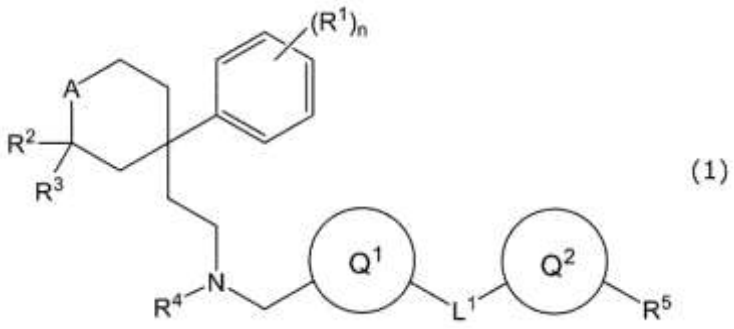
[CLAIMS]

[Claim 1]

A compound represented by the following formula (1):

[Chem. 1]



(1)

wherein

A is -O-, -S-, -NR^a-, or -CR^bR^c-,

wherein

R^a is hydrogen or C_{1-3} alkyl,

R^b and R^c are each independently hydrogen, halogen, or C_{1-3} alkyl, and

the alkyl is unsubstituted or substituted by 1 to 3 halogens,

each R^1 in the number of n is independently halogen, hydroxy, -CN, C_{1-6} alkyl, C_{2-6} alkenyl, -O-C_{1-6} alkyl, -N(H)-C_{1-3} alkyl, -N(C_{1-3} alkyl)$_2$, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

the cycloalkyl and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the heterocycloalkyl has 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

R^2 and R^3 are each independently hydrogen, halogen, C_{1-6} alkyl, or C_{2-6} alkenyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

R^4 is C_{1-6} alkyl, $-C(=O)-R^d$ (R^d indicates C_{1-6} alkyl, C_{2-5} alkenyl, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl), C_{6-12} aryl, or 6- to 12-membered heteroaryl,

wherein

the C_{1-6} alkyl is unsubstituted or substituted by 1 to 3 halogens, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl,

the aryl, heteroaryl, cycloalkyl, and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the heteroaryl and heterocycloalkyl have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

ring Q^1 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, or a 3- to 7-membered heterocycloalkene ring,

wherein

the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, and heterocycloalkene ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring, and heterocycloalkene ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

L^1 is a single bond, -O-, -S-, -NH-, C_{1-3} alkylene, C_{2-3} alkenylene, -C(=O)-, -C(=O)NH-, -NHC(=O)-, -C(=O)O-, or -OC(=O)-,

wherein

the alkylene and alkenylene are each independently

unsubstituted or substituted by 1 to 3 halogens,

ring Q^2 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, a 3- to 7-membered heterocycloalkene ring, a C_{5-12} spirocycloalkane ring, or a 5- to 12-membered spiroheterocycloalkane ring,

wherein

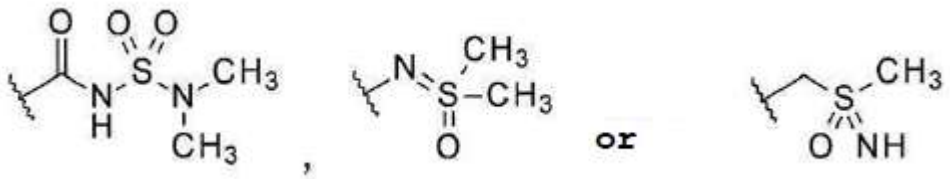
the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, heterocycloalkene ring, spirocycloalkane ring, and spiroheterocycloalkane ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring, heterocycloalkene ring, and spiroheterocycloalkane ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

R^5 is C_{1-6} alkyl, carboxy, hydroxy, or

a group represented by the following formula:

[Chem. 2]



wherein

the C_{1-6} alkyl is unsubstituted or substituted by 1 or 2 groups selected from the group consisting of carboxy, hydroxy, and $-O-C_{1-6}$ alkyl, and

n is an integer of 0 to 3, or a pharmaceutically acceptable salt thereof.

[Claim 2]

The compound according to claim 1 or a pharmaceutically

acceptable salt thereof, wherein A is -O- or -CR^bR^c-.

[Claim 3]

The compound according to claim 1 or 2 or a pharmaceutically acceptable salt thereof, wherein

each R^1 in the number of n is independently halogen, -O-C_{1-6} alkyl, -N(H)-C_{1-3} alkyl, -N(C_{1-3} alkyl)$_2$, or 3- to 7-membered heterocycloalkyl,

wherein the heterocycloalkyl has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 4]

The compound according to any one of claims 1 to 3 or a pharmaceutically acceptable salt thereof, wherein

R^2 and R^3 are each independently hydrogen or C_{1-6} alkyl.

[Claim 5]

The compound according to any one of claims 1 to 4 or a pharmaceutically acceptable salt thereof, wherein

R^4 is C_{1-6} alkyl, -C(=O)-R^d, or 6- to 12-membered heteroaryl,

wherein

the R^d is C_{1-6} alkyl,

the C_{1-6} alkyl is unsubstituted or substituted by 1 to 3 halogens or C_{3-7} cycloalkyl, and

the heteroaryl has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 6]

The compound according to any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof, wherein

ring Q^1 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, or a C_{3-7} cycloalkene ring, and the aromatic heterocycle has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 7]

The compound according to any one of claims 1 to 6 or a pharmaceutically acceptable salt thereof, wherein

L^1 is a single bond, -O-, C_{1-3} alkylene, or -C(=O)-.

[Claim 8]

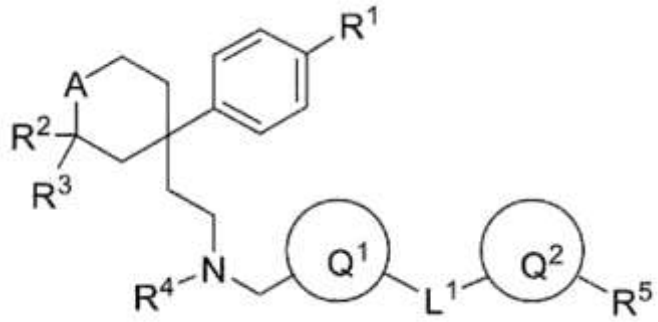
The compound according to any one of claims 1 to 7 or a pharmaceutically acceptable salt thereof, wherein

ring Q^2 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, or a 5- to 12-membered spiroheterocycloalkane ring, and the heterocycloalkane ring and spiroheterocycloalkane ring have 1 or 2 nitrogen atoms as ring member atoms.

[Claim 9]

A compound represented by the following formula (1'):

[Chem. 3]



(1')

wherein

A is -O- or $-CF_2-$,

R^1 is halogen, $-O-C_{1-6}$ alkyl optionally substituted by 1 to 3 halogens, $-N(H)-C_{1-3}$ alkyl, $-N(C_{1-3}$ alkyl$)_2$ or 4- to 6-membered heterocycloalkyl having one nitrogen atom as a ring member atom,

R^2 and R^3 are each independently hydrogen or C_{1-6} alkyl,

R^4 is C_{1-6} alkyl optionally substituted by 1 to 3 halogens, $-C(=O)-C_{1-6}$ alkyl optionally substituted by 1 to 3 halogens, C_{3-6} cycloalkylmethyl optionally substituted by one trifluoromethyl or 6-membered heteroaryl having 1 or 2 nitrogen atoms as ring member atoms (the heteroaryl is optionally substituted by one halogen),

ring Q^1 is a benzene ring optionally having 1 or 2 groups selected from the group consisting of halogen and C_{1-3} alkyl, a

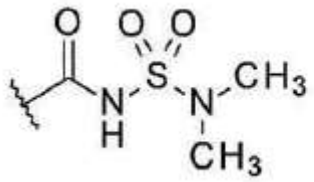
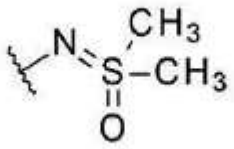
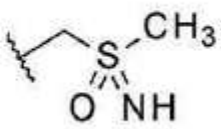
6- to 12-membered monocyclic or bicyclic aromatic heterocycle having 1 or 2 nitrogen atoms as ring member atoms, a C_{4-7} cycloalkane ring, or a C_{4-7} cycloalkene ring,

L^1 is a single bond, -O-, $-CH_2-$, or -C(=O)-,

ring Q^2 is a benzene ring optionally substituted by one halogen, a C_{4-7} cycloalkane ring, a C_{4-7} cycloalkene ring optionally substituted by one halogen, a piperidine ring, or a 7-azaspiro[3.5]nonane ring, and

R^5 is C_{1-6} alkyl optionally having 1 or 2 groups selected from the group consisting of carboxy, hydroxy, and $-O-C_{1-6}$ alkyl, carboxy, hydroxy, or a group represented by the following formula:

[Chem. 4]


,

or

,

or a pharmaceutically acceptable salt thereof.

[Claim 10]

The compound according to claim 9 or a pharmaceutically acceptable salt thereof, wherein

A is -O-,

R^2 is methyl,

R^3 is methyl,

R^4 is C_{1-6} alkyl optionally substituted by 1 to 3 halogens, $-C(=O)-C_{1-6}$ alkyl optionally substituted by 1 to 3 halogens, or 6-membered heteroaryl having 1 or 2 nitrogen atoms as ring member atoms (the heteroaryl is optionally substituted by one halogen),

ring Q^1 is a benzene ring optionally having one group selected from the group consisting of halogen and C_{1-3} alkyl, or a pyridine ring,

L^1 is a single bond, -O-, or -C(=O)-, and

ring Q^2 is a benzene ring, a C_{4-7} cycloalkane ring, or a

C_{4-7} cycloalkene ring.

[Claim 11]

The compound according to claim 9 or 10 or a pharmaceutically acceptable salt thereof, wherein

R^1 is methoxy, and

R^4 is 3,3,3-trifluoro-2,2-dimethylpropyl.

[Claim 12]

Any one compound selected from the following group:

trans-4-(4-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}phenoxy)cyclohexanecarboxylic acid,

2-[4-(4-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}phenoxy)phenyl]propanoic acid,

{trans-4-[(5-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}pyridin-2-yl)oxy]cyclohexyl}acetic acid,

[trans-4-(4-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}phenoxy)cyclohexyl]acetic acid,

(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[biphenyl]-4-carboxylic acid,

[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[biphenyl]-4-yl]methanol, and

tert-butyl 4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyltetrahydro-2H-pyran-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[biphenyl]-4-yl]methyl}piperazine-1-carboxylate,

or a pharmaceutically acceptable salt thereof.

[Claim 13]

A polyfunctional molecule comprising a moiety corresponding to the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12.

[Claim 14]

The polyfunctional molecule according to claim 13, further comprising another functional moiety, wherein the moiety corresponding to the compound or a pharmaceutically acceptable salt thereof is linked to the other functional moiety directly or is linked via a linker at any position in R^5.

[Claim 15]

The polyfunctional molecule according to claim 14, wherein

said other functional moiety is an E3 ligase-binding moiety, an autophagy-recruiting moiety, a lysosome-recruiting moiety, a kinase-recruiting moiety, a phosphatase-recruiting moiety, a glycosyltransferase-recruiting moiety, an acetyltransferase-recruiting moiety, or ADC.

[Claim 16]

The polyfunctional molecule according to claim 14, wherein

said other functional moiety is an E3 ligase-binding moiety.

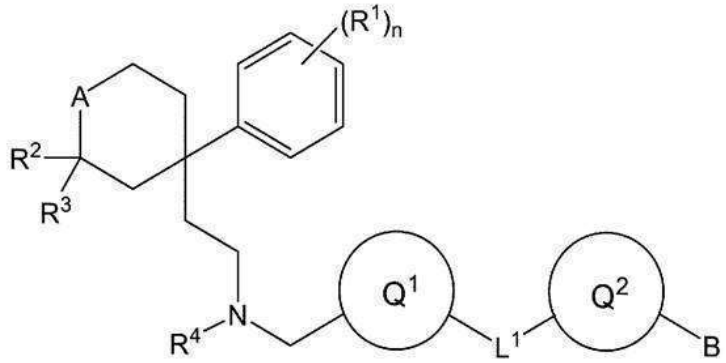
[Claim 17]

The polyfunctional molecule according to claim 16, wherein the E3 ligase-binding moiety is a cereblon (CRBN)-binding moiety.

[Claim 18]

A compound represented by the following formula (2):

[Chem. 5]



(2)

wherein

A is -O-, -S-, -NR^a-, or -CR^{b}R^c-,

wherein

R^a is hydrogen or C$_{1-3}$ alkyl,

R^b and R^c are each independently hydrogen, halogen, or C$_{1-3}$ alkyl, and

the alkyl is unsubstituted or substituted by 1 to 3 halogens,

each R^1 in the number of n is independently halogen, hydroxy, -CN, C$_{1-6}$ alkyl, C$_{2-6}$ alkenyl, -O-C$_{1-6}$ alkyl, -N(H)-C$_{1-3}$ alkyl, -N(C$_{1-3}$ alkyl)$_2$, C$_{3-7}$ cycloalkyl, or 3- to 7-membered heterocycloalkyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

the cycloalkyl and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C$_{1-3}$ alkyl, and C$_{1-3}$ haloalkyl, and

the heterocycloalkyl has 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

R^2 and R^3 are each independently hydrogen, halogen, C$_{1-6}$ alkyl, or C$_{2-6}$ alkenyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

R^4 is C$_{1-6}$ alkyl, -C(=O)-R^d (R^d indicates C$_{1-6}$ alkyl, C$_{2-5}$ alkenyl, C$_{3-7}$ cycloalkyl, or 3- to 7-membered heterocycloalkyl),

C_{6-12} aryl, or 6- to 12-membered heteroaryl,

wherein

the C_{1-6} alkyl is unsubstituted or substituted by 1 to 3 halogens, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl,

the aryl, heteroaryl, cycloalkyl, and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the heteroaryl and heterocycloalkyl have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

ring Q^1 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, or a 3- to 7-membered heterocycloalkene ring,

wherein

the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, and heterocycloalkene ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring, and heterocycloalkene ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

L^1 is a single bond, -O-, -S-, -NH-, C_{1-3} alkylene, C_{2-3} alkenylene, -C(=O)-, -C(=O)NH-, -NHC(=O)-, -C(=O)O-, or -OC(=O)-,

wherein

the alkylene and alkenylene are each independently unsubstituted or substituted by 1 to 3 halogens,

ring Q^2 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, a 3-

to 7-membered heterocycloalkene ring, a C_{5-12} spirocycloalkane ring, or a 5- to 12-membered spiroheterocycloalkane ring,

wherein

the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, heterocycloalkene ring, spirocycloalkane ring, and spiroheterocycloalkane ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring, heterocycloalkene ring, and spiroheterocycloalkane ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

B is $-L^2-L^3-L^4-R^6$,

L^2 is a single bond, C_{1-6} alkylene, -C(=O)-, -C(=O)NH-, $-(CH_2)_k$-C(=O)NH- (k indicates an integer of 1 to 3), or -NHC(=O)-,

L^3 is a single bond, C_{1-6} alkylene, C_{3-6} cycloalkylene, piperazinediyl, piperazin-2-onediyl, piperidinediyl, pyrrolidinediyl, azetidinediyl, or 3-oxa-9-azabicyclo[3.3.1]nonanediyl,

L^4 is a single bond, $-NH-$, $-N(-R^7)-$ (R^7 indicates C_{1-6} alkyl), $-CH_2-$, or -C(=O)-, and

R^6 is an E3 ligase-binding moiety, an autophagy-recruiting moiety, a lysosome-recruiting moiety, a kinase-recruiting moiety, a phosphatase-recruiting moiety, a glycosyltransferase-recruiting moiety, an acetyltransferase-recruiting moiety, or ADC, and

n is an integer of 0 to 3, or a pharmaceutically acceptable salt thereof.

[Claim 19]

The compound according to claim 18 or a pharmaceutically acceptable salt thereof, wherein A is -O- or $-CR^bR^c-$.

[Claim 20]

The compound according to claim 18 or 19 or a pharmaceutically acceptable salt thereof, wherein

each R^1 in the number of n is independently halogen, -O-C_{1-6} alkyl, -N(H)-C_{1-3} alkyl, -N(C_{1-3} alkyl)$_2$, or 3- to 7-membered heterocycloalkyl, and the heterocycloalkyl has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 21]

The compound according to any one of claims 18 to 20 or a pharmaceutically acceptable salt thereof, wherein

R^2 and R^3 are each independently hydrogen or C_{1-6} alkyl.

[Claim 22]

The compound according to any one of claims 18 to 21 or a pharmaceutically acceptable salt thereof, wherein

R^4 is C_{1-6} alkyl, -C(=O)-R^d, or 6- to 12-membered heteroaryl,

wherein

the R^d is C_{1-6} alkyl,

the C_{1-6} alkyl is unsubstituted or substituted by 1 to 3 halogens or C_{3-7} cycloalkyl, and

the heteroaryl has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 23]

The compound according to any one of claims 18 to 22 or a pharmaceutically acceptable salt thereof, wherein

ring Q^1 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, or a C_{3-7} cycloalkene ring, and the aromatic heterocycle has 1 or 2 nitrogen atoms as ring member atoms.

[Claim 24]

The compound according to any one of claims 18 to 23 or a pharmaceutically acceptable salt thereof, wherein

L^1 is a single bond, -O-, C_{1-3} alkylene, or -C(=O)-.

[Claim 25]

The compound according to any one of claims 18 to 24 or a

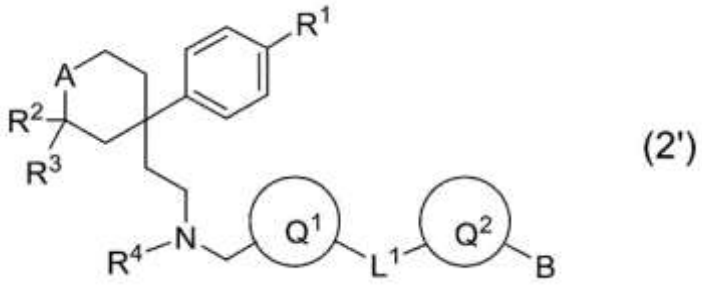
pharmaceutically acceptable salt thereof, wherein

ring Q^2 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, or a 5- to 12-membered spiroheterocycloalkane ring, and the heterocycloalkane ring and spiroheterocycloalkane ring have 1 or 2 nitrogen atoms as ring member atoms.

[Claim 26]

A compound represented by the following formula (2'):

[Chem. 6]



(2')

wherein

A is -O- or $-CF_2-$,

R^1 is halogen, $-O-C_{1-6}$ alkyl optionally substituted by 1 to 3 halogens, $-N(H)-C_{1-3}$ alkyl, $-N(C_{1-3}\ alkyl)_2$ or 4- to 6-membered heterocycloalkyl having one nitrogen atom as a ring member atom,

R^2 and R^3 are each independently hydrogen or C_{1-6} alkyl,

R^4 is C_{1-6} alkyl optionally substituted by 1 to 3 halogens, $-C(=O)-C_{1-6}$ alkyl optionally substituted by 1 to 3 halogens, C_{3-6} cycloalkylmethyl optionally substituted by one trifluoromethyl, or 6-membered heteroaryl having 1 or 2 nitrogen atoms as ring member atoms (the heteroaryl is optionally substituted by one halogen),

ring Q^1 is a benzene ring optionally having 1 or 2 groups selected from the group consisting of halogen and C_{1-3} alkyl, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle having 1 or 2 nitrogen atoms as ring member atoms, a C_{4-7} cycloalkane ring, or a C_{4-7} cycloalkene ring,

L^1 is a single bond, -O-, $-CH_2-$, or -C(=O)-,

ring Q^2 is a benzene ring optionally substituted by one halogen, a C_{4-7} cycloalkane ring, a C_{4-7} cycloalkene ring optionally substituted by one halogen, a piperidine ring, or a 7-azaspiro[3.5]nonane ring,

B is $-L^2-L^3-L^4-R^6$,

L^2 is a single bond, C_{1-6} alkylene, -C(=O)-, -C(=O)NH-, $-(CH_2)_k$-C(=O)NH- (k indicates an integer of 1 to 3), or -NHC(=O)-,

L^3 is a single bond, C_{1-6} alkylene, C_{3-6} cycloalkylene, piperazinediyl, piperazin-2-onediyl, piperidinediyl, pyrrolidinediyl, azetidinediyl, or 3-oxa-9-azabicyclo[3.3.1]nonanediyl,

L^4 is a single bond, -NH-, $-N(-R^7)-$ (R^7 indicates C_{1-6} alkyl), $-CH_2-$, or -C(=O)-, and

R^6 is an E3 ligase-binding moiety, an autophagy-recruiting moiety, a lysosome-recruiting moiety, a kinase-recruiting moiety, a phosphatase-recruiting moiety, a glycosyltransferase-recruiting moiety, an acetyltransferase-recruiting moiety, or ADC, or a pharmaceutically acceptable salt thereof.

[Claim 27]

The compound according to any one of claims 18 to 26, wherein R^6 is an E3 ligase-binding moiety, or a pharmaceutically acceptable salt thereof.

[Claim 28]

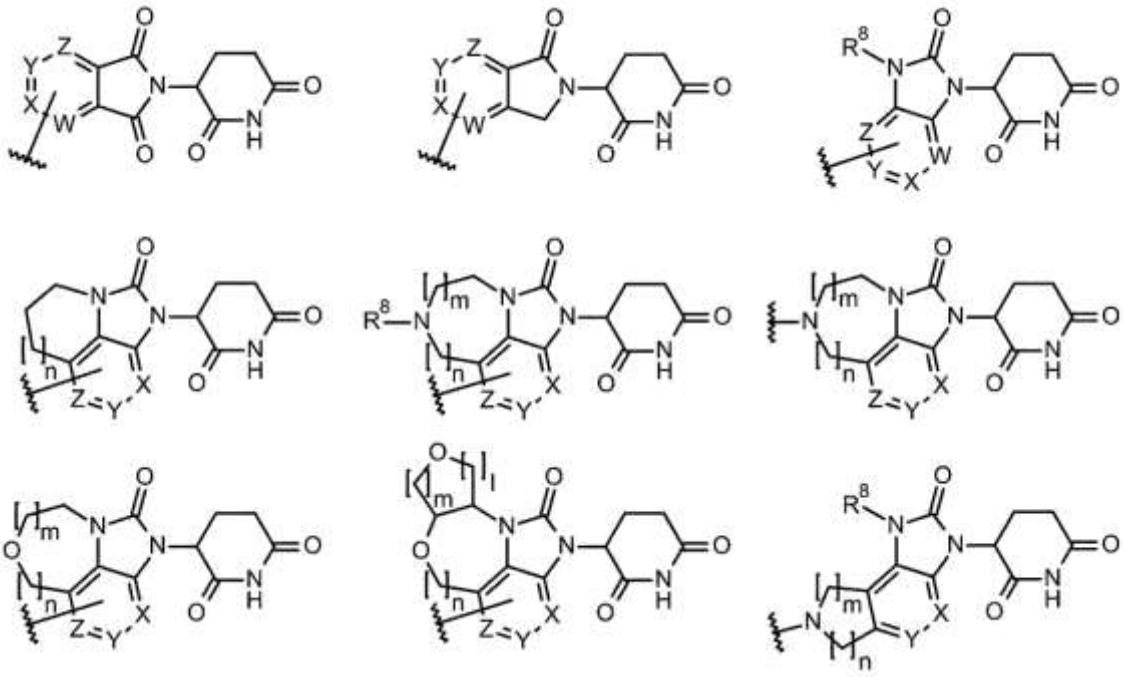
The compound according to claim 27 or a pharmaceutically acceptable salt thereof, wherein the E3 ligase-binding moiety is a cereblon (CRBN)-binding moiety.

[Claim 29]

The compound according to any one of claims 18 to 28 or a pharmaceutically acceptable salt thereof, wherein

R^6 is any substituent selected from the following formulas:

[Chem. 7]



wherein,

R^8 is hydrogen or C_{1-6} alkyl,

W, X, Y, and Z are each independently a nitrogen atom or a carbon atom optionally having one group selected from the group consisting of halogen, C_{1-6} alkyl, and -O-C_{1-6} alkyl,

l, m, and n indicate each independently an integer of 0 to 3, and

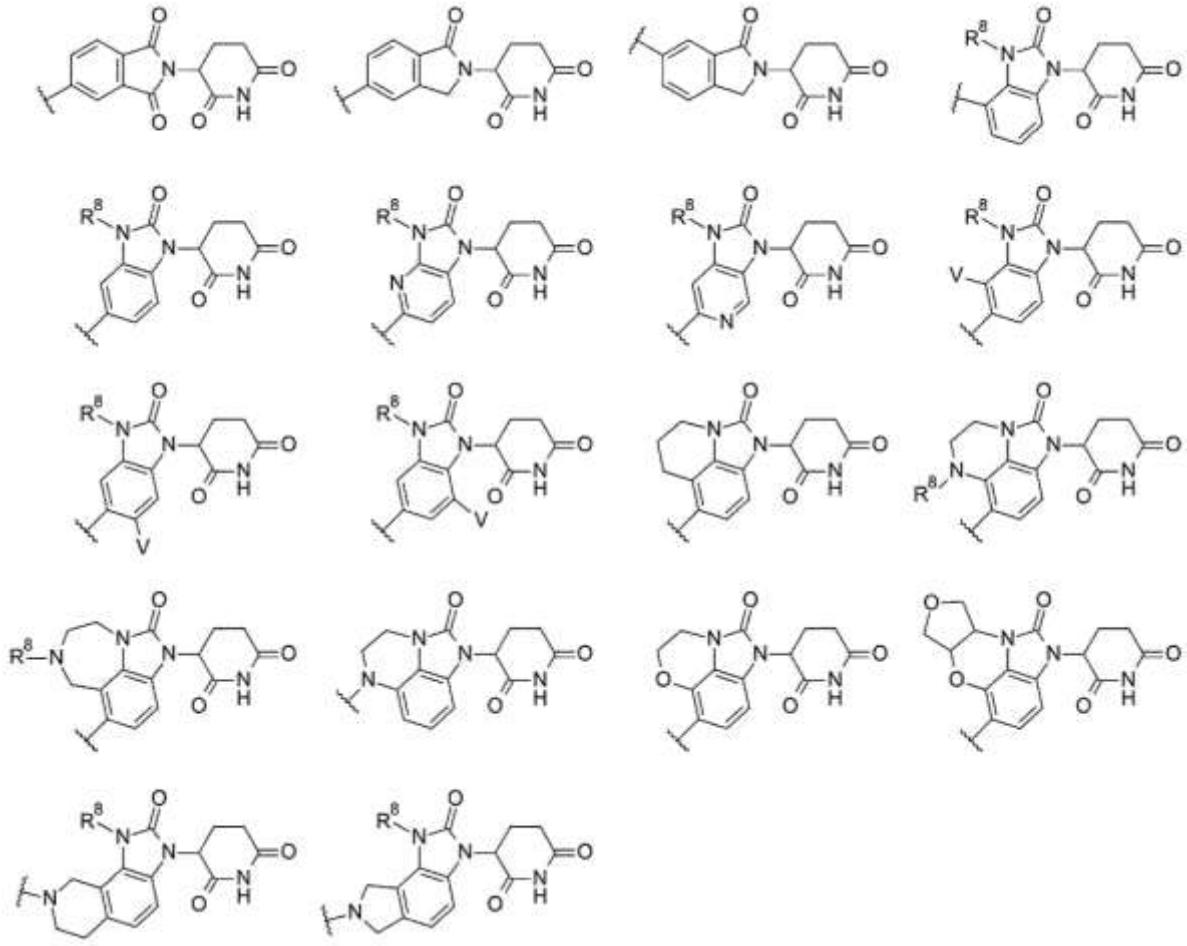
a wavy line indicates the bonding position with L^4.

[Claim 30]

The compound according to claim 29 or a pharmaceutically acceptable salt thereof, wherein

R^6 is any substituent selected from the following formulas:

[Chem. 8]



wherein

R^8 is hydrogen or C_{1-6} alkyl,

V is halogen, and

a wavy line indicates the bonding position with L^4.

[Claim 31]

The compound according to any one of claims 18 to 30 or a pharmaceutically acceptable salt thereof, wherein

R^1 is -O-C_{1-6} alkyl optionally substituted by 1 to 3 halogens,

R^4 is C_{1-6} alkyl optionally substituted by 1 to 3 halogens or C_{3-6} cycloalkylmethyl optionally substituted by one trifluoromethyl,

ring Q^1 is a benzene ring optionally having 1 or 2 groups selected from the group consisting of halogen and C_{1-6} alkyl, a 9- to 10-membered bicyclic aromatic heterocycle having 1 or 2 nitrogen atoms as ring member atoms, a C_{4-7} cycloalkane ring, or a C_{4-7} cycloalkene ring, and

L^1 is a single bond or -O-.

[Claim 32]

The compound according to any one of claims 18 to 31 or a pharmaceutically acceptable salt thereof, wherein

A is -O-,

R^2 is methyl, and

R^3 is methyl.

[Claim 33]

The compound according to any one of claims 18 to 32 or a pharmaceutically acceptable salt thereof, wherein

R^1 is methoxy, and

R^4 is 3,3,3-trifluoro-2,2-dimethylpropyl.

[Claim 34]

The compound according to any one of claims 18 to 33 or a pharmaceutically acceptable salt thereof, wherein

ring Q^1 is a benzene ring optionally having one halogen,

L^1 is a single bond, and

ring Q^2 is a cyclohexene ring.

[Claim 35]

Any one compound selected from the following group:

(3RS)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione,

(3R)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione,

(3S)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione,

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3S)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3RS)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3S)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione, and

(3S)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione,

or a pharmaceutically acceptable salt thereof.

[Claim 36]

The compound according to claim 35, which is any one compound selected from the following group:

(3RS)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione,

(3R)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione,

(3S)-3-[5-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-3-methyl-2-oxo-2,3-dihydro-1H-benzimidazol-1-yl]piperidine-2,6-dione, or a pharmaceutically acceptable salt thereof.

[Claim 37]

The compound according to claim 35, which is any one compound selected from the following group:

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-

dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3S)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione, or a pharmaceutically acceptable salt thereof.

[Claim 38]

The compound according to claim 35, which is any one compound selected from the following group:

(3RS)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione,

(3S)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione, or a pharmaceutically acceptable salt thereof.

[Claim 39]

The compound according to claim 35, which is any one

compound selected from the following group:

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione,

(3R)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione, and

(3S)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione, or a pharmaceutically acceptable salt thereof.

[Claim 40]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate.

[Claim 41]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione monobenzenesulfonate.

[Claim 42]

The compound or the pharmaceutically acceptable salt

thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate.

[Claim 43]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione monoethanesulfonate.

[Claim 44]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-({1-[(4R)-2'-Fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate.

[Claim 45]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-({1-[(4R)-2'-Fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione mono-10-camphorsulfonate.

[Claim 46]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-

2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate.

[Claim 47]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione monoethanesulfonate.

[Claim 48]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione salicylate.

[Claim 49]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione monosalicylate.

[Claim 50]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate.

[Claim 51]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione monobenzenesulfonate.

[Claim 52]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate.

[Claim 53]

The compound or the pharmaceutically acceptable salt thereof according to claim 35, which is (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione mono-10-camphorsulfonate.

[Claim 54]

A crystal of any one compound selected from the following group:

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate,

(3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-

dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate,

(3RS)-3-[7-({1-[(4R)-2’-Fluoro-4’-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate,

(3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate,

(3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione salicylate,

(3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate, and

(3RS)-3-[7-(4-{[(4R)-4’-{[{2-[(4R)-4-(4-Methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1’-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate.

[Claim 55]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate, the crystal having peaks at diffraction angles (2θ) of 2.15±0.2, 8.30±0.2, 10.29±0.2, 14.75±0.2, 17.19±0.2, 20.00±0.2, 21.34±0.2, 22.68±0.2, 23.77±0.2, and 25.23±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 56]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate, the crystal having peaks at diffraction angles (2θ) of 2.21±0.2, 12.04±0.2, 14.87±0.2, 17.69±0.2, 18.93±0.2, 20.41±0.2, 22.42±0.2, 23.19±0.2, 24.13±0.2, and 27.98±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 57]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-({1-[(4R)-2'-fluoro-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-carbonyl]piperidin-4-yl}amino)-2-oxo-5,6-dihydro-4H-imidazo[4,5,1-ij]quinolin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate, the crystal having peaks at diffraction angles (2θ) of 3.89±0.2, 6.81±0.2, 7.68±0.2, 8.20±0.2, 10.28±0.2, 13.15±0.2, 15.97±0.2, 16.81±0.2, 18.58±0.2, and 23.56±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 58]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione ethanesulfonate, the crystal having peaks at diffraction angles (2θ) of 2.27±0.2, 8.18±0.2, 9.88±0.2, 13.09±0.2, 14.57±0.2, 15.80±0.2, 16.91±0.2, 17.77±0.2, 18.87±0.2, and 20.14±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 59]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione salicylate, the crystal having peaks at diffraction angles (2θ) of 2.20±0.2, 4.34±0.2, 9.45±0.2, 10.97±0.2, 13.23±0.2, 16.98±0.2, 18.09±0.2, 20.20±0.2, 21.32±0.2, and 25.19±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 60]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione benzenesulfonate, having peaks at diffraction angles (2θ) of 2.19±0.2, 8.87±0.2, 10.86±0.2, 12.55±0.2, 13.05±0.2, 14.99±0.2, 17.84±0.2, 20.62±0.2, 21.43±0.2, and 25.27±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα

ray (λ=1.54 angstroms).

[Claim 61]

The crystal according to claim 54, which is a crystal of (3RS)-3-[7-(4-{[(4R)-4'-{[{2-[(4R)-4-(4-methoxyphenyl)-2,2-dimethyloxan-4-yl]ethyl}(3,3,3-trifluoro-2,2-dimethylpropyl)amino]methyl}-2,3,4,5-tetrahydro[1,1'-biphenyl]-4-yl]methyl}piperazine-1-carbonyl)-2-oxo-5,6-dihydro-4H-imidazo[1,5,4-de]quinoxalin-1(2H)-yl]piperidine-2,6-dione 10-camphorsulfonate, having peaks at diffraction angles (2θ) of 2.20±0.2, 7.82±0.2, 11.05±0.2, 12.42±0.2, 13.34±0.2, 15.23±0.2, 16.49±0.2, 17.86±0.2, 20.15±0.2, and 24.36±0.2 in a powder X-ray diffraction pattern obtained by irradiation with copper Kα ray (λ=1.54 angstroms).

[Claim 62]

A composition for inhibiting Steroidogenic Factor 1, comprising the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, the polyfunctional molecule according to any one of claims 13 to 17, or the compound or a pharmaceutically acceptable salt thereof, or the crystal thereof according to any one of claims 18 to 61.

[Claim 63]

A composition for inducing degradation of Steroidogenic Factor 1, comprising the polyfunctional molecule according to any one of claims 13 to 17 or the compound or a pharmaceutically acceptable salt thereof, or the crystal thereof according to any one of claims 18 to 61.

[Claim 64]

A pharmaceutical composition comprising the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, the polyfunctional molecule according to any one of claims 13 to 17, or the compound or a pharmaceutically acceptable salt thereof, or the crystal thereof according to any one of claims 18 to 61.

[Claim 65]

The pharmaceutical composition according to claim 5264,

which is for the treatment of castration-resistant prostate cancer, adrenocortical carcinoma, Leydig cell tumor, hormone-sensitive prostate cancer, breast cancer, Cushing's syndrome, or primary aldosteronism.

[Claim 66]

Use the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12 in the manufacture of a medicament for treating castration-resistant prostate cancer, adrenocortical carcinoma, Leydig cell tumor, hormone-sensitive prostate cancer, breast cancer, Cushing's syndrome, or primary aldosteronism, comprising an effective amount of the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, the polyfunctional molecule according to any one of claims 13 to 17, or the compound or a pharmaceutically acceptable salt thereof, or the crystal thereof according to any one of claims 18 to 61 to be administered to a subject in need of a treatment of castration-resistant prostate cancer, adrenocortical carcinoma, Leydig cell tumor, hormone-sensitive prostate cancer, breast cancer, Cushing's syndrome, or primary aldosteronism.

[Claim 67]

The compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, the polyfunctional molecule according to any one of claims 13 to 17 or the compound or a pharmaceutically acceptable salt thereof, or the crystal thereof according to any one of claims 18 to 61, which is for use in the treatment of castration-resistant prostate cancer, adrenocortical carcinoma, Leydig cell tumor, hormone-sensitive prostate cancer, breast cancer, Cushing's syndrome, or primary aldosteronism.

[Claim 68]

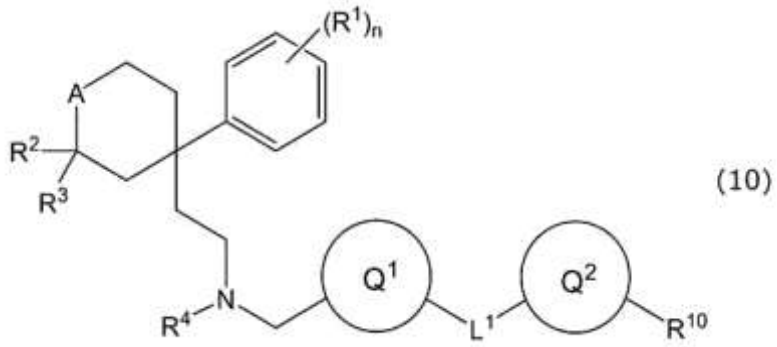
Use of the compound or a pharmaceutically acceptable salt thereof according to any one of claims 1 to 12, the polyfunctional molecule according to any one of claims 13 to 17, or the compound or a pharmaceutically acceptable salt thereof,

or the crystal thereof according to any one of claims 18 to 61 in the manufacture of a medicament for the treatment of castration-resistant prostate cancer, adrenocortical carcinoma, Leydig cell tumor, hormone-sensitive prostate cancer, breast cancer, Cushing's syndrome, or primary aldosteronism.

[Claim 69]

A compound represented by the following formula (10):

[Chem. 9]



(10)

wherein

A is -O-, -S-, -NR^a-, or -CR^bR^c-,

wherein

R^a is hydrogen or C_{1-3} alkyl,

R^b and R^c are each independently hydrogen, halogen, or C_{1-3} alkyl, and

the alkyl is unsubstituted or substituted by 1 to 3 halogens,

each R^1 in the number of n is independently halogen, hydroxy, -CN, C_{1-6} alkyl, C_{2-6} alkenyl, -O-C_{1-6} alkyl, -N(H)-C_{1-3} alkyl, -N(C_{1-3} alkyl)$_2$, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

the cycloalkyl and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the heterocycloalkyl has 1 or 2 hetero atoms selected

from oxygen, nitrogen, and sulfur as ring member atoms,

R^2 and R^3 are each independently hydrogen, halogen, C_{1-6} alkyl, or C_{2-6} alkenyl,

wherein

the alkyl and alkenyl are each independently unsubstituted or substituted by 1 to 3 halogens,

R^4 is C_{1-6} alkyl, $-C(=O)-R^d$ (R^d indicates C_{1-6} alkyl, C_{2-5} alkenyl, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl), C_{6-12} aryl, or 6- to 12-membered heteroaryl,

wherein

the C_{1-6} alkyl is unsubstituted or substituted by 1 to 3 halogens, C_{3-7} cycloalkyl, or 3- to 7-membered heterocycloalkyl,

the aryl, heteroaryl, cycloalkyl, and heterocycloalkyl are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the heteroaryl and heterocycloalkyl have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

ring Q^1 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, or a 3- to 7-membered heterocycloalkene ring,

wherein

the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, and heterocycloalkene ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring and heterocycloalkene ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

L^1 is a single bond, -O-, -S-, -NH-, C_{1-3} alkylene, C_{2-3} alkenylene, -C(=O)-, -C(=O)NH-, -NHC(=O)-, -C(=O)O-, or -

OC(=O)-,

wherein

the alkylene and alkenylene are each independently unsubstituted or substituted by 1 to 3 halogens,

ring Q^2 is a C_{6-12} monocyclic or bicyclic aromatic hydrocarbocycle, a 6- to 12-membered monocyclic or bicyclic aromatic heterocycle, a C_{3-7} cycloalkane ring, a 3- to 7-membered heterocycloalkane ring, a C_{3-7} cycloalkene ring, a 3- to 7-membered heterocycloalkene ring, a C_{5-12} spirocycloalkane ring, or a 5- to 12-membered spiroheterocycloalkane ring,

wherein

the aromatic hydrocarbocycle, aromatic heterocycle, cycloalkane ring, heterocycloalkane ring, cycloalkene ring, heterocycloalkene ring, spirocycloalkane ring, and spiroheterocycloalkane ring are each independently unsubstituted or substituted by 1 to 3 groups selected from the group consisting of halogen, unsubstituted C_{1-3} alkyl, and C_{1-3} haloalkyl, and

the aromatic heterocycle, heterocycloalkane ring, heterocycloalkene ring, and spiroheterocycloalkane ring have 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms,

R^{10} is C_{1-6} alkyl,

wherein

the C_{1-6} alkyl is substituted by one or two 3- to 7-membered heterocycloalkyls,

the heterocycloalkyl has 1 or 2 hetero atoms selected from oxygen, nitrogen, and sulfur as ring member atoms, and

the heterocycloalkyl is unsubstituted or substituted by an amino-protecting group, and

n is an integer of 0 to 3, or a pharmaceutically acceptable salt thereof.