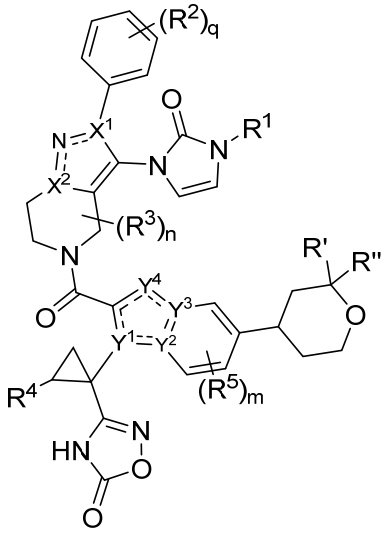
CLAIMS

1. A compound of formula (I), a stereoisomer thereof, or a pharmaceutically acceptable salt thereof,



formula (I)

wherein

X^1 and X^2 are each independently selected from the group consisting of C and N;

Y^1, Y^2, Y^3, and Y^4 are each independently selected from the group consisting of CH, C, and N;

R^1 is selected from the group consisting of C_{11-15} cycloalkyl, C_{11-15} aryl, 11- to 15-membered heteroaryl, and 11- to 15-membered heterocyclyl, wherein the C_{11-15} cycloalkyl, C_{11-15} aryl, 11- to 15-membered heteroaryl, or 11- to 15-membered heterocyclyl is a tricyclic group, and the C_{11-15} cycloalkyl, C_{11-15} aryl, 11- to 15-membered heteroaryl, or 11- to 15-membered heterocyclyl may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of C_{3-7} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 7-membered heterocyclyl, wherein R^1 is substituted with one C_{2-4} alkynyl, R^1 may further be optionally independently substituted with one or more R^a, and the C_{2-4} alkynyl may be optionally substituted with one or more R^b;

R^a is each independently selected from the group consisting of deuterium, halogen, =O, deuterated C_{1-6} alkyl, -OH, -CN, NH_2, -COOH, C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2$N-, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the deuterated C_{1-6} alkyl, C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2$N-, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, or C_{1-6} alkoxy C_{1-3} alkylene is optionally independently substituted with one or more R^{c1}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d1};

R^2 is each independently selected from the group consisting of halogen, -OH, -CN, NH_2, -COOH, C_{1-6} alkyl NH-, (C_{1-6} alkyl$)_2$N-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the C_{1-6} alkyl NH-, (C_{1-6} alkyl$)_2$N-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, or C_{1-6} alkoxy C_{1-3} alkylene is optionally independently substituted with one or more R^{c2}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d2};

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form C_{4-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 4- to 6-membered heterocyclyl, wherein the C_{4-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 4- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d3};

R^3 is each independently selected from the group consisting of deuterium, halogen, -OH, -CN, NH_2, -COOH, C_{1-6}

alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, or C_{1-6} alkoxy C_{1-3} alkylene is optionally independently substituted with one or more R^{c3}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d4};

R^4 is selected from the group consisting of H, deuterium, halogen, -CN, NH_2, -COOH, C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, and C_{1-6} alkoxy C_{1-3} alkylene, wherein the C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, or C_{1-6} alkoxy C_{1-3} alkylene is optionally independently substituted with one or more R^{c4};

R^5 is each independently selected from the group consisting of halogen, -CN, -OH, -SH, $-NH_2$, C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{1-6} alkylthio, $-CONH_2$, $-CONHC_{1-3}$ alkyl, $-NHCOC_{1-3}$ alkyl, $-SO_2NH_2$, $-SO_2NHC_{1-3}$ alkyl, and $-NHSO_2C_{1-3}$ alkyl, wherein the C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{1-6} alkylthio, $-CONH_2$, $-CONHC_{1-3}$ alkyl, $-NHCOC_{1-3}$ alkyl, $-SO_2NH_2$, $-SO_2NHC_{1-3}$ alkyl, or $-NHSO_2C_{1-3}$ alkyl is optionally independently substituted with one or more R^{c5};

R' and R" are each independently selected from the group consisting of H, halogen, -CN, -OH, -SH, $-NH_2$, C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{1-6} alkylthio, $-CONH_2$, $-CONHC_{1-3}$ alkyl, $-NHCOC_{1-3}$ alkyl, $-SO_2NH_2$, $-SO_2NHC_{1-3}$ alkyl, and $-NHSO_2C_{1-3}$ alkyl, wherein the C_{1-6} alkyl NH-, $(C_{1-6}$ alkyl$)_2N$-, C_{1-6} alkyl, deuterated C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkoxy C_{1-3} alkylene, C_{1-6} alkylthio, $-CONH_2$, $-CONHC_{1-3}$ alkyl, $-NHCOC_{1-3}$ alkyl, $-SO_2NH_2$, $-SO_2NHC_{1-3}$ alkyl, or $-NHSO_2C_{1-3}$ alkyl is optionally independently substituted with one or more R^{c6};

or, R' and R", together with the carbon atom connected thereto, form C_{3-6} cycloalkyl or 3- to 6-membered heterocycloalkyl, wherein the C_{3-6} cycloalkyl or 3- to 6-membered heterocycloalkyl is optionally independently substituted with one or more R^{d5};

"$\diagup\!\!\diagup$" is each independently selected from the group consisting of a single bond and a double bond;

R^b is each independently selected from the group consisting of deuterium, halogen, -CN, -OH, $-NH_2$, C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl or C_{1-3} alkoxy is optionally independently substituted with one or more substituents selected from the group consisting of deuterium, halogen, OH, CN, and NH_2;

R^{c1}, R^{c2}, R^{c3}, R^{c4}, R^{c5}, and R^{c6} are each independently selected from the group consisting of deuterium, halogen, -CN, -OH, and $-NH_2$;

R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from the group consisting of deuterium, halogen, -CN, -OH, =O, $-NH_2$, C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl or C_{1-3} alkoxy is optionally independently substituted with one or more substituents selected from the group consisting of deuterium, halogen, OH, CN, and NH_2;

q is selected from the group consisting of 0, 1, 2, 3, and 4;

n is selected from the group consisting of 0, 1, 2, 3, and 4;

m is selected from the group consisting of 0, 1, 2, 3, and 4.

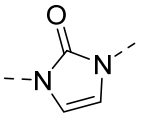
2. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to claim 1, wherein R^1 is selected from the group consisting of C_{11-15} aryl and 11- to 15-membered heteroaryl, wherein the C_{11-15} aryl or 11- to 15-membered heteroaryl is a tricyclic group, and the C_{11-15} aryl or 11- to 15-membered heteroaryl may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo C_{7-11} fused bicycloalkyl, benzo 7- to 11-membered fused heterobicyclyl, benzo 7- to 11-membered fused heterobiaryl, pyridino C_{7-11} fused bicycloalkyl, pyridino 7- to 11-membered fused heterobicyclyl, pyridino 7- to 11-membered fused heterobiaryl, pyrimido C_{7-11} fused

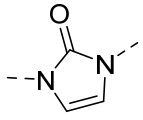
bicycloalkyl, pyrimido 7- to 11-membered fused heterobicyclyl, pyrimido 7- to 11-membered fused heterobiaryl, pyridazino C_{7-11} fused bicycloalkyl, pyridazino 7- to 11-membered fused heterobicycloalkyl, pyridazino 7- to 11-membered fused heterobiaryl, pyrazino C_{7-11} fused bicycloalkyl, pyrazino 7- to 11-membered fused heterobicycloalkyl, pyrazino 7- to 11-membered fused heterobiaryl, benzo C_{7-11} spiro bicycloalkyl, benzo C_{7-11} spiro heterobicyclyl, pyridino C_{7-11} spiro bicycloalkyl, pyridino C_{7-11} spiro heterobicyclyl, pyrimido C_{7-11} spiro bicycloalkyl, pyrimido C_{7-11} spiro heterobicyclyl, pyridazino C_{7-11} spiro bicycloalkyl, pyridazino C_{7-11} spiro heterobicyclyl, pyrazino C_{7-11} spiro bicycloalkyl, and pyrazino C_{7-11} spiro heterobicyclyl, wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo C_{7-9} fused bicycloalkyl, benzo 7- to 9-membered fused heterobicyclyl, benzo 7- to 9-membered fused heterobiaryl, pyridino C_{7-9} fused bicycloalkyl, pyridino 7- to 9-membered fused heterobicyclyl, pyridino 7- to 9-membered fused heterobiaryl, pyrimido C_{7-9} fused bicycloalkyl, pyrimido 7- to 9-membered fused heterobicyclyl, pyrimido 7- to 9-membered fused heterobiaryl, pyridazino C_{7-9} fused bicycloalkyl, pyridazino 7- to 9-membered fused heterobicycloalkyl, pyridazino 7- to 9-membered fused heterobiaryl, pyrazino C_{7-9} fused bicycloalkyl, pyrazino 7- to 9-membered fused heterobicycloalkyl, pyrazino 7- to 9-membered fused heterobiaryl, benzo C_{7-9} spiro bicycloalkyl, benzo C_{7-9} spiro heterobicyclyl, pyridino C_{7-9} spiro bicycloalkyl, pyridino C_{7-9} spiro heterobicyclyl, pyrimido C_{7-9} spiro bicycloalkyl, pyrimido C_{7-9} spiro heterobicyclyl, pyridazino C_{7-9} spiro bicycloalkyl, pyridazino C_{7-9} spiro heterobicyclyl, pyrazino C_{7-9} spiro bicycloalkyl, and pyrazino C_{7-9} spiro heterobicyclyl, wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo 7- to 9-membered fused heterobicyclyl, benzo 7- to 9-membered fused heterobiaryl, benzo C_{7-9} spiro bicycloalkyl, benzo C_{7-9} spiro heterobicyclyl, and pyridino C_{7-9} spiro bicycloalkyl, wherein R^1 may be optionally independently substituted with one or more R^a;

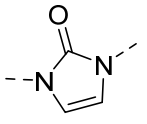
or, R^1 is selected from the group consisting of benzo 7- to 9-membered fused heterobicyclyl, benzo 7- to 9-membered fused heterobiaryl, benzo C_{7-9} spiro bicycloalkyl, benzo C_{7-9} spiro heterobicyclyl, and pyridino C_{7-9} spiro bicycloalkyl, wherein in R^1, the ring connected to the structural unit  is a benzene ring or a pyridine ring, and R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo 7- to 9-membered fused heterobicyclyl, benzo C_{7-9} spiro bicycloalkyl, and benzo C_{7-9} spiro heterobicyclyl, wherein R^1 may be optionally independently substituted with one or more R^a;

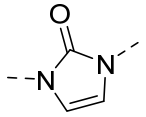
or, R^1 is selected from the group consisting of benzo 7- to 9-membered fused heterobicyclyl, benzo C_{7-9} spiro bicycloalkyl, and benzo C_{7-9} spiro heterobicyclyl, wherein in R^1, the ring connected to the structural unit  is a benzene ring, and R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo 5-membered heteroaryl fused 5-membered heterocyclyl, benzo 5-membered heteroaryl fused 6-membered heterocyclyl, benzo 5-membered heterocyclyl fused 5-membered heteroaryl, benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 4-membered cycloalkyl, benzo 5-membered cycloalkyl spiro 4-membered heterocyclyl, pyridino 5-membered heteroaryl fused 5-membered cycloalkyl, and pyridino 5-membered cycloalkyl spiro 3-membered cycloalkyl, wherein R^1 may be optionally independently substituted with one or more R^a;

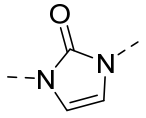
or, R^1 is selected from the group consisting of benzo 5-membered heteroaryl fused 5-membered heterocyclyl, benzo 5-membered heteroaryl fused 6-membered heterocyclyl, benzo 5-membered heterocyclyl fused 5-membered heteroaryl, benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 4-membered cycloalkyl, benzo 5-membered cycloalkyl spiro 4-membered heterocyclyl, pyridino 5-membered heteroaryl fused 5-membered

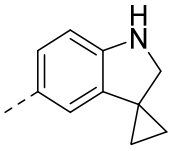
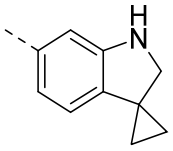
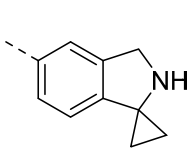
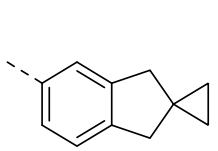
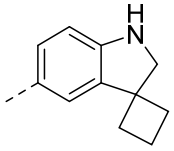
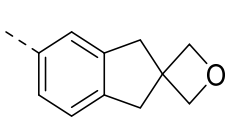
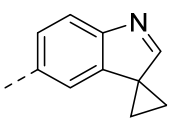
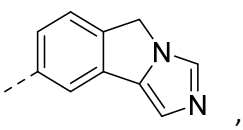
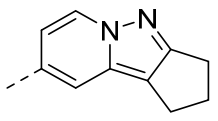
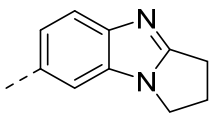
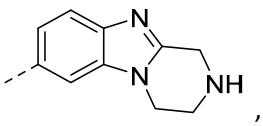
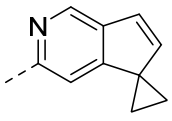
cycloalkyl, and pyridino 5-membered cycloalkyl spiro 3-membered cycloalkyl, wherein in R^1, the ring connected to the structural unit  is a benzene ring or a pyridine ring, and R^1 may be optionally independently substituted with one or more R^a;

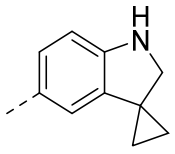
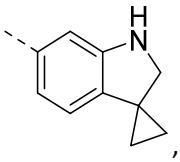
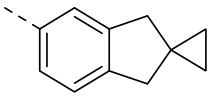
or, R^1 is selected from the group consisting of benzo 5-membered heteroaryl fused 5-membered cycloalkyl, benzo 5-membered heteroaryl fused 5-membered heterocyclyl, benzo 5-membered heteroaryl fused 6-membered heterocyclyl, benzo 5-membered heterocyclyl fused 5-membered heteroaryl, benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 4-membered cycloalkyl, benzo 5-membered cycloalkyl spiro 4-membered heterocyclyl, and pyridino 5-membered cycloalkyl spiro 3-membered cycloalkyl, wherein R^1 may be optionally independently substituted with one or more R^a;

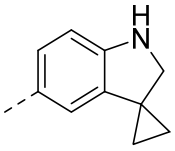
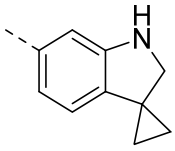
or, R^1 is selected from the group consisting of benzo 5-membered heteroaryl fused 5-membered cycloalkyl, benzo 5-membered heteroaryl fused 5-membered heterocyclyl, benzo 5-membered heteroaryl fused 6-membered heterocyclyl, benzo 5-membered heterocyclyl fused 5-membered heteroaryl, benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, benzo 5-membered heterocyclyl spiro 4-membered cycloalkyl, benzo 5-membered cycloalkyl spiro 4-membered heterocyclyl, and pyridino 5-membered cycloalkyl spiro 3-membered cycloalkyl, wherein in R^1, the ring connected to the structural unit  is a benzene ring or a pyridine ring, and R^1 may be optionally independently substituted with one or more R^a;

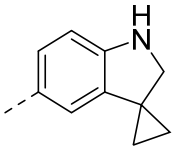
or, R^1 is selected from the group consisting of benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl and benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of benzo 5-membered cycloalkyl spiro 3-membered cycloalkyl and benzo 5-membered heterocyclyl spiro 3-membered cycloalkyl, wherein in R^1, the ring connected to the structural unit  is a benzene ring, and R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of , , , , , , , , , , , and , wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of , , and , wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of  and , wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from , wherein R^1 may be optionally independently substituted with one or more R^a;

or, R^1 is selected from the group consisting of phenyl and 5- to 6-membered heteroaryl, wherein R^1 is substituted with one C_{2-4} alkynyl, R^1 may further be optionally independently substituted with one or more R^a, and the C_{2-4} alkynyl may be optionally substituted with one or more R^b;

or, R^1 is selected from the group consisting of phenyl, pyridinyl, pyrimidinyl, pyrazinyl, and pyridazinyl, wherein R^1 is substituted with one C_{2-4} alkynyl, R^1 may further be optionally independently substituted with one or more R^a, and the C_{2-4} alkynyl may be optionally substituted with one or more R^b;

or, R^1 is selected from the group consisting of phenyl and pyridinyl, wherein R^1 is substituted with one C_{2-4} alkynyl, R^1 may further be optionally independently substituted with one or more R^a, and the C_{2-4} alkynyl may be optionally substituted with one or more R^b;

or, R^1 is selected from the group consisting of phenyl and pyridinyl, wherein R^1 is substituted with one ethynyl or propynyl, R^1 may further be optionally independently substituted with one or more R^a, and the ethynyl or propynyl may be optionally substituted with one or more R^b;

or, R^1 is selected from the group consisting of phenyl and pyridinyl, wherein R^1 is substituted with one ethynyl or 1-propynyl, R^1 may further be optionally independently substituted with one or more R^a, and the ethynyl or propynyl may be optionally substituted with one or more R^b;

or, R^1 is selected from the group consisting of phenyl and pyridinyl, wherein R^1 is substituted with one ethynyl or propynyl, R^1 may further be optionally independently substituted with 1, 2, or 3 substituents selected from the group consisting of F and methyl, and the ethynyl or propynyl may be optionally substituted with 1, 2, or 3 methoxy;

or, R^1 is selected from the group consisting of phenyl and pyridinyl, wherein R^1 is substituted with one 1-propynyl, R^1 may further be optionally independently substituted with 1, 2, or 3 F, and the 1-propynyl may be optionally substituted with 1 methoxy.

3. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to claim 1 or 2, wherein R^a is each independently selected from the group consisting of halogen, =O, deuterated C_{1-5} alkyl, -OH, -CN, NH_2, C_{1-5} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-5} alkoxy, C_{1-5} alkoxy C_{1-3} alkylene, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the deuterated C_{1-5} alkyl, C_{1-5} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-5} alkoxy, or C_{1-5} alkoxy C_{1-3} alkylene is optionally independently substituted with one or more R^{c1}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d1}; R^b is each independently selected from the group consisting of halogen, -CN, -OH, $-NH_2$, methyl, ethyl, methoxy, and ethoxy, wherein the methyl, ethyl, methoxy, or

ethoxy is optionally independently substituted with one or more substituents selected from the group consisting of deuterium, halogen, OH, CN, and NH_2;

or, R^a is each independently selected from the group consisting of halogen, =O, deuterated C_{1-3} alkyl, -OH, -CN, NH_2, C_{1-3} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-3} alkoxy, C_{1-3} alkoxymethylene, cyclopropyl, cyclobutyl, cyclopentyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 5-membered heterocyclyl, wherein the deuterated C_{1-3} alkyl, C_{1-3} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-3} alkoxy, or C_{1-3} alkoxymethylene is optionally independently substituted with one or more R^{c1}, and the cyclopropyl, cyclobutyl, cyclopentyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 5-membered heterocyclyl is optionally independently substituted with one or more R^{d1};

or, R^a is each independently selected from the group consisting of halogen, =O, deuterated C_{1-3} alkyl, C_{1-3} alkyl, and C_{3-6} cycloalkyl, wherein the deuterated C_{1-3} alkyl or C_{1-3} alkyl is optionally independently substituted with one or more R^{c1}, and the C_{3-6} cycloalkyl is optionally independently substituted with one or more R^{d1};

or, R^a is each independently selected from the group consisting of F, Cl, Br, I, =O, $-CD_3$, $-C_2D_5$, -OH, -CN, methyl, ethyl, propyl, ethenyl, propenyl, ethynyl, propynyl, methoxy, ethoxy, propoxy, methoxymethylene, ethoxymethylene, cyclopropyl, cyclobutyl, cyclopentyl, and phenyl, wherein the methyl, ethyl, propyl, ethenyl, propenyl, ethynyl, propynyl, methoxy, ethoxy, propoxy, methoxymethylene, or ethoxymethylene is optionally independently substituted with one or more R^{c1}, and the cyclopropyl, cyclobutyl, cyclopentyl, or phenyl is optionally independently substituted with one or more R^{d1};

or, R^a is each independently selected from the group consisting of F, Cl, Br, I, =O, $-CD_3$, $-C_2D_5$, -OH, -CN, methyl, ethyl, propyl, methoxymethylene, ethoxymethylene, cyclopropyl, cyclobutyl, and cyclopentyl, wherein the methyl, ethyl, propyl, methoxymethylene, or ethoxymethylene is optionally independently substituted with one or more R^{c1}, and the cyclopropyl, cyclobutyl, or cyclopentyl is optionally independently substituted with one or more R^{d1};

or, R^a is each independently selected from the group consisting of F, Cl, Br, =O, $-CD_3$, $-C_2D_5$, methyl, ethyl, propyl, cyclopropyl, cyclobutyl, and cyclopentyl, wherein the methyl, ethyl, or propyl is optionally independently substituted with one or more R^{c1}, and the cyclopropyl, cyclobutyl, or cyclopentyl is optionally independently substituted with one or more R^{d1};

or, R^a is each independently selected from the group consisting of F, methyl, =O, $-CD_3$, and cyclopropyl;

or, R^a is each independently selected from the group consisting of methyl and =O;

or, R^a is each independently selected from the group consisting of F and methyl;

or, R^b is each independently selected from C_{1-3} alkoxy, wherein the C_{1-3} alkoxy is optionally independently substituted with one or more substituents selected from the group consisting of deuterium, halogen, OH, CN, and NH_2;

or, R^b is each independently selected from the group consisting of F, Cl, Br, I, and methoxy;

or, R^b is each independently selected from methoxy.

4. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-3, wherein R^2 is each independently selected from the group consisting of halogen, -OH, -CN, C_{1-5} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-5} alkoxy, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the C_{1-5} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, or C_{1-5} alkoxy is optionally independently substituted with one or more R^{c2}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d2};

or, R^2 is each independently selected from the group consisting of halogen, -OH, -CN, C_{1-3} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-3} alkoxy, C_{3-5} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 5-membered heterocyclyl, wherein the C_{1-3} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, or C_{1-3} alkoxy is optionally independently substituted with one or more R^{c2}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d2};

or, R^2 is each independently selected from the group consisting of halogen, C_{1-3} alkyl, and C_{3-5} cycloalkyl, wherein

the C_{1-3} alkyl is optionally independently substituted with one or more R^{c2}, and the C_{3-6} cycloalkyl is optionally independently substituted with one or more R^{d2};

or, R^2 is each independently selected from the group consisting of F, Cl, Br, I, methyl, ethyl, propyl, cyclopropyl, cyclobutyl, and cyclopentyl, wherein the methyl, ethyl, or propyl is optionally independently substituted with one or more R^{c2}, and the cyclopropyl, cyclobutyl, or cyclopentyl is optionally independently substituted with one or more R^{d2};

or, R^2 is each independently selected from the group consisting of F, methyl, and cyclopropyl, wherein the methyl is optionally independently substituted with one or more R^{c2}, and the cyclopropyl is optionally independently substituted with one or more R^{d2};

or, R^2 is each independently selected from the group consisting of F, methyl, and cyclopropyl;

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form C_{5-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 5- to 6-membered heterocyclyl, wherein the C_{5-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 5- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d3};

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form C_{5-6} cycloalkyl or 5- to 6-membered heterocyclyl, wherein the C_{5-6} cycloalkyl or 5- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d3};

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form C_{5-6} cycloalkyl, wherein the C_{5-6} cycloalkyl is optionally independently substituted with one or more R^{d3};

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form cyclopentyl, pyrrolyl, tetrahydrofuranyl, or tetrahydrothienyl, wherein the cyclopentyl, pyrrolyl, tetrahydrofuranyl, or tetrahydrothienyl is optionally independently substituted with one or more R^{d3}; or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form cyclopentyl, wherein the cyclopentyl is optionally independently substituted with one or more R^{d3};

or, R^2 on two adjacent carbon atoms, together with the carbon atoms connected thereto, form cyclopentyl.

5. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-4, wherein one of X^1 and X^2 is selected from C, and the other is selected from N; Y^1, Y^2, and Y^3 are each independently selected from the group consisting of C and N, and Y^4 is selected from CH;

or, at least one of Y^1, Y^2, and Y^3 is selected from N, and Y^4 is selected from CH;

or, Y^1 is selected from C, Y^2 is selected from N, Y^3 is selected from C, and Y^4 is selected from CH;

or, Y^1 is selected from C, Y^2 is selected from C, Y^3 is selected from N, and Y^4 is selected from CH;

or, Y^1 is selected from N, Y^2 is selected from C, Y^3 is selected from C, and Y^4 is selected from CH.

6. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-5, wherein R^3 is each independently selected from the group consisting of deuterium, halogen, C_{1-3} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, and 3- to 6-membered heterocyclyl, wherein the C_{1-3} alkyl, C_{2-4} alkenyl, or C_{2-4} alkynyl is optionally independently substituted with one or more R^{c3}, and the C_{3-6} cycloalkyl, phenyl, 5- to 6-membered heteroaryl, or 3- to 6-membered heterocyclyl is optionally independently substituted with one or more R^{d4}; R^4 is selected from the group consisting of H, deuterium, halogen, -CN, C_{1-3} alkyl, deuterated C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl, deuterated C_{1-3} alkyl, or C_{1-3} alkoxy is optionally independently substituted with one or more R^{c4}; R^5 is selected from the group consisting of halogen, -CN, C_{1-3} alkyl, deuterated C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl, deuterated C_{1-3} alkyl, or C_{1-3} alkoxy is optionally independently substituted with one or more R^{c5};

or, R^3 is each independently selected from the group consisting of deuterium, halogen, and C_{1-3} alkyl, wherein the C_{1-3} alkyl is optionally independently substituted with one or more R^{c3};

or, R^3 is each independently selected from C_{1-3} alkyl, wherein the C_{1-3} alkyl is optionally independently substituted with one or more R^{c3};

or, R^3 is each independently selected from the group consisting of deuterium, F, Cl, Br, I, methyl, ethyl, propyl, cyclopropyl, cyclobutyl, and cyclopentyl, wherein the methyl, ethyl, or propyl is optionally independently substituted with one or more R^{c3}, and the cyclopropyl, cyclobutyl, or cyclopentyl is optionally independently substituted with one or more R^{d4};

or, R^3 is each independently selected from the group consisting of methyl, ethyl, and propyl, wherein the methyl, ethyl, or propyl is optionally substituted with one or more R^{c3};

or, R^3 is selected from methyl;

or, R^4 is selected from the group consisting of H and C_{1-3} alkyl, wherein the C_{1-3} alkyl is optionally independently substituted with one or more R^{c4};

or, R^4 is selected from the group consisting of H and methyl, wherein the methyl is optionally substituted with one or more R^{c4};

or, R^4 is selected from the group consisting of H and methyl;

or, R^4 is selected from H;

or, R^4 is selected from methyl;

or, R^5 is selected from C_{1-3} alkyl, wherein the C_{1-3} alkyl is optionally independently substituted with one or more R^{c5};

or, R^5 is selected from methyl.

7. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-6, wherein R' and R" are each independently selected from the group consisting of H, deuterium, halogen, -CN, C_{1-3} alkyl, deuterated C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl, deuterated C_{1-3} alkyl, or C_{1-3} alkoxy is optionally independently substituted with one or more R^{c6};

or, R' and R" are each independently selected from the group consisting of H and C_{1-3} alkyl, wherein the C_{1-3} alkyl is optionally independently substituted with one or more R^{c6};

or, R' and R" are each independently selected from the group consisting of H and methyl, wherein the methyl is optionally substituted with one or more R^{c6};

or, R' and R" are selected from methyl;

or, R' and R", together with the carbon atom connected thereto, form C_{3-4} cycloalkyl or 3- to 4-membered heterocycloalkyl, wherein the C_{3-4} cycloalkyl or 3- to 4-membered heterocycloalkyl is optionally independently substituted with one or more R^{d5};

or, R' and R", together with the carbon atom connected thereto, form cyclopropyl, wherein the cyclopropyl is optionally independently substituted with one or more R^{d5};

or, R' and R", together with the carbon atom connected thereto, form cyclopropyl.

8. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-7, wherein q is selected from the group consisting of 0, 1, 2, and 3; or, q is selected from the group consisting of 1, 2, and 3; or, q is selected from 2; or, q is selected from 3;

optionally, m is selected from the group consisting of 0, 1, 2, and 3; or, m is selected from the group consisting of 0, 1, and 2; or, m is selected from 0; or, m is selected from 1;

optionally, n is selected from the group consisting of 0, 1, 2, and 3; or, n is selected from the group consisting of 1, 2, and 3; or, n is selected from 1.

9. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-8, wherein R^{c1}, R^{c2}, R^{c3}, R^{c4}, R^{c5}, and R^{c6} are each independently selected from the group consisting of halogen, -CN, -OH, and $-NH_2$;

or, R^{c1}, R^{c2}, R^{c3}, R^{c4}, R^{c5}, and R^{c6} are each independently selected from the group consisting of F, -CN, -OH, and $-NH_2$;

or, R^{c1}, R^{c2}, R^{c3}, R^{c4}, R^{c5}, and R^{c6} are each independently selected from the group consisting of F and OH;

or, R^{c1}, R^{c2}, R^{c3}, R^{c4}, R^{c5}, and R^{c6} are each independently selected from F;

optionally, R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from the group consisting of halogen, -CN, -OH, $-NH_2$, C_{1-3} alkyl, and C_{1-3} alkoxy, wherein the C_{1-3} alkyl or C_{1-3} alkoxy is optionally independently substituted with one or more substituents selected from the group consisting of halogen, OH, CN, and NH_2;

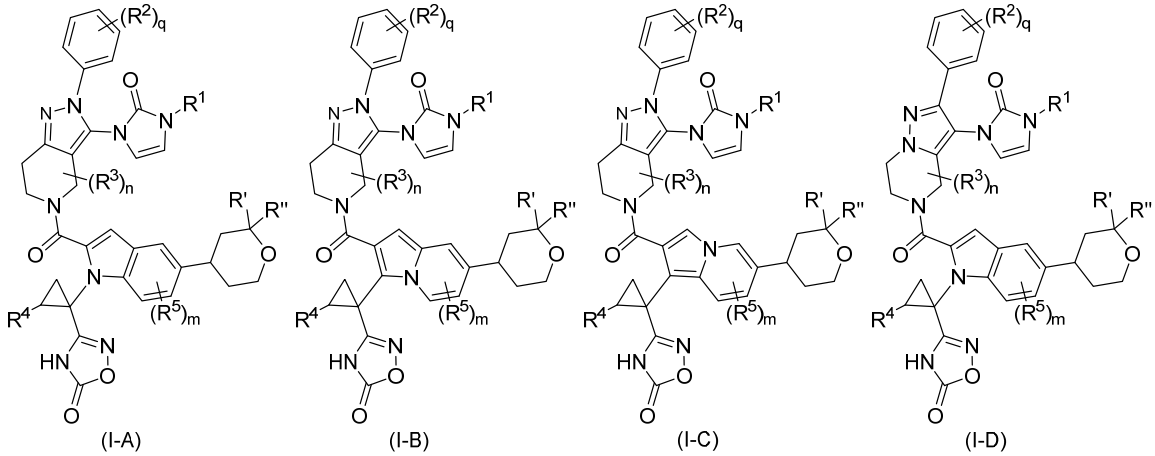
or, R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from the group consisting of F, -CN, -OH, $-NH_2$, methyl, and methoxy, wherein the methyl or methoxy is optionally independently substituted with one or more substituents selected from the group consisting of F, OH, CN, and NH_2;

or, R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from the group consisting of F, -CN, -OH, $-NH_2$, methyl, and methoxy;

or, R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from the group consisting of F and methyl;

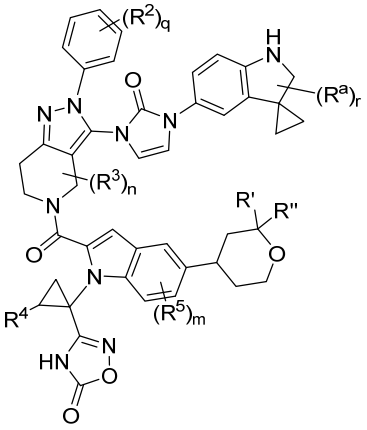
or, R^{d1}, R^{d2}, R^{d3}, R^{d4}, and R^{d5} are each independently selected from F.

10. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-9, being selected from the group consisting of compounds of formulas (I-A), (I-B), (I-C), and (I-D), stereoisomers thereof, or pharmaceutically acceptable salts thereof,

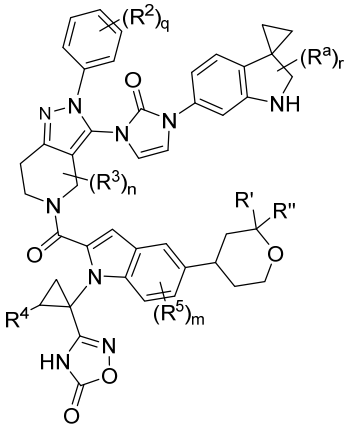


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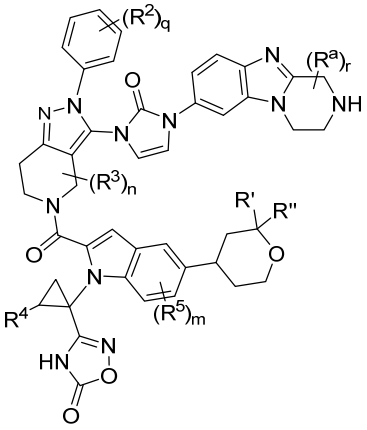
11. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-10, being selected from the group consisting of compounds of formulas (II-A), (II-B), (II-C), (II-D), (II-E), (II-F), (II-G), (II-H), (II-I), (II-J), (II-K), and (II-L), stereoisomers thereof, or pharmaceutically acceptable salts thereof,



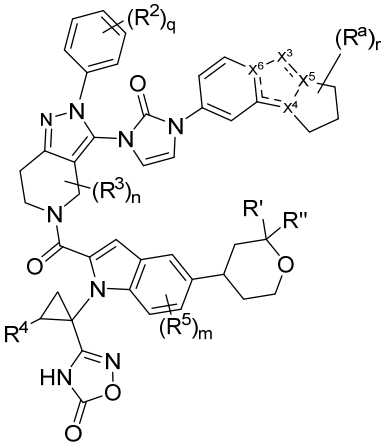
(II-A)



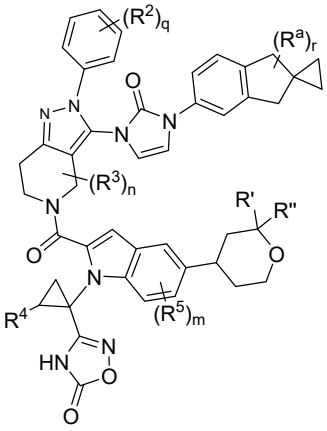
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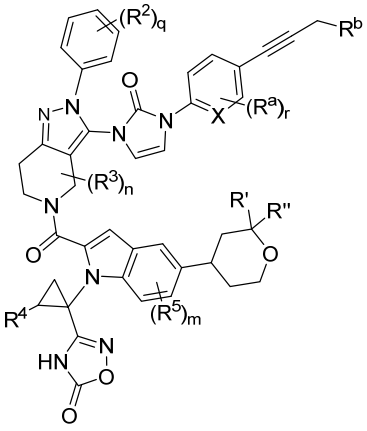
(II-C)



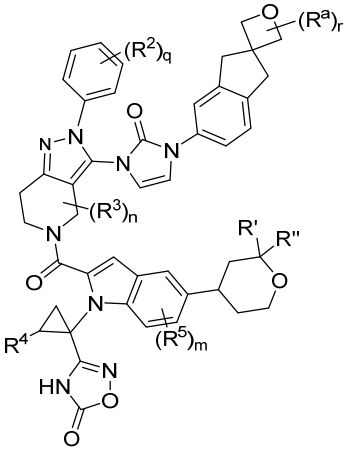
(II-D)



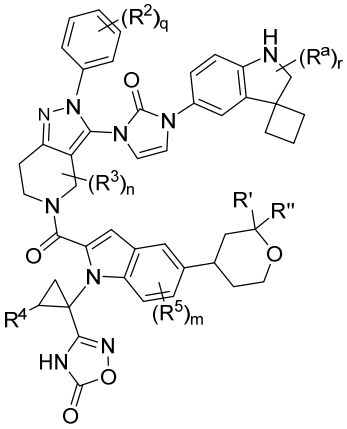
(II-E)



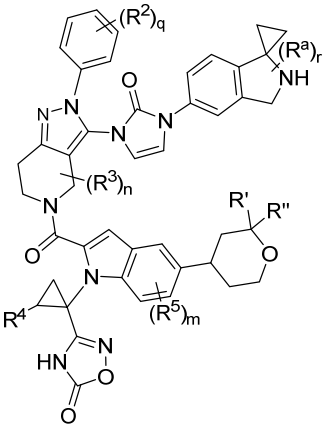
(II-F)



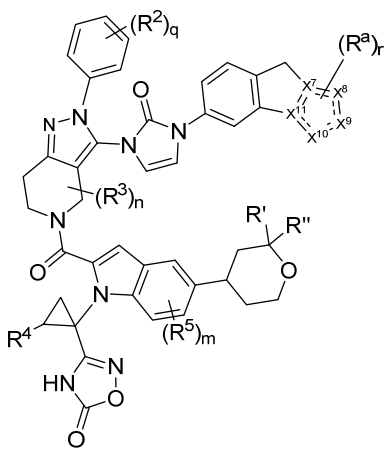
(II-G)



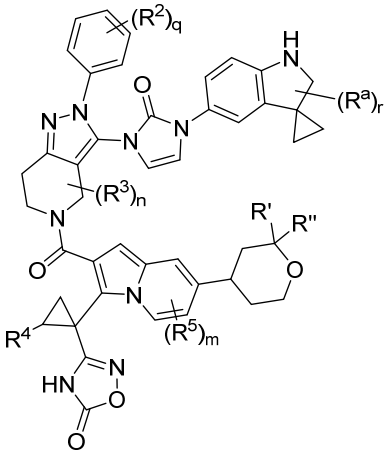
(II-H)



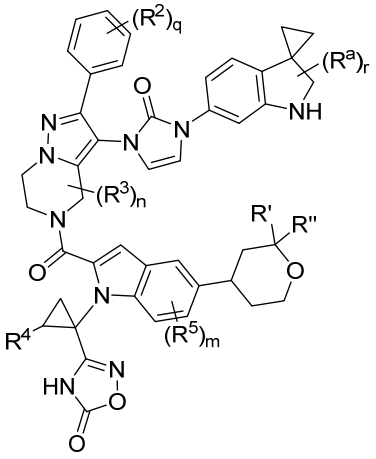
(II-I)



(II-J)



(II-K)



(II-L)

wherein, r is selected from the group consisting of 0, 1, 2, 3, and 4; X is selected from the group consisting of C and N; X^3, X^4, X^5, and X^6 are each independently selected from the group consisting of C and N; X^7, X^8, X^9, X^{10}, and X^{11} are each independently selected from the group consisting of C, CH, and N;

or, X is selected from C; or, X is selected from N;

or, X^3 is selected from N, and X^4, X^5, and X^6 are each independently selected from the group consisting of C and N;

or, X^3 and X^6 are selected from N, and X^4 and X^5 are selected from C;

or, X^3 and X^4 are selected from N, and X^5 and X^6 are selected from C;

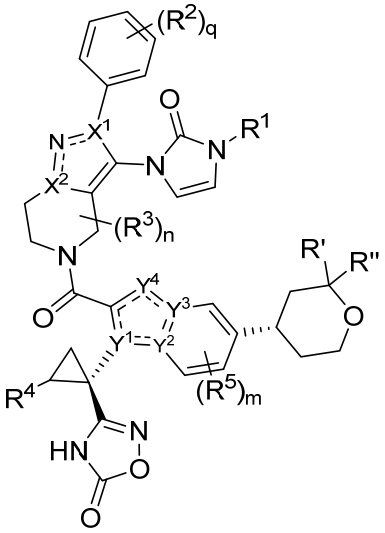
or, one of X^7 and X^{11} is selected from N, and the other is selected from C;

or, X^7 and X^9 are selected from N, and X^{11} is selected from C, and X^8 and X^{10} are selected from CH;

or, r is selected from the group consisting of 0, 1, and 2;

or, r is selected from the group consisting of 0 and 2.

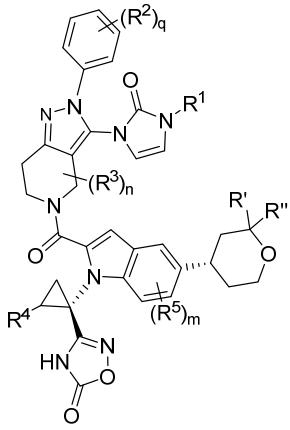
12. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-11, being selected from a compound of formula (I'), a stereoisomer thereof, or a pharmaceutically acceptable salt thereof,



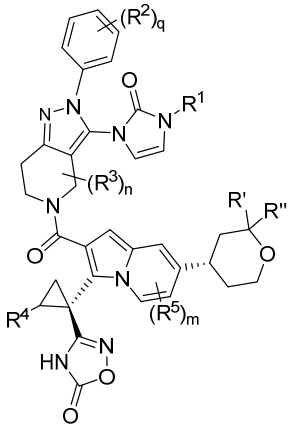
formula (I')

.

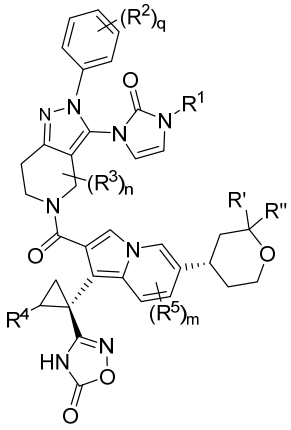
13. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-12, being selected from the group consisting of compounds of formulas (I-A'), (I-B'), (I-C'), and (I-D'), stereoisomers thereof, or pharmaceutically acceptable salts thereof,



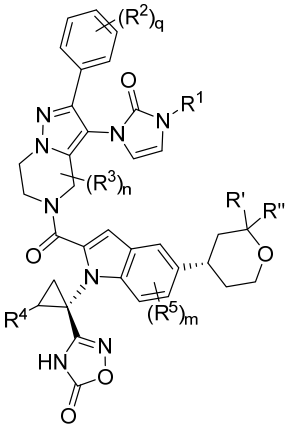
(I-A')



(I-B')



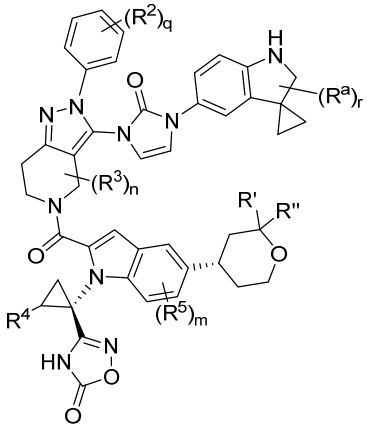
(I-C')



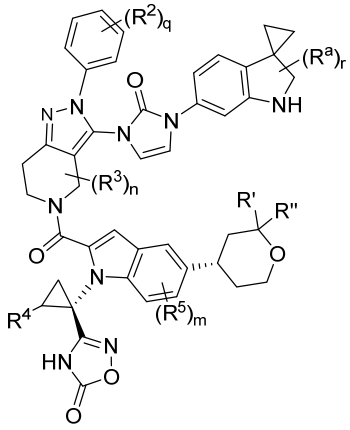
(I-D')

.

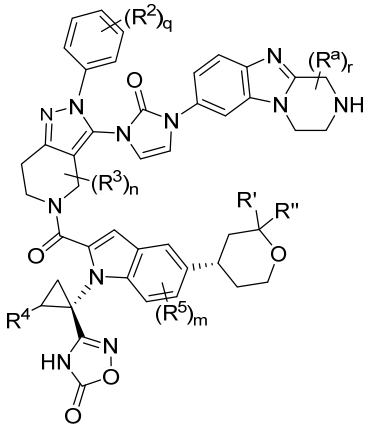
14. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-13, being selected from the group consisting of compounds of formulas (II-A'), (II-B'), (II-C'), (II-D'), (II-E'), (II-F'), (II-G'), (II-H'), (II-I'), (II-J'), (II-K'), and (II-L'), stereoisomers thereof, or pharmaceutically acceptable salts thereof,



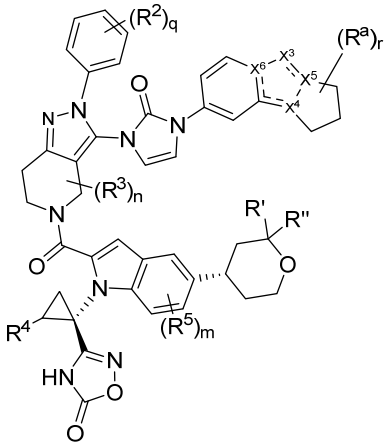
(II-A')



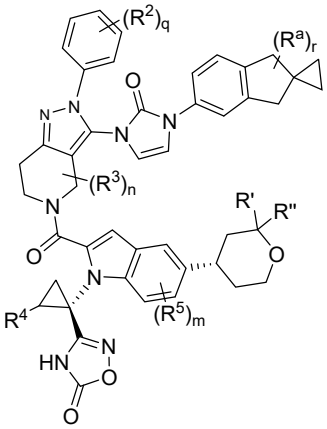
(II-B')



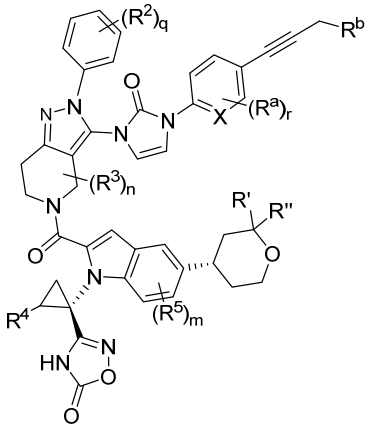
(II-C')



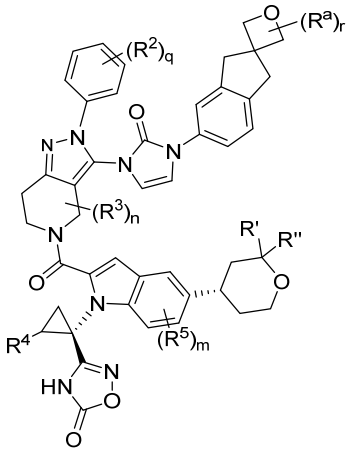
(II-D')



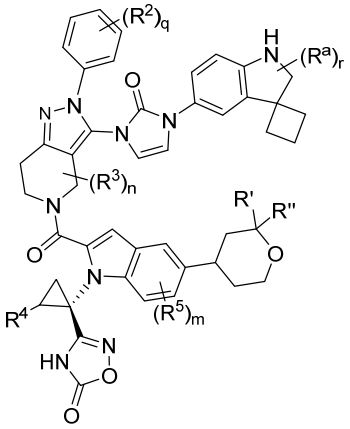
(II-E')



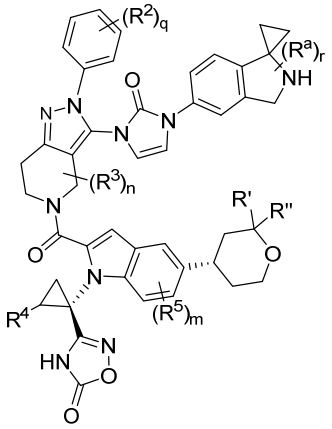
(II-F')



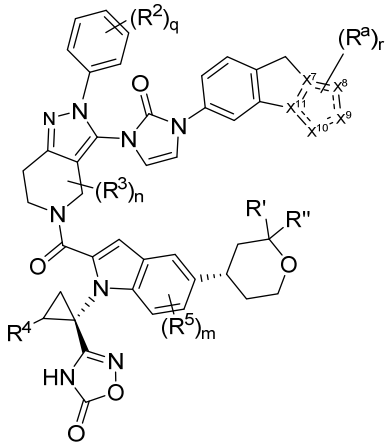
(II-G')



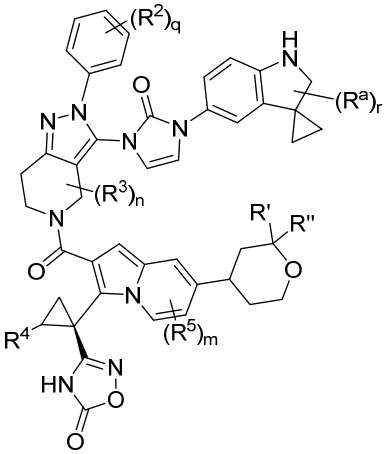
(II-H')



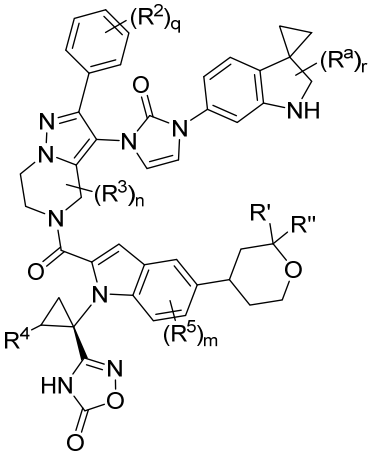
(II-I')



(II-J')



(II-K')

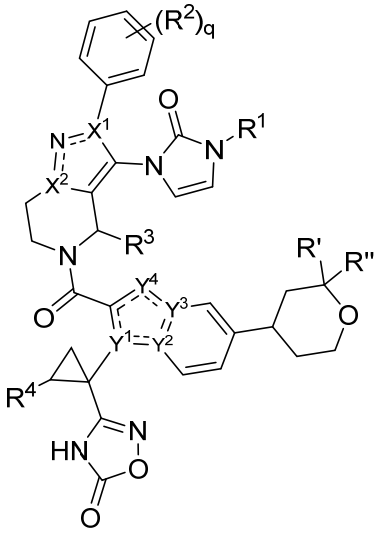


(II-L')

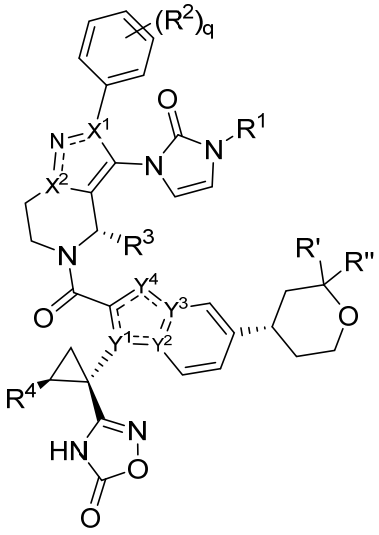
wherein, r is selected from the group consisting of 0, 1, 2, 3, and 4; X is selected from the group consisting of C and N; X^3, X^4, X^5, and X^6 are each independently selected from the group consisting of C and N; X^7, X^8, X^9, X^{10}, and X^{11} are each independently selected from the group consisting of C, CH, and N;

or, X, X^3, X^4, X^5, X^6, X^7, X^8, X^9, X^{10}, or X^{11} is as defined in the compound of formula (II-D), (II-F), or (II-J) in claim 11.

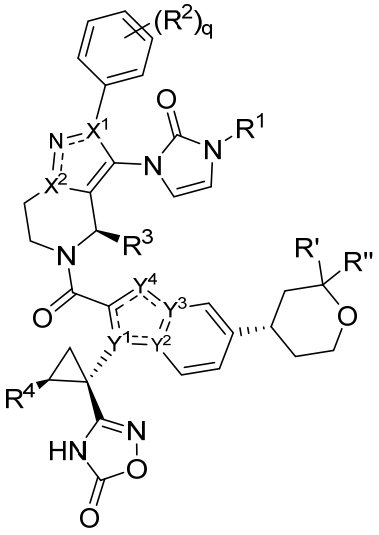
15. The compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-14, being selected from the group consisting of compounds of formulas (IV-A), (IV-A'), (IV-B'), and (IV-C'), stereoisomers thereof, or pharmaceutically acceptable salts thereof,



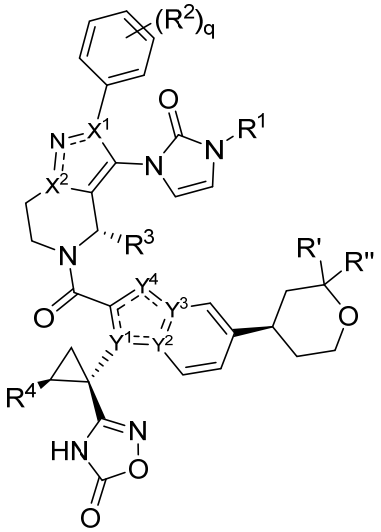
formula (IV-A)



formula (IV-A')



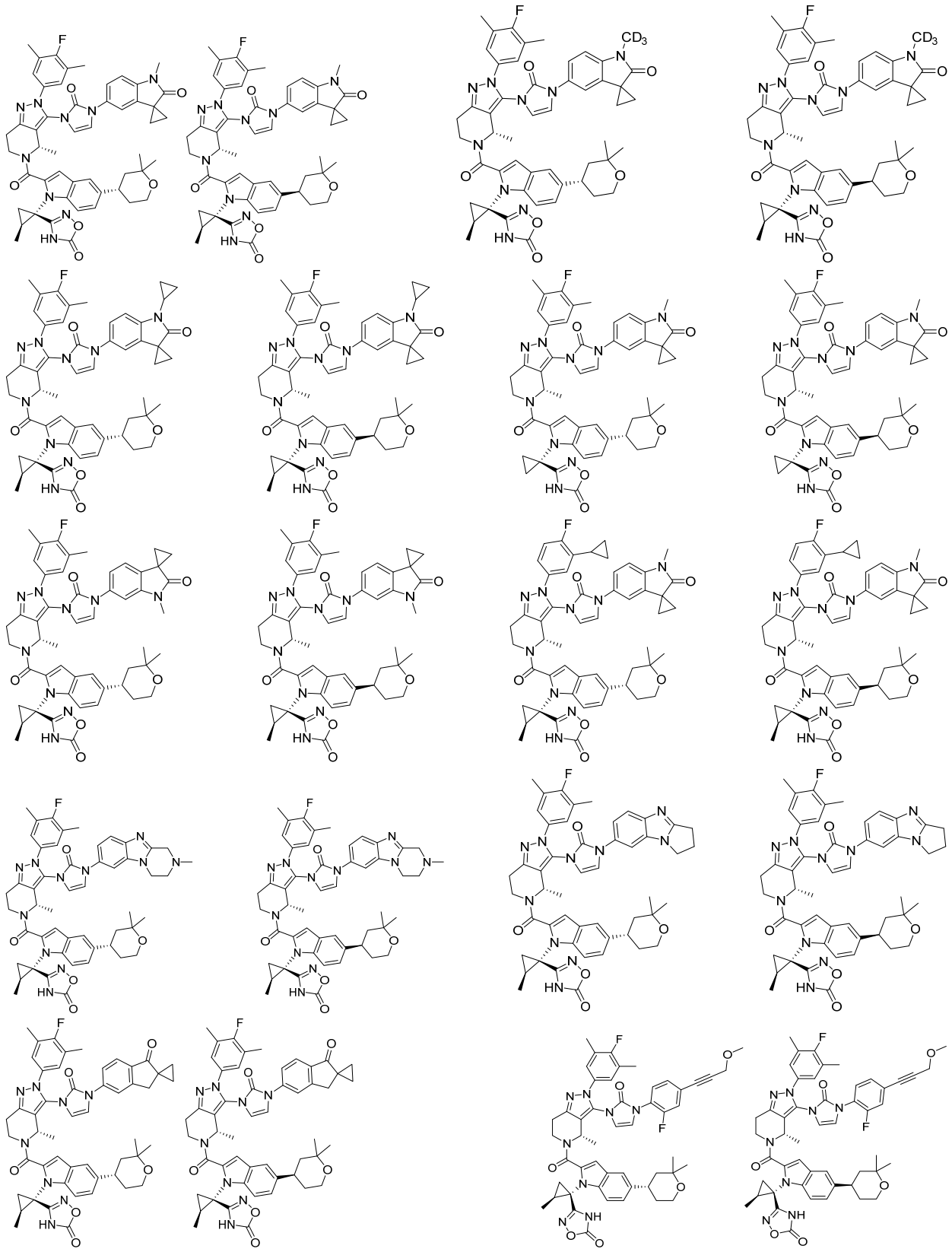
formula (IV-B')

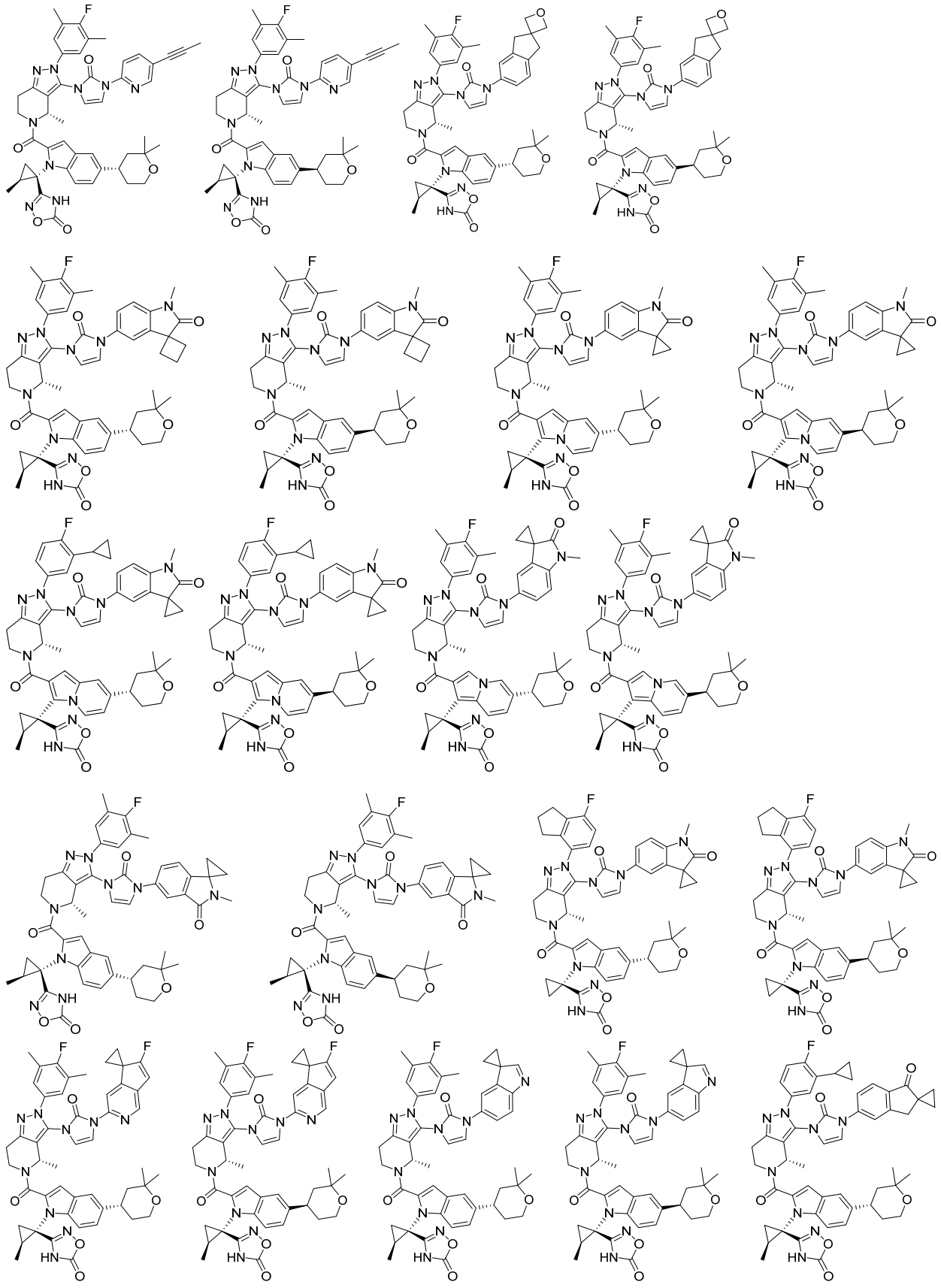


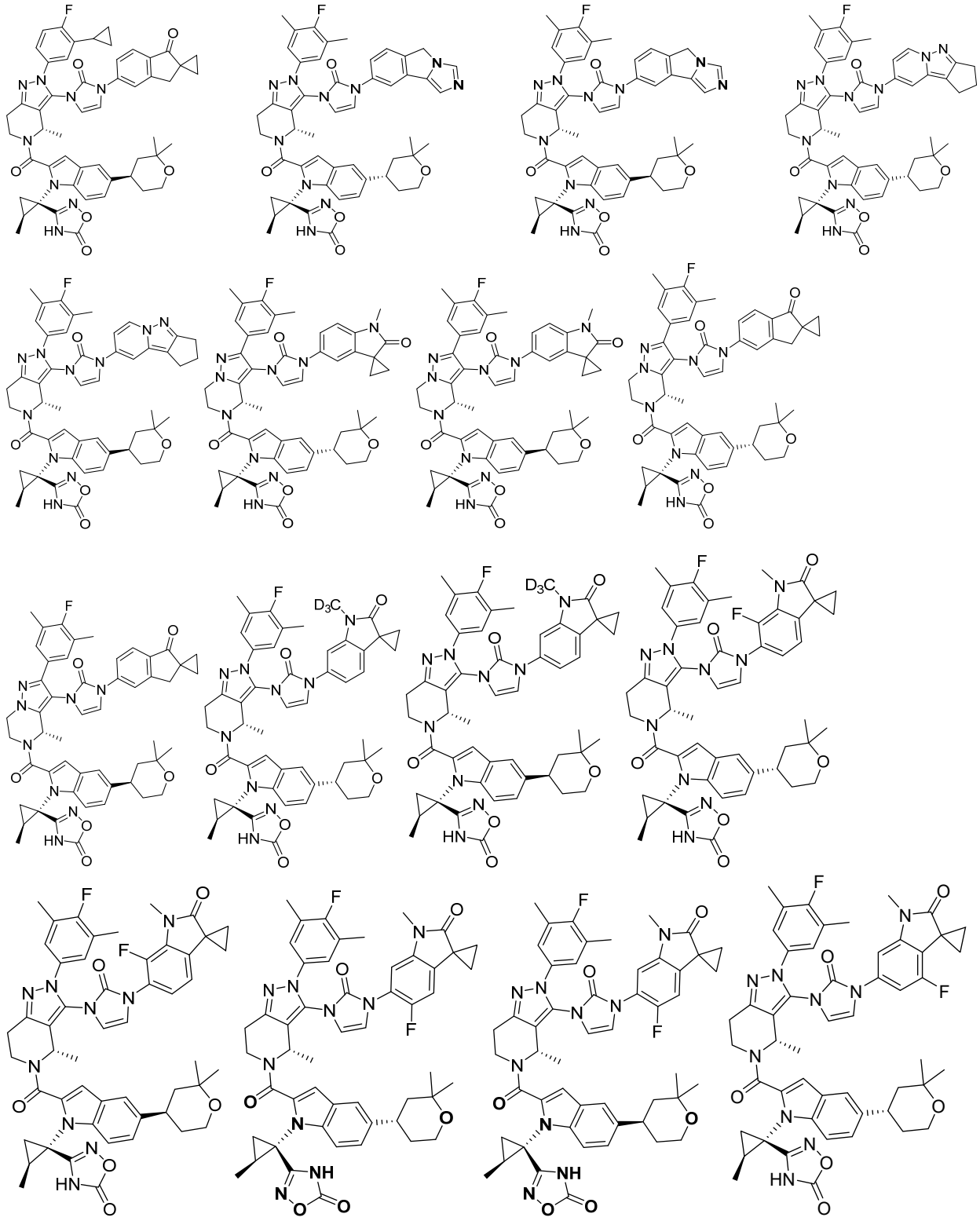
formula (IV-C')

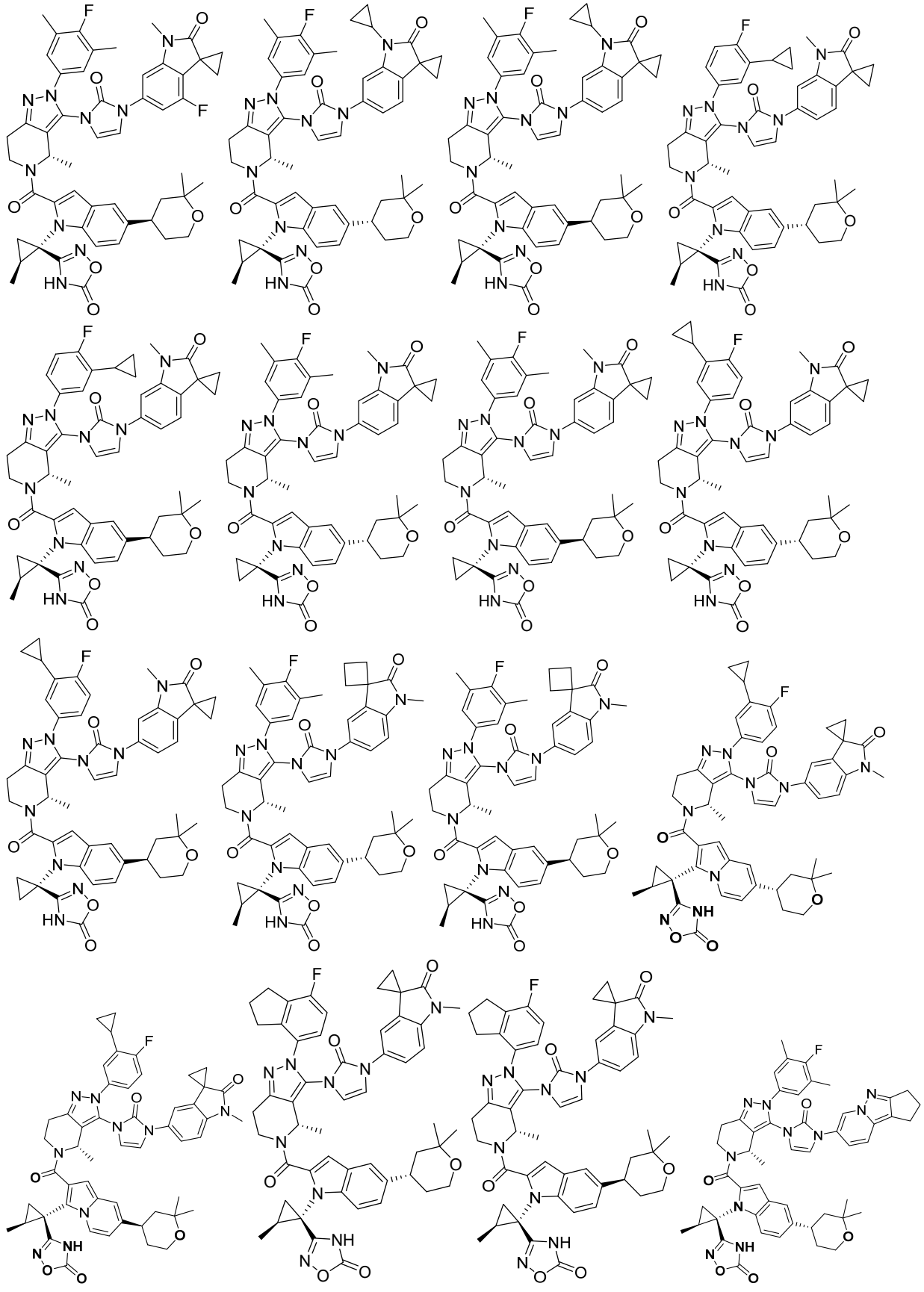
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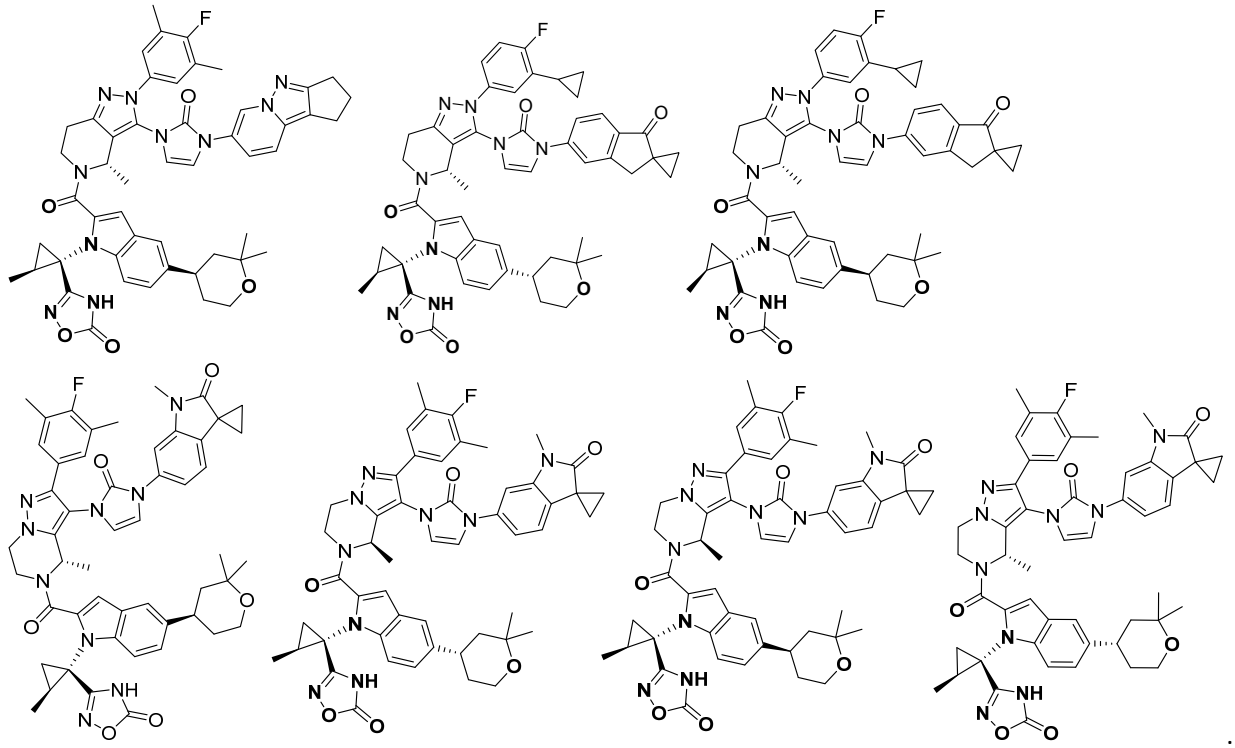
16. A compound of one of the following formulas, a stereoisomer thereof, or a pharmaceutically acceptable salt thereof:











17. A pharmaceutical composition, comprising the compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-16, and further comprising a pharmaceutically acceptable excipient.

18. Use of the compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-16 or the pharmaceutical composition according to claim 17 for preparing a medicament for treating a GLP-1-associated disease.

19. A method for treating or preventing a GLP-1-associated disease, comprising administering to a mammal, preferably a human, in need of the treatment a therapeutically effective amount of the compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-16, or the pharmaceutical composition according to claim 17.

20. Use of the compound, the stereoisomer thereof, or the pharmaceutically acceptable salt thereof according to any one of claims 1-16 or the pharmaceutical composition according to claim 17 for treating a GLP-1-associated disease.