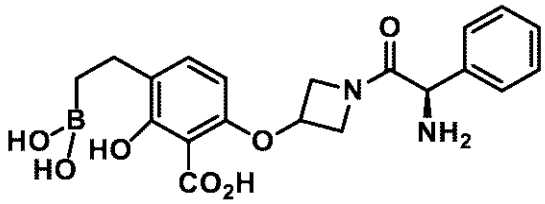
[Chemical Formula 1155]



,

6-({1-[(2R)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

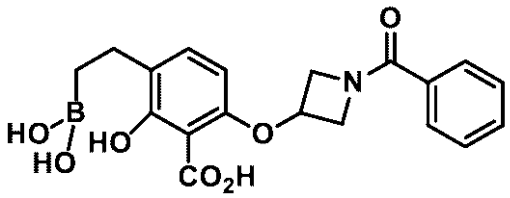
[Chemical Formula 1156]



,

6-[(1-benzoylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

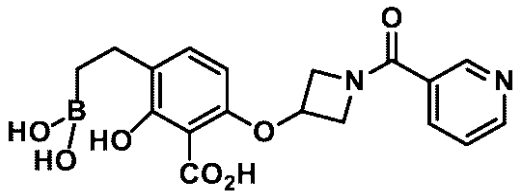
[Chemical Formula 1157]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

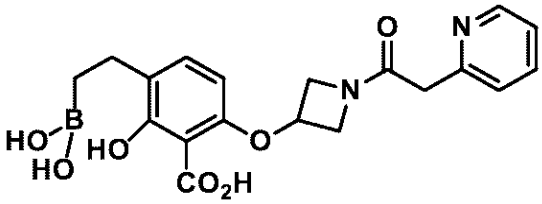
[Chemical Formula 1158]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

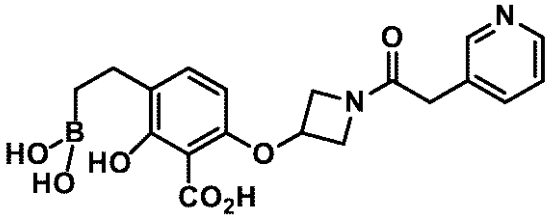
[Chemical Formula 1159]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

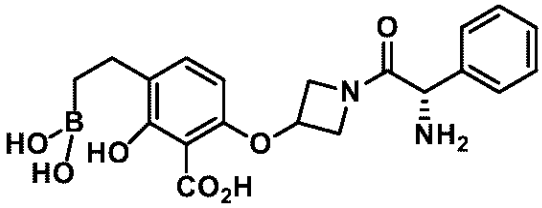
[Chemical Formula 1160]



,

6-({1-[(2S)-2-amino-2-phenylacetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

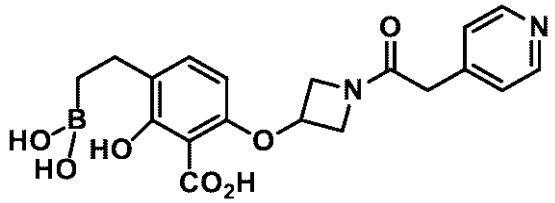
[Chemical Formula 1161]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyridin-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

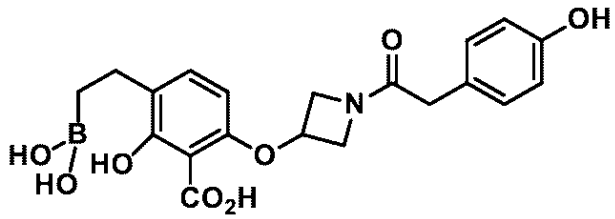
[Chemical Formula 1162]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4-hydroxyphenyl)acetyl]azetidin-3-yl}oxy)benzoic acid

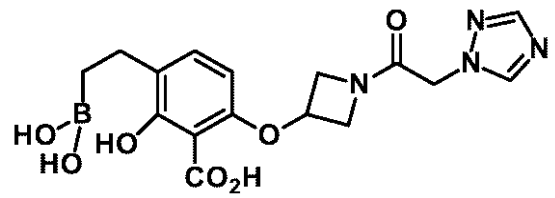
[Chemical Formula 1163]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,4-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

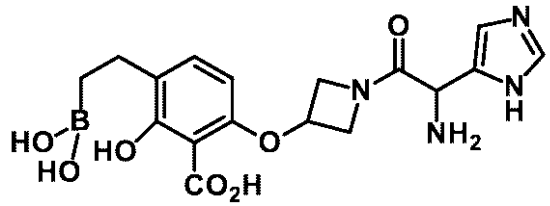
[Chemical Formula 1164]



,

6-({1-[amino(1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

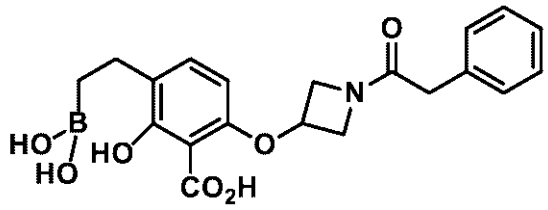
[Chemical Formula 1165]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(phenylacetyl)azetidin-3-yl]oxy}benzoic acid

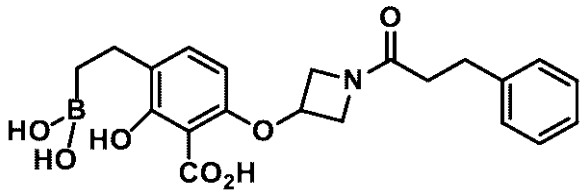
[Chemical Formula 1166]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(3-phenylpropanoyl)azetidin-3-yl]oxy}benzoic acid

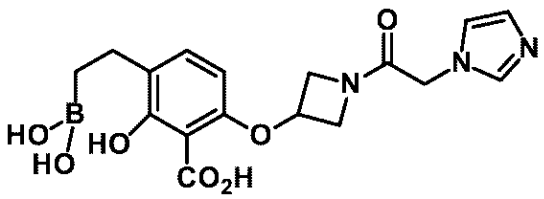
[Chemical Formula 1167]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

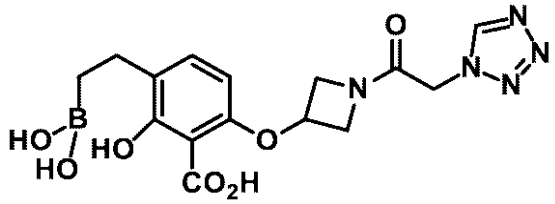
[Chemical Formula 1168]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-tetrazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

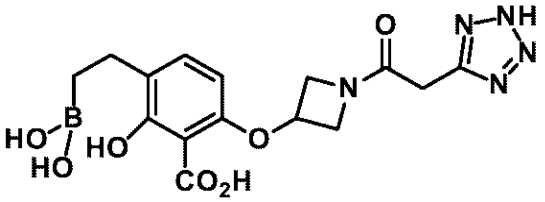
[Chemical Formula 1169]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(2H-tetrazol-5-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

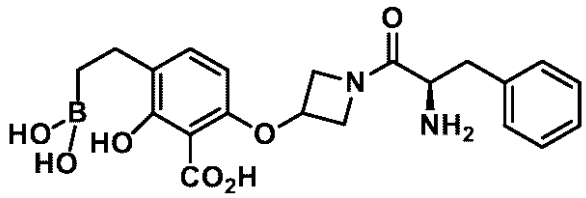
[Chemical Formula 1170]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-phenylalanylazetidin-3-yl)oxy]benzoic acid

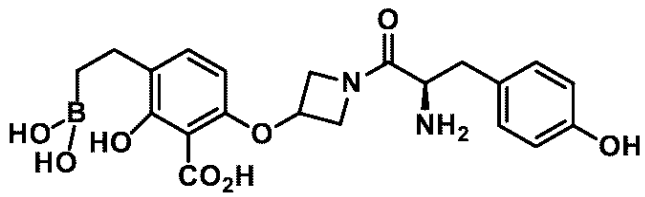
[Chemical Formula 1171]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-tyrosylazetidin-3-yl)oxy]benzoic acid

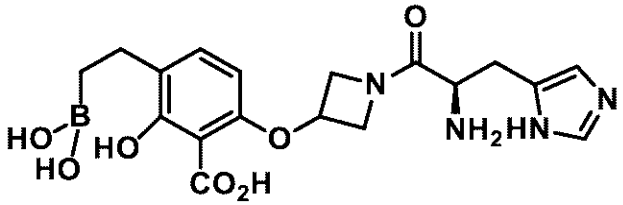
[Chemical Formula 1172]



,

3-(2-boronoethyl)-6-[(1-D-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

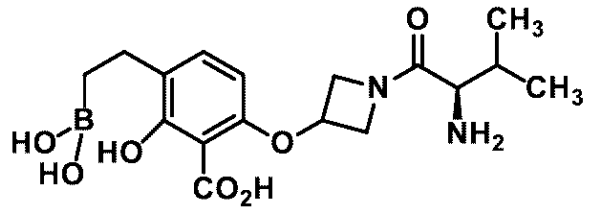
[Chemical Formula 1173]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-valylazetidin-3-yl)oxy]benzoic acid

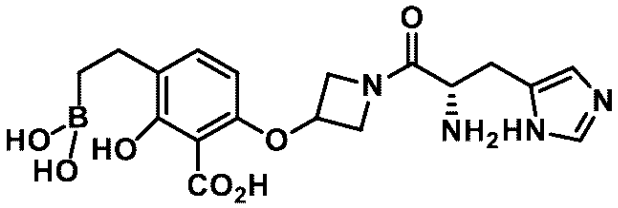
[Chemical Formula 1174]



,

3-(2-boronoethyl)-6-[(1-L-histidylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

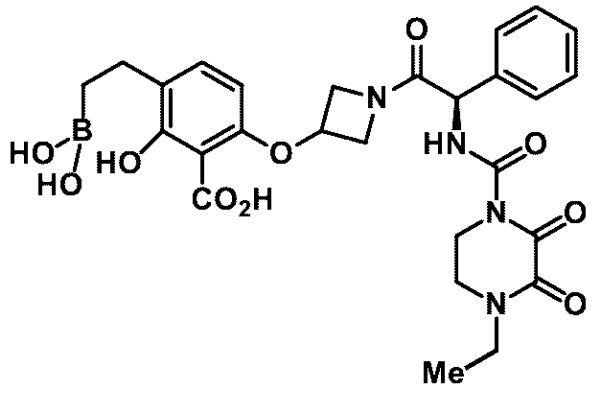
[Chemical Formula 1175]



,

3-(2-boronoethyl)-6-[(1-{(2R)-2-[(4-ethyl-2,3-dioxopiperazine-1-carbonyl)amino]-2-phenylacetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

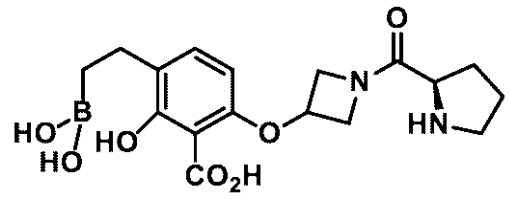
[Chemical Formula 1176]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-prolylazetidin-3-yl)oxy]benzoic acid

[Chemical Formula 1177]

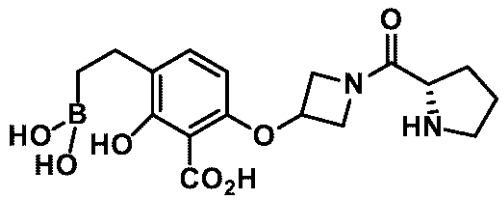


,

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-prolylazetidin-3-

yl)oxy]benzoic acid

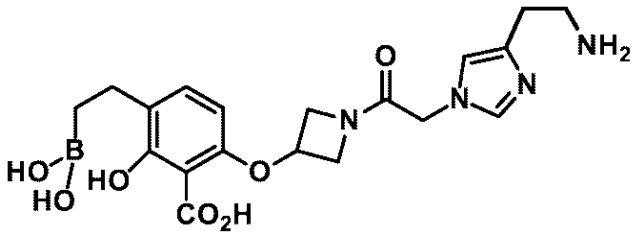
[Chemical Formula 1178]



,

6-[(1-{[4-(2-aminoethyl)-1H-imidazol-1-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

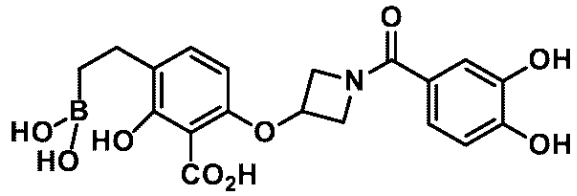
[Chemical Formula 1179]



,

3-(2-boronoethyl)-6-{[1-(3,4-dihydroxybenzoyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

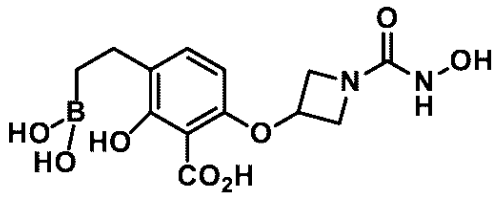
[Chemical Formula 1180]



, and

3-(2-boronoethyl)-2-hydroxy-6-{[1-(hydroxycarbamoyl)azetidin-3-yl]oxy}benzoic acid

[Chemical Formula 1181]



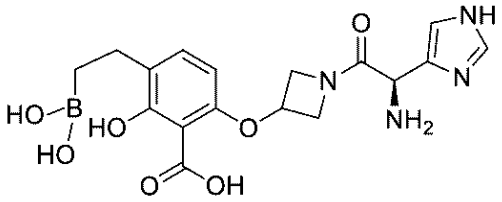
.

[Claim 69]

The compound or the pharmaceutically acceptable salt thereof according to claim 55, selected from the group consisting of the following compounds:

6-({1-[(2R)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

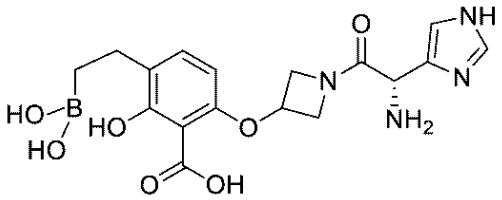
[Chemical Formula 1182]



,

6-({1-[(2S)-2-amino-2-(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

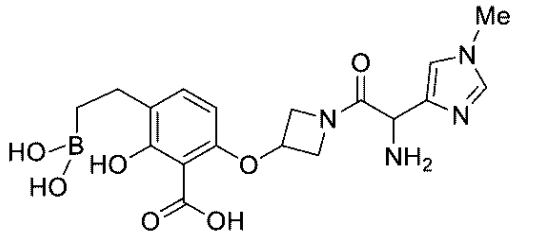
[Chemical Formula 1183]



,

6-({1-[amino(1-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

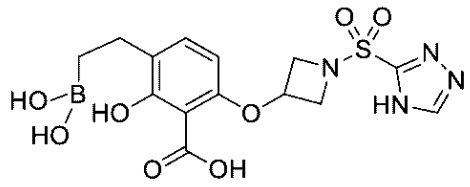
[Chemical Formula 1184]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4H-1,2,4-triazole-3-sulfonyl)azetidin-3-yl]oxy}benzoic acid

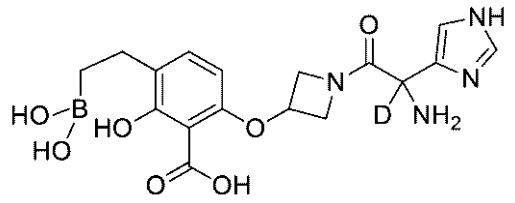
[Chemical Formula 1185]



,

6-({1-[2-amino-2-(1H-imidazol-4-yl)(^{2}H)ethanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

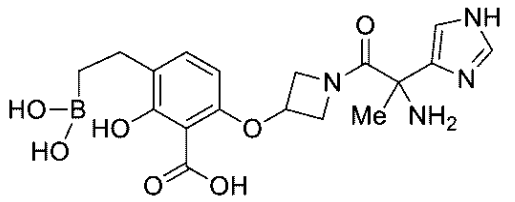
[Chemical Formula 1186]



,

6-({1-[2-amino-2-(1H-imidazol-4-yl)propanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

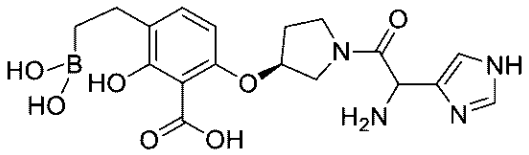
[Chemical Formula 1187]



,

6-({(3S)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

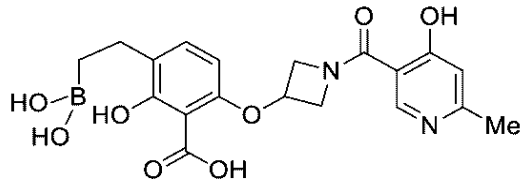
[Chemical Formula 1188]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4-hydroxy-6-methylpyridine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

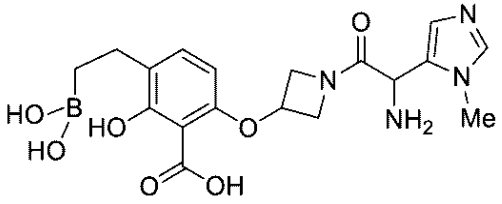
[Chemical Formula 1189]



,

6-({1-[amino(1-methyl-1H-imidazol-5-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

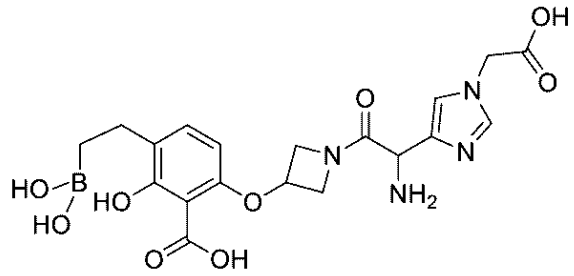
[Chemical Formula 1190]



,

6-[(1-{amino[1-(carboxymethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

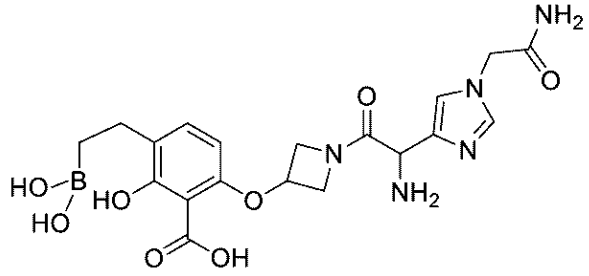
[Chemical Formula 1191]



,

6-[(1-{amino[1-(2-amino-2-oxoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

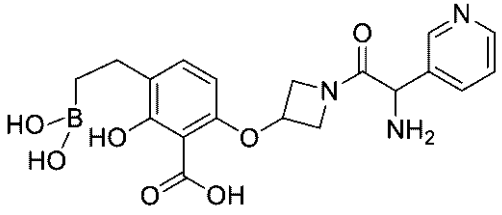
[Chemical Formula 1192]



,

6-({1-[amino(pyridin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

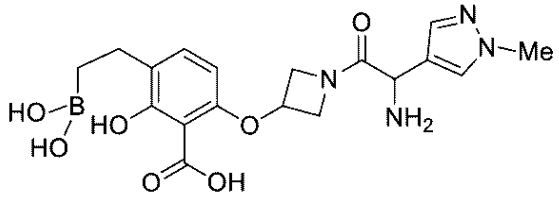
[Chemical Formula 1193]



,

6-({1-[amino(1-methyl-1H-pyrazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

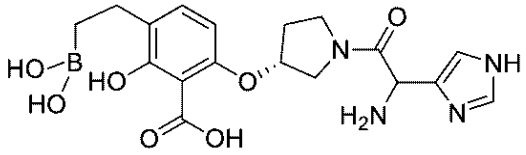
[Chemical Formula 1194]



,

6-({(3R)-1-[amino(1H-imidazol-4-yl)acetyl]pyrrolidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

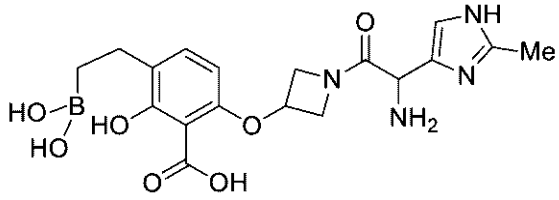
[Chemical Formula 1195]



,

6-({1-[amino(2-methyl-1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

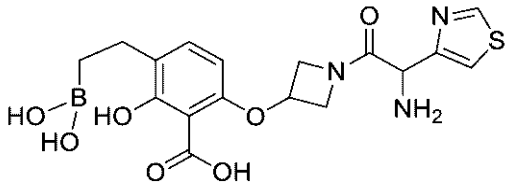
[Chemical Formula 1196]



,

6-({1-[amino(1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

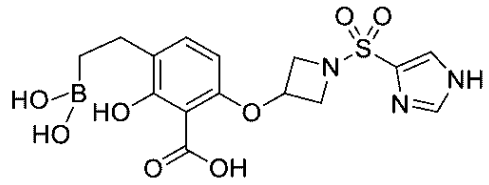
[Chemical Formula 1197]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-4-sulfonyl)azetidin-3-yl]oxy}benzoic acid

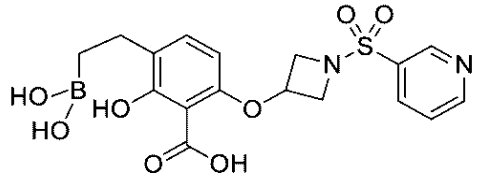
[Chemical Formula 1198]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyridine-3-sulfonyl)azetidin-3-yl]oxy}benzoic acid

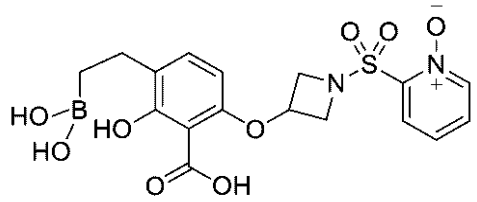
[Chemical Formula 1199]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-oxo-1λ^5-pyridine-2-sulfonyl)azetidin-3-yl]oxy}benzoic acid

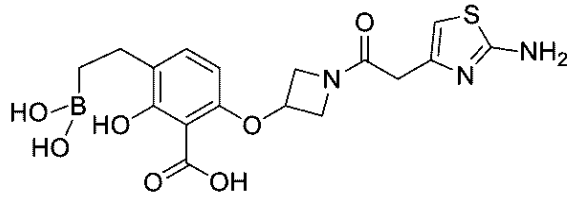
[Chemical Formula 1200]



,

6-({1-[(2-amino-1,3-thiazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

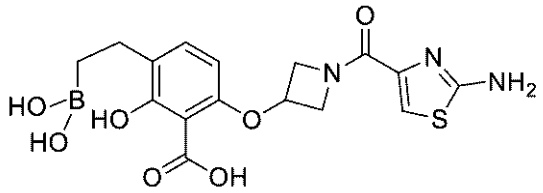
[Chemical Formula 1201]



,

6-{[1-(2-amino-1,3-thiazole-4-carbonyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

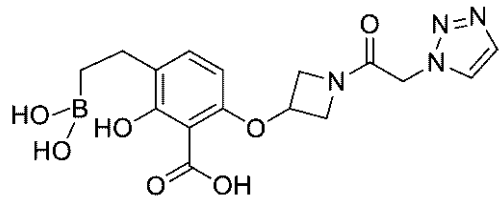
[Chemical Formula 1202]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

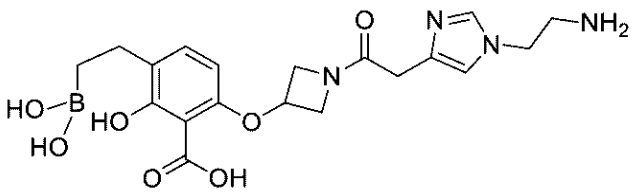
[Chemical Formula 1203]



,

6-[(1-{[1-(2-aminoethyl)-1H-imidazol-4-yl]acetyl}azetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

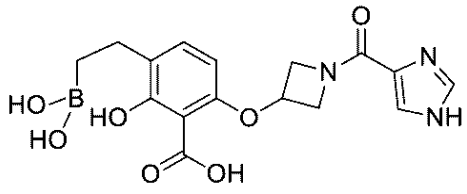
[Chemical Formula 1204]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-4-carbonyl)azetidin-3-yl]oxy}benzoic acid

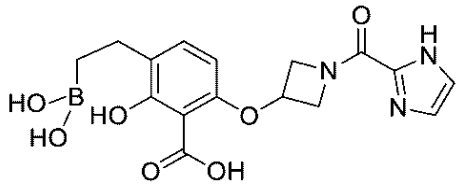
[Chemical Formula 1205]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1H-imidazole-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

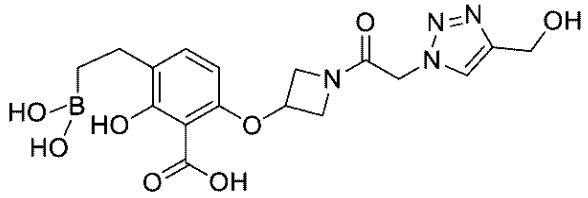
[Chemical Formula 1206]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[4-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

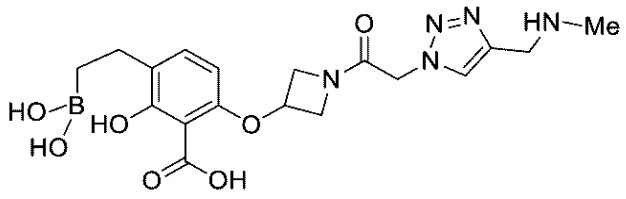
[Chemical Formula 1207]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({4-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

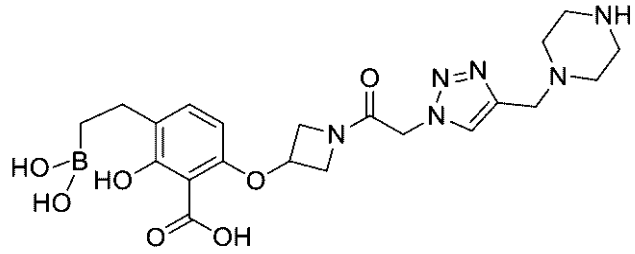
[Chemical Formula 1208]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({4-[(piperazin-1-yl)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

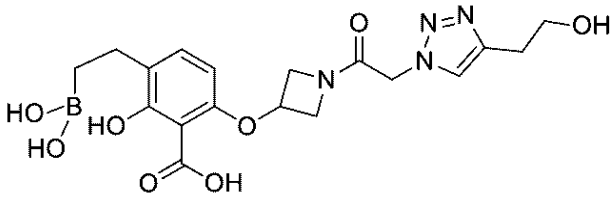
[Chemical Formula 1209]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[4-(2-hydroxyethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

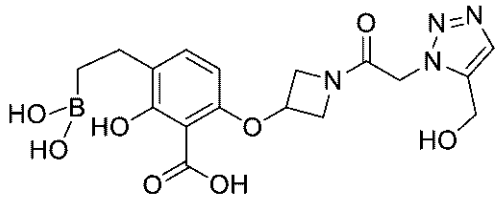
[Chemical Formula 1210]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

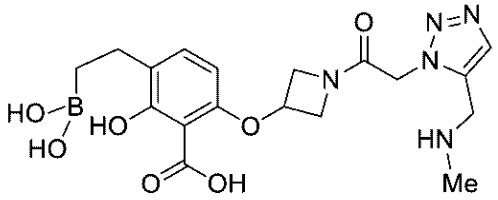
[Chemical Formula 1211]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-({5-[(methylamino)methyl]-1H-1,2,3-triazol-1-yl}acetyl)azetidin-3-yl]oxy}benzoic acid

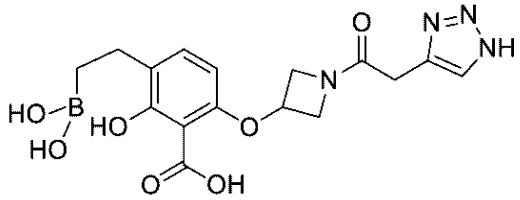
[Chemical Formula 1212]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

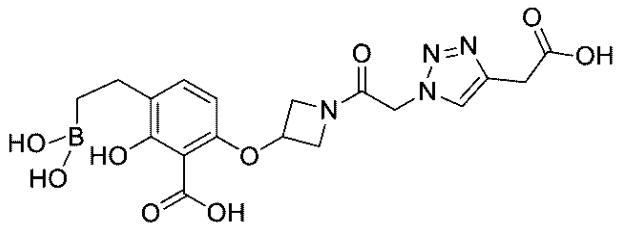
[Chemical Formula 1213]



,

3-(2-boronoethyl)-6-[(1-{[4-(carboxymethyl)-1H-1,2,3-triazol-1-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

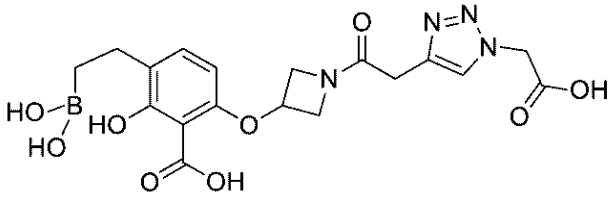
[Chemical Formula 1214]



,

3-(2-boronoethyl)-6-[(1-{[1-(carboxymethyl)-1H-1,2,3-triazol-4-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

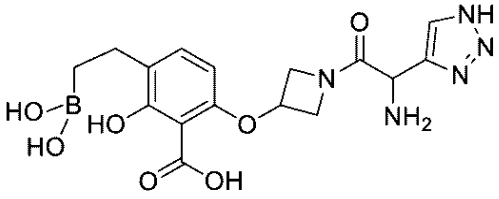
[Chemical Formula 1215]



,

6-({1-[amino(1H-1,2,3-triazol-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

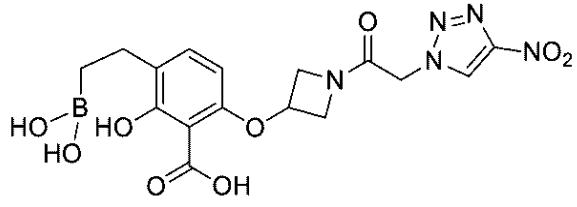
[Chemical Formula 1216]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4-nitro-1H-1,2,3-triazol-1-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

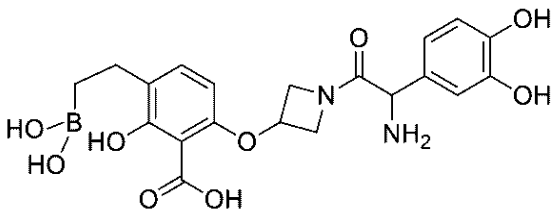
[Chemical Formula 1217]



,

6-({1-[amino(3,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

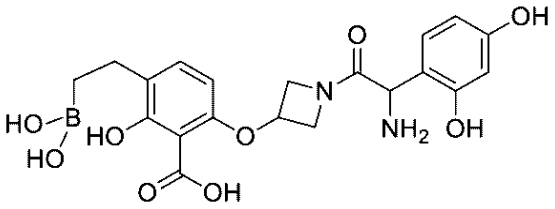
[Chemical Formula 1218]



,

6-({1-[amino(2,4-dihydroxyphenyl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

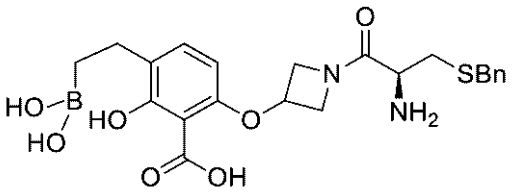
[Chemical Formula 1219]



,

6-{[1-(S-benzyl-D-cysteinyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

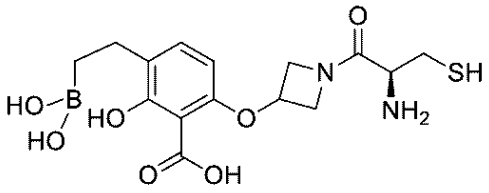
[Chemical Formula 1220]



,

3-(2-boronoethyl)-6-[(1-D-cysteinylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

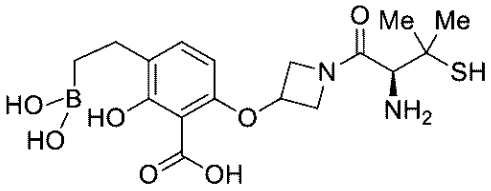
[Chemical Formula 1221]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(3-sulfanyl-D-valyl)azetidin-3-yl]oxy}benzoic acid

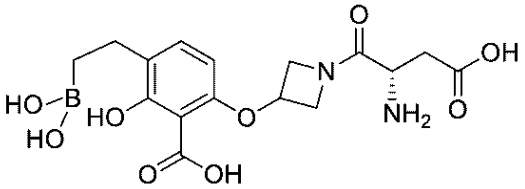
[Chemical Formula 1222]



,

6-({1-[(2S)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

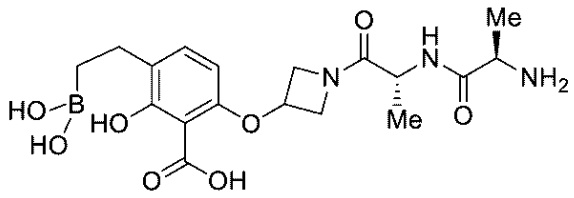
[Chemical Formula 1223]



,

6-{[1-(D-alanyl-D-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

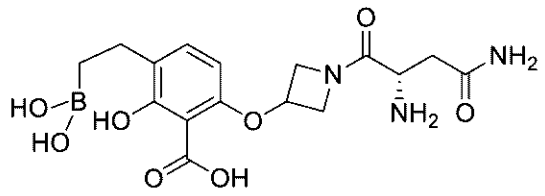
[Chemical Formula 1224]



,

6-[(1-L-asparaginylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

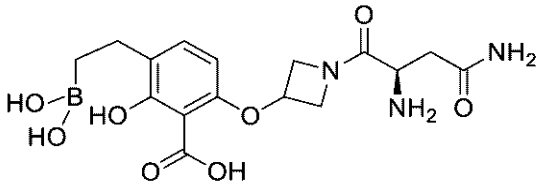
[Chemical Formula 1225]



,

6-[(1-D-asparaginylazetidin-3-yl)oxy]-3-(2-boronoethyl)-2-hydroxybenzoic acid

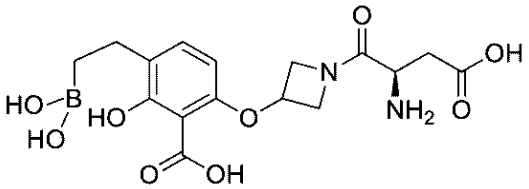
[Chemical Formula 1226]



,

6-({1-[(2R)-2-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

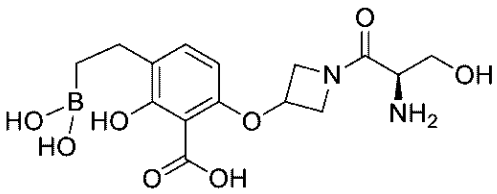
[Chemical Formula 1227]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-serylazetidin-3-yl)oxy]benzoic acid

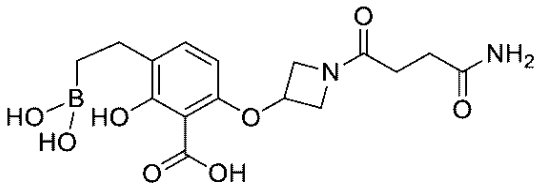
[Chemical Formula 1228]



,

6-{[1-(4-amino-4-oxobutanoyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

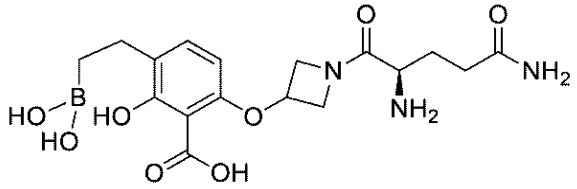
[Chemical Formula 1229]



,

3-(2-boronoethyl)-6-[(1-D-glutaminylazetidin-3-yl)oxy]-2-hydroxybenzoic acid

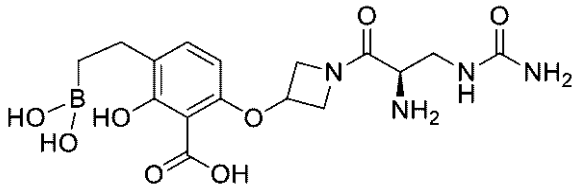
[Chemical Formula 1230]



,

3-(2-boronoethyl)-6-({1-[3-(carbamoylamino)-D-alanyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

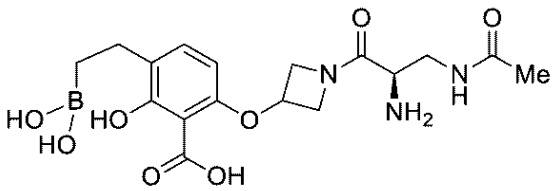
[Chemical Formula 1231]



,

6-{[1-(3-acetamido-D-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

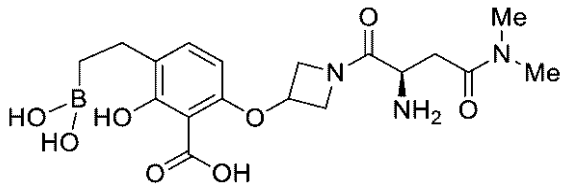
[Chemical Formula 1232]



,

3-(2-boronoethyl)-6-{[1-(N,N-dimethyl-D-asparaginyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

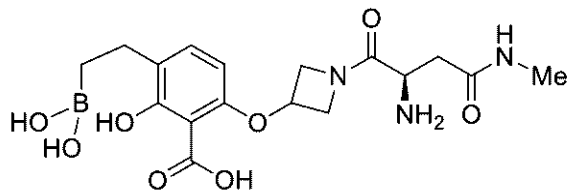
[Chemical Formula 1233]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(N-methyl-D-asparaginyl)azetidin-3-yl]oxy}benzoic acid

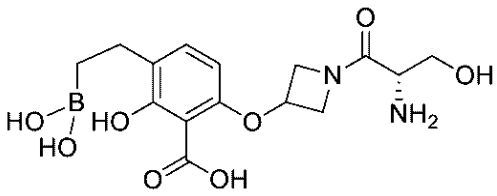
[Chemical Formula 1234]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-serylazetidin-3-yl)oxy]benzoic acid

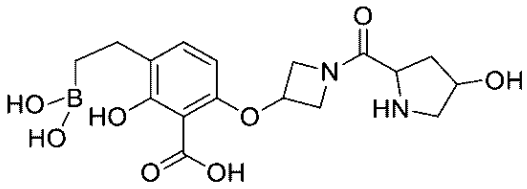
[Chemical Formula 1235]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(4-hydroxyprolyl)azetidin-3-yl]oxy}benzoic acid

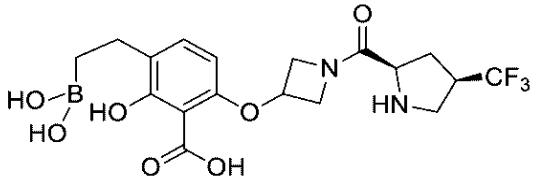
[Chemical Formula 1236]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-(trifluoromethyl)-D-prolyl]azetidin-3-yl}oxy)benzoic acid

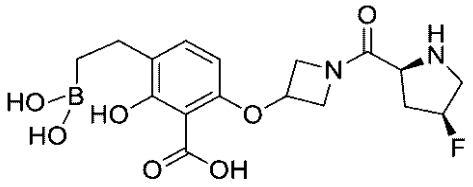
[Chemical Formula 1237]



,

3-(2-boronoethyl)-6-({1-[(4S)-4-fluoro-L-prolyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

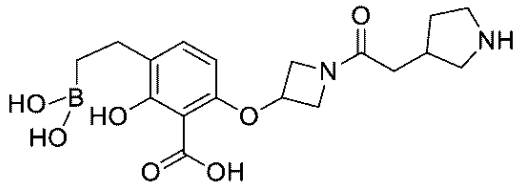
[Chemical Formula 1238]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

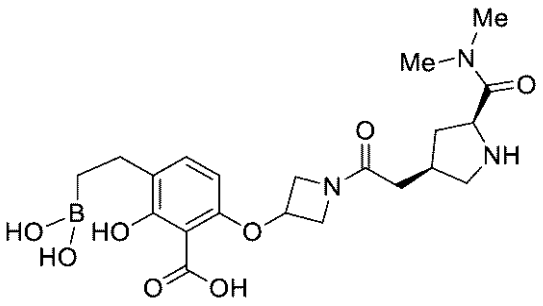
[Chemical Formula 1239]



,

3-(2-boronoethyl)-6-[(1-{[(3R,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

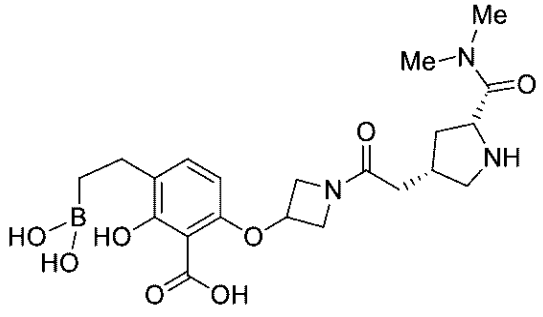
[Chemical Formula 1240]



,

3-(2-boronoethyl)-6-[(1-{[(3S,5R)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

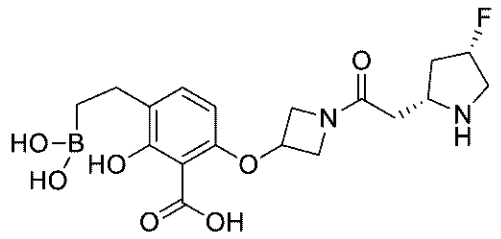
[Chemical Formula 1241]



,

3-(2-boronoethyl)-6-[(1-{[(2R,4S)-4-fluoropyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]-2-hydroxybenzoic acid

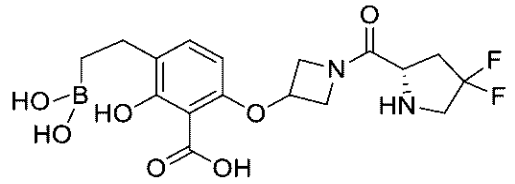
[Chemical Formula 1242]



,

3-(2-boronoethyl)-6-{[1-(4,4-difluoro-L-prolyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

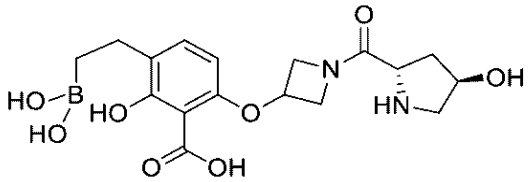
[Chemical Formula 1243]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

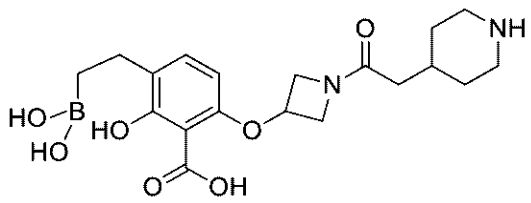
[Chemical Formula 1244]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

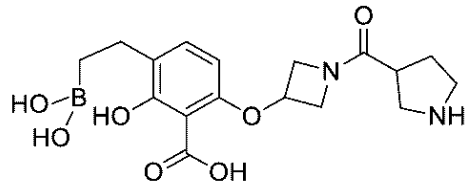
[Chemical Formula 1245]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(pyrrolidine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

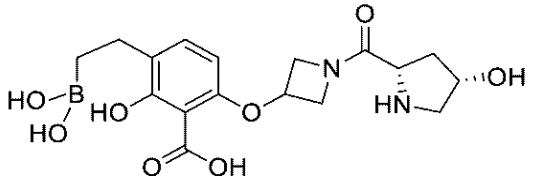
[Chemical Formula 1246]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4S)-4-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

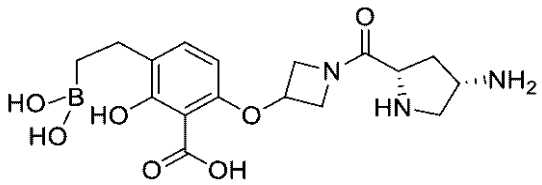
[Chemical Formula 1247]



,

6-({1-[(4S)-4-amino-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

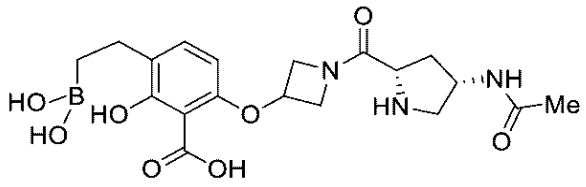
[Chemical Formula 1248]



,

6-({1-[(4S)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

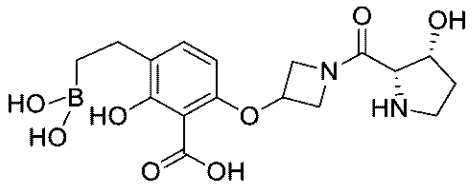
[Chemical Formula 1249]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(3R)-3-hydroxy-L-prolyl]azetidin-3-yl}oxy)benzoic acid

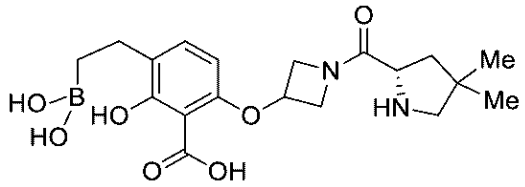
[Chemical Formula 1250]



,

3-(2-boronoethyl)-6-{[1-(4,4-dimethyl-L-prolyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

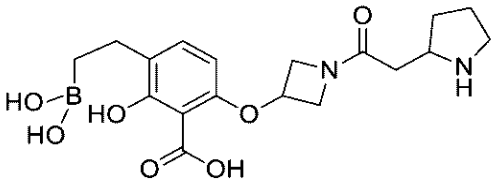
[Chemical Formula 1251]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(pyrrolidin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

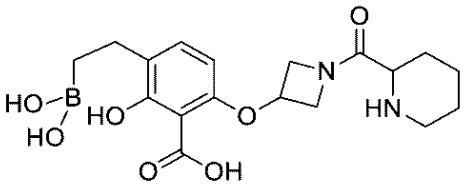
[Chemical Formula 1252]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-2-carbonyl)azetidin-3-yl]oxy}benzoic acid

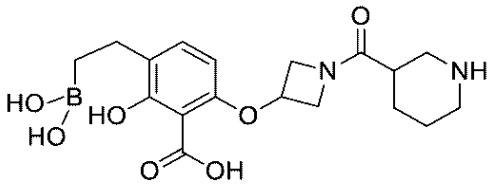
[Chemical Formula 1253]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-3-carbonyl)azetidin-3-yl]oxy}benzoic acid

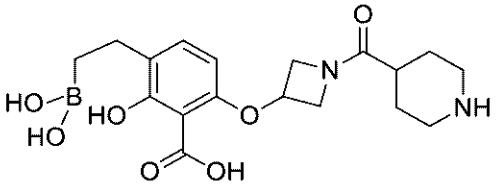
[Chemical Formula 1254]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(piperidine-4-carbonyl)azetidin-3-yl]oxy}benzoic acid

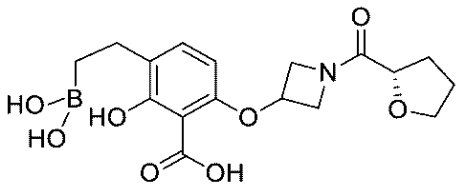
[Chemical Formula 1255]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(2S)-oxolane-2-carbonyl]azetidin-3-yl}oxy)benzoic acid

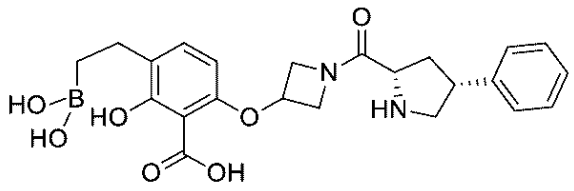
[Chemical Formula 1256]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(4R)-4-phenyl-L-prolyl]azetidin-3-yl}oxy)benzoic acid

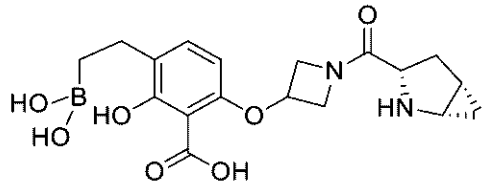
[Chemical Formula 1257]



,

6-({1-[(1S,3S,5S)-2-azabicyclo[3.1.0]hexane-3-carbonyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

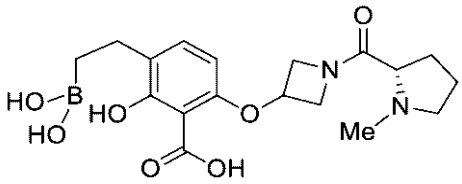
[Chemical Formula 1258]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(1-methyl-L-prolyl)azetidin-3-yl]oxy}benzoic acid

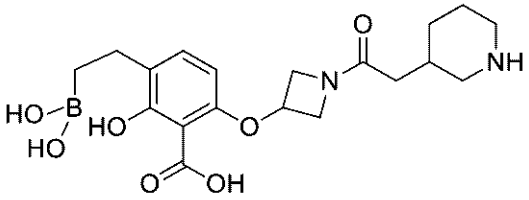
[Chemical Formula 1259]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-3-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

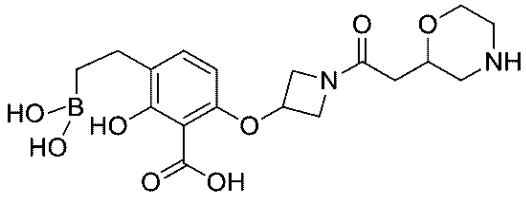
[Chemical Formula 1260]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(morpholin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

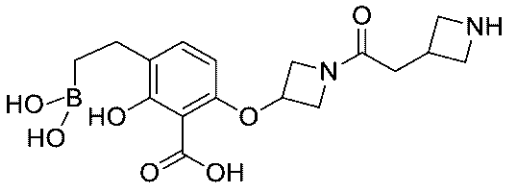
[Chemical Formula 1261]



,

6-({1-[(azetidin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

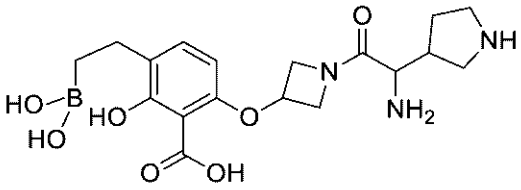
[Chemical Formula 1262]



,

6-({1-[amino(pyrrolidin-3-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

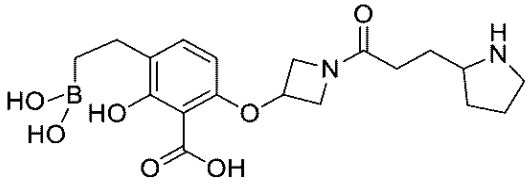
[Chemical Formula 1263]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[3-(pyrrolidin-2-yl)propanoyl]azetidin-3-yl}oxy)benzoic acid

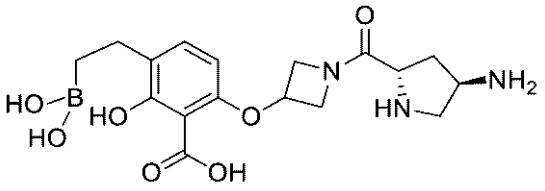
[Chemical Formula 1264]



,

6-({1-[(4R)-4-amino-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

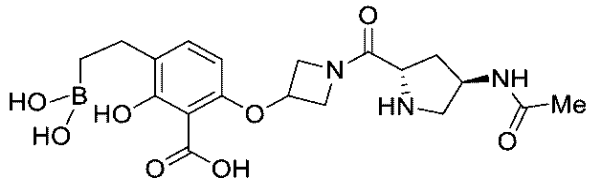
[Chemical Formula 1265]



,

6-({1-[(4R)-4-acetamido-L-prolyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

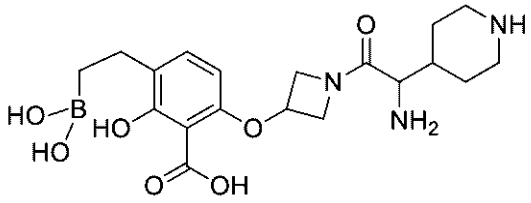
[Chemical Formula 1266]



,

6-({1-[amino(piperidin-4-yl)acetyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

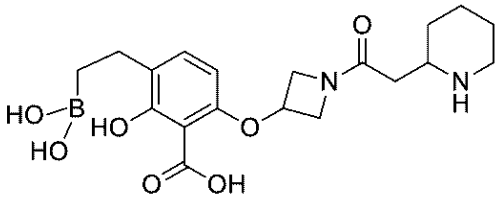
[Chemical Formula 1267]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperidin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

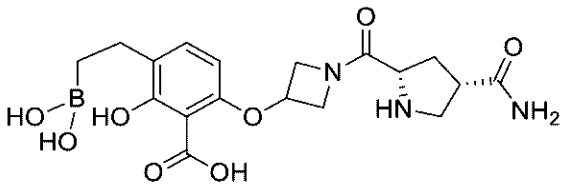
[Chemical Formula 1268]



,

3-(2-boronoethyl)-6-({1-[(4S)-4-carbamoyl-L-prolyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

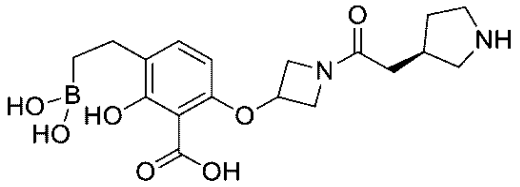
[Chemical Formula 1269]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(3R)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

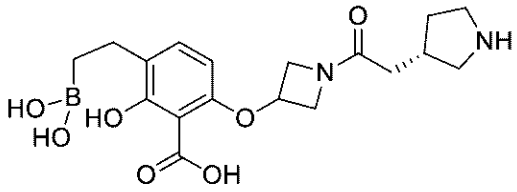
[Chemical Formula 1270]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(3S)-pyrrolidin-3-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

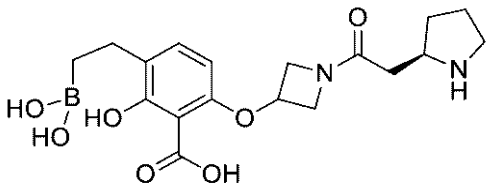
[Chemical Formula 1271]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(2R)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

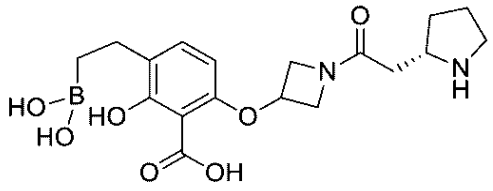
[Chemical Formula 1272]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-{[(2S)-pyrrolidin-2-yl]acetyl}azetidin-3-yl)oxy]benzoic acid

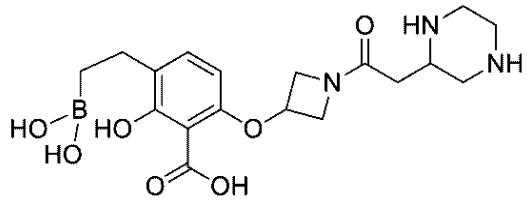
[Chemical Formula 1273]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(piperazin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

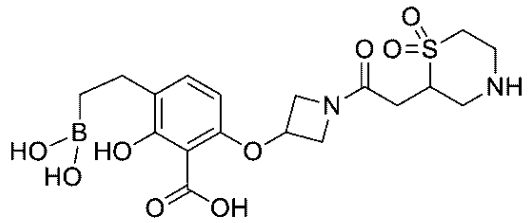
[Chemical Formula 1274]



,

3-(2-boronoethyl)-6-({1-[(1,1-dioxo-1λ^6-thiomorpholin-2-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

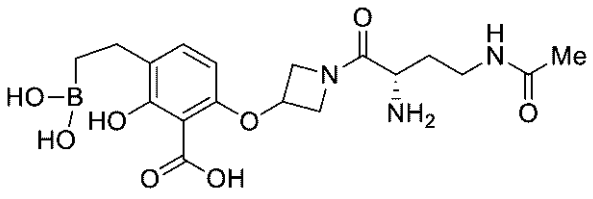
[Chemical Formula 1275]



,

6-({1-[(2S)-4-acetamido-2-aminobutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

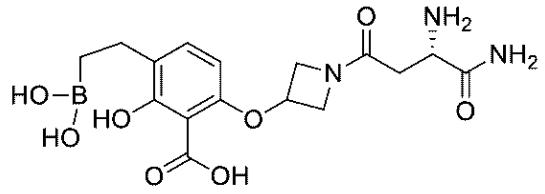
[Chemical Formula 1276]



,

6-{[1-(L-α-asparaginyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

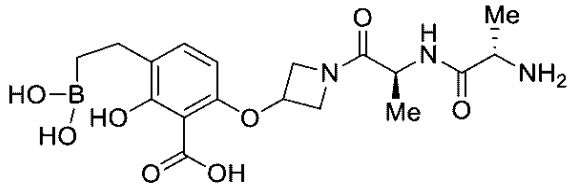
[Chemical Formula 1277]



,

6-{[1-(L-alanyl-L-alanyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

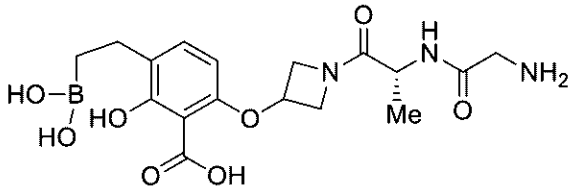
[Chemical Formula 1278]



,

3-(2-boronoethyl)-6-{[1-(glycyl-D-alanyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

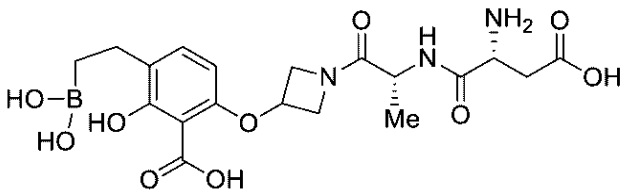
[Chemical Formula 1279]



,

N-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-α-asparagine

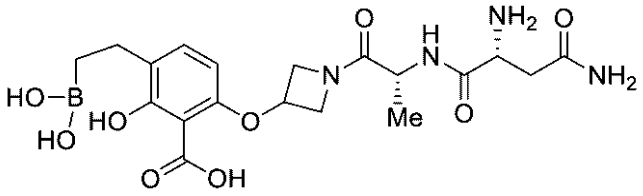
[Chemical Formula 1280]



,

N^1-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-aspartamide

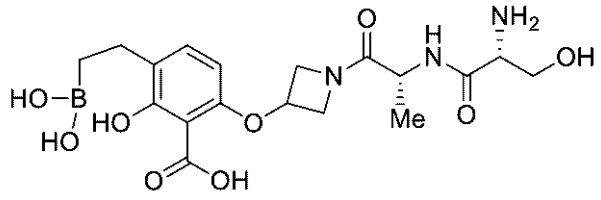
[Chemical Formula 1281]



,

N-[(2R)-1-{3-[4-(2-boronoethyl)-2-carboxy-3-hydroxyphenoxy]azetidin-1-yl}-1-oxopropan-2-yl]-D-serinamide

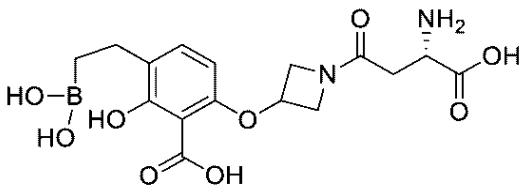
[Chemical Formula 1282]



,

6-({1-[(3S)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

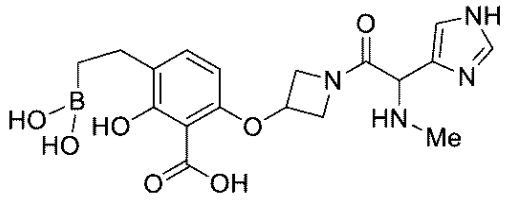
[Chemical Formula 1283]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(1H-imidazol-4-yl)(methylamino)acetyl]azetidin-3-yl}oxy)benzoic acid

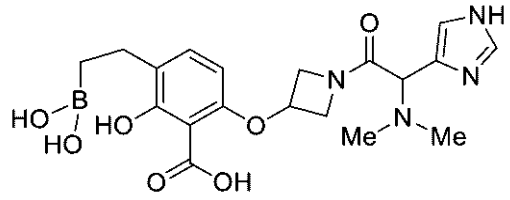
[Chemical Formula 1284]



,

3-(2-boronoethyl)-6-({1-[(dimethylamino)(1H-imidazol-4-yl)acetyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

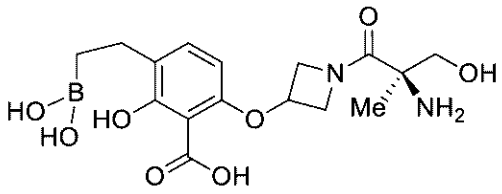
[Chemical Formula 1285]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(2-methyl-D-seryl)azetidin-3-yl]oxy}benzoic acid

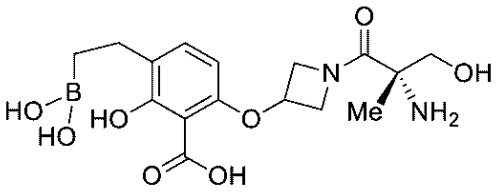
[Chemical Formula 1286]



,

3-(2-boronoethyl)-2-hydroxy-6-{[1-(2-methyl-L-seryl)azetidin-3-yl]oxy}benzoic acid

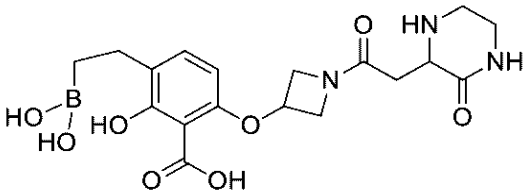
[Chemical Formula 1287]



,

3-(2-boronoethyl)-2-hydroxy-6-({1-[(3-oxopiperazin-2-yl)acetyl]azetidin-3-yl}oxy)benzoic acid

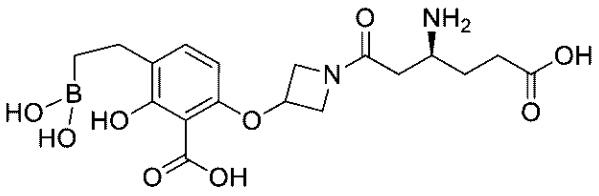
[Chemical Formula 1288]



,

6-({1-[(3S)-3-amino-5-carboxypentanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

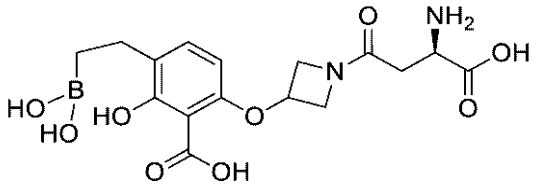
[Chemical Formula 1289]



,

6-({1-[(3R)-3-amino-3-carboxypropanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

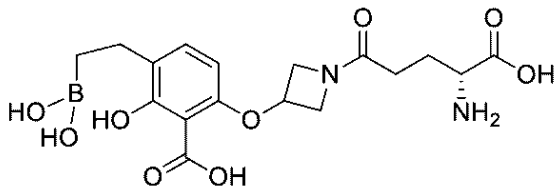
[Chemical Formula 1290]



,

6-({1-[(4R)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

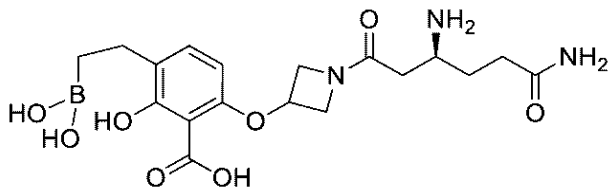
[Chemical Formula 1291]



,

3-(2-boronoethyl)-6-({1-[(3S)-3,6-diamino-6-oxohexanoyl]azetidin-3-yl}oxy)-2-hydroxybenzoic acid

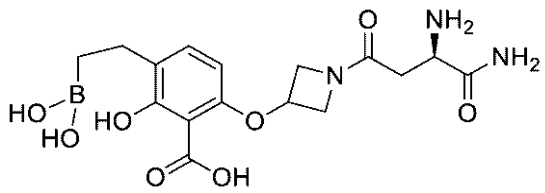
[Chemical Formula 1292]



,

6-{[1-(D-α-asparaginyl)azetidin-3-yl]oxy}-3-(2-boronoethyl)-2-hydroxybenzoic acid

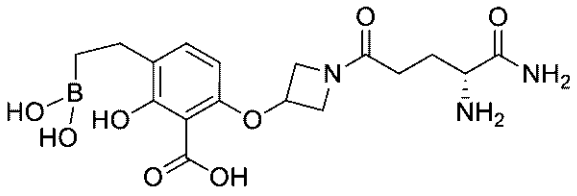
[Chemical Formula 1293]



,

3-(2-boronoethyl)-6-{[1-(D-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

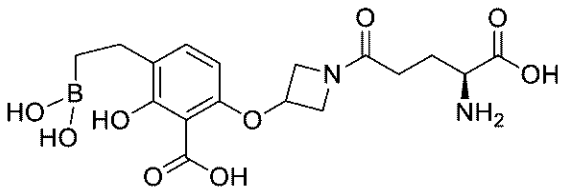
[Chemical Formula 1294]



,

6-({1-[(4S)-4-amino-4-carboxybutanoyl]azetidin-3-yl}oxy)-3-(2-boronoethyl)-2-hydroxybenzoic acid

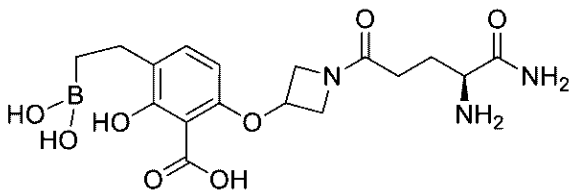
[Chemical Formula 1295]



,

3-(2-boronoethyl)-6-{[1-(L-α-glutaminyl)azetidin-3-yl]oxy}-2-hydroxybenzoic acid

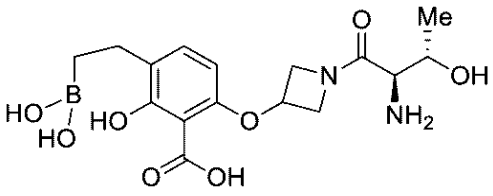
[Chemical Formula 1296]



,

3-(2-boronoethyl)-2-hydroxy-6-[(1-D-threonylazetidin-3-yl)oxy]benzoic acid

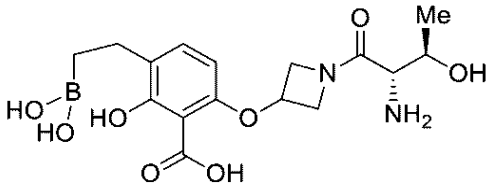
[Chemical Formula 1297]



, and

3-(2-boronoethyl)-2-hydroxy-6-[(1-L-threonylazetidin-3-yl)oxy]benzoic acid

[Chemical Formula 1298]



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[Claim 70]

A medicament comprising the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69.

[Claim 71]

The medicament according to claim 70, which is a therapeutic drug or a prophylactic drug for a bacterial infection.

[Claim 72]

A β-lactamase inhibiting agent comprising the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69 as an active ingredient.

[Claim 73]

A pharmaceutical composition comprising the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69 and a pharmaceutically acceptable carrier.

[Claim 74]

The pharmaceutical composition according to claim 73, further comprising an additional agent.

[Claim 75]

The pharmaceutical composition according to claim 74, wherein the additional agent is selected from the group consisting of an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, and an anti-allergic agent.

[Claim 76]

The pharmaceutical composition according to claim 74 or 75, wherein the additional agent is a β-lactam agent.

[Claim 77]

The pharmaceutical composition according to claim 75 or 76, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide, ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Claim 78]

The pharmaceutical composition according to claim 76 or 77, wherein the β-lactam agent is selected from ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, or panipenem.

[Claim 79]

The pharmaceutical composition according to claim 76 or 77, wherein the β-lactam agent is selected from aztreonam, tigemonam, BAL30072, SYN2416, or carumonam.

[Claim 80]

The pharmaceutical composition according to claim 73, characterized in that an additional agent is concomitantly administered.

[Claim 81]

The pharmaceutical composition according to claim 80, wherein the additional agent is selected from an antibacterial agent, an antifungal agent, an antiviral agent, an anti-inflammatory agent, or an anti-allergic agent.

[Claim 82]

The pharmaceutical composition according to claim 80 or 81, wherein the additional agent is a β-lactam agent.

[Claim 83]

The pharmaceutical composition according to claim 81 or 82, wherein a β-lactam agent, which is the additional agent, is selected from the group consisting of amoxicillin, ampicillin (pivampicillin, hetacillin, bacampicillin, metampicillin, and talampicillin), epicillin, carbenicillin (carindacillin), ticarcillin, temocillin, azlocillin, piperacillin, mezlocillin, mecillinam (pivmecillinam), sulbenicillin, benzylpenicillin (G), clometocillin, benzathine benzylpenicillin, procaine benzylpenicillin, azidocillin, penamecillin, phenoxymethyl penicillin (V), propicillin, benzathine phenoxymethylpenicillin, phenethicillin, cloxacillin (dicloxacillin and flucloxacillin), oxacillin, methicillin, nafcillin, faropenem, biapenem, doripenem, ertapenem, imipenem, meropenem, panipenem, tomopenem, razupenem, cefazolin, cefacetrile, cefadroxil, cephalexin, cefaloglycin, cefalonium, cefaloridine, cephalothin, cephapirin, cefatrizine, cefazedone, cefazaflur, cefradine, cefroxadine, ceftezole, cefaclor, cefamandole, cefminox, cefonicide,

ceforanide, cefotiam, cefprozil, cefbuperazone, cefuroxime, cefuzonam, cefoxitin, cefotetan, cefmetazole, loracarbef, cefixime, ceftazidime, ceftriaxone, cefcapene, cefdaloxime, cefdinir, cefditoren, cefetamet, cefmenoxime, cefodizime, cefoperazone, cefotaxime, cefpimizole, cefpiramide, cefpodoxime, cefsulodin, cefteram, ceftibuten, ceftiolene, ceftizoxime, flomoxef, latamoxef, cefepime, cefozopran, cefpirome, cefquinome, ceftobiprole, ceftaroline, CXA-101, RWJ-54428, MC-04546, ME1036, BAL30072, SYN2416, ceftiofur, cefquinome, cefovecin, aztreonam, tigemonam, carumonam, RWJ-442831, RWJ-333441, and RWJ-333442.

[Claim 84]

The pharmaceutical composition according to claim 82 or 83, wherein the β-lactam agent is selected from the group consisting of ceftazidime, biapenem, doripenem, ertapenem, imipenem, meropenem, and panipenem.

[Claim 85]

The pharmaceutical composition according to claim 82 or 83, wherein the β-lactam agent is selected from the group consisting of aztreonam, tigemonam, BAL30072, SYN2416, and carumonam.

[Claim 86]

The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69 for treating a bacterial infection.

[Claim 87]

The compound or the pharmaceutically acceptable salt thereof according to claim 86, wherein the bacterial infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Claim 88]

The compound or the pharmaceutically acceptable salt thereof according to claim 86 or 87, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a

chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, eye infection, or an odontogenic infection.

[Claim 89]

A medicament comprised of a combination of the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69 and at least one agent selected from the group consisting of therapeutic agents for sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, eye infection, and an odontogenic infection.

[Claim 90]

A pharmaceutical composition comprising a β-lactam agent, wherein the pharmaceutical composition is administered with the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69.

[Claim 91]

A method for treating a bacterial infection, characterized in that a therapeutically effective amount of the compound or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 69 is administered to a patient in need thereof.

[Claim 92]

The method according to claim 91, wherein the bacterial

infection is a bacterial infection in which a bacteria that can have a β-lactamase is involved.

[Claim 93]

The method according to claim 91 or 92, wherein the bacterial infection is sepsis, febrile neutropenia, bacterial meningitis, bacterial endocarditis, otitis media, sinusitis, pneumonia, lung abscess, empyema, secondary infection of a chronic respiratory disease, pharyngolaryngitis, tonsillitis, osteomyelitis, arthritis, peritonitis, intraperitoneal abscess, cholecystitis, cholangitis, liver abscess, a deep skin infection, lymphangitis/lymphadenitis, secondary infection of trauma, burn injury, surgical wound, or the like, a urinary tract infection, a genital infection, an eye infection, or an odontogenic infection.

[Claim 94]

The method of any one of claims 91 to 93, characterized in that an additional agent is concomitantly administered.