alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heterocyclyl or heteroaryl contains 1 to 3 (such as 1, 2 or 3) heteroatoms selected from O, S or N;

in some embodiments, each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl, wherein the methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heteroaryl contains 1 to 3 (such as 1, 2 or 3) heteroatoms selected from O, S or N;

in some embodiments, each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl, wherein the phenyl or 5- to 6-membered heteroaryl (such as pyrazole or pyrrole) is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, methyl, ethyl, methoxy or ethoxy, and the heteroaryl contains 1 to 3 (such as 1, 2 or 3) heteroatoms selected from O, S or N;

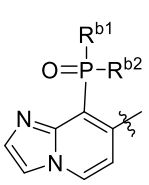
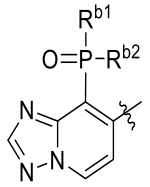
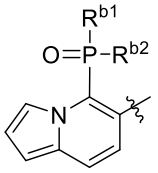
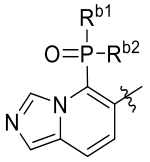
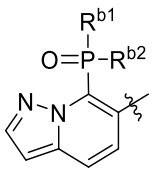
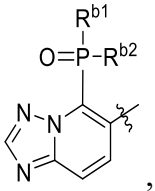
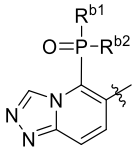
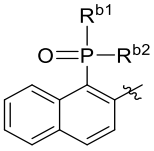
in some embodiments, each R^{b4} is independently selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl or C_{1-4} alkoxy, wherein the alkyl or alkoxy is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

in some embodiments, each R^{b4} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy, wherein the methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

in some embodiments, R^{b4} is selected from H, F, Cl or Br;

in some embodiments, R^{b5} is selected from H or C_{1-4} alkyl, wherein the alkyl is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

in some embodiments, R^{b5} is selected from H;

 ,  ,  ,  ,  ,  ,  or  ;

ring V is selected from azetidinyl, azacyclopentyl, piperidyl or piperazinyl, wherein the azetidinyl, azacyclopentyl, piperidyl or piperazinyl is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, =O, CN or C_{1-4} alkyl;

R^{b1} and R^{b2} are each independently selected from methyl or ethyl;

each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl, wherein the methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heteroaryl contains 1 to 3 (such as 1, 2 or 3) heteroatoms selected from O, S or N;

each R^{b4} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy, wherein the methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

R^{b5} is selected from H;

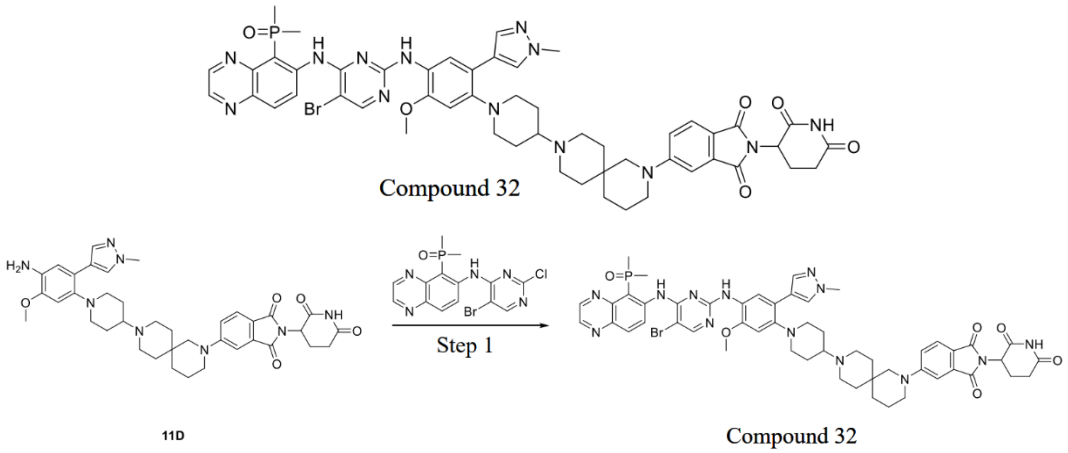
each R^{b6} is independently selected from H, F, Cl, Br, I, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy or isopropoxy, wherein the methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy or isopropoxy is optionally further substituted with 0 to 4 (such as 0, 1, 2, 3 or 4) substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

dried under reduced pressure and then purified by silica gel column chromatography (dichloromethane/methanol (V/V) = 100/1-12/1) to obtain a product, which was further purified by preparative HPLC (composition of mobile phases: mobile phase A: acetonitrile, and mobile phase B: water (containing 0.1% TFA)). The resultant was lyophilized to obtain a solid, which was dissolved in 20 mL of dichloromethane and extracted by adding saturated sodium bicarbonate solution (50 ml). Liquid separation was performed. The organic layer was then dried over anhydrous sodium sulfate and concentrated under reduced pressure to obtain **compound 31** (30 mg, yield: 8%).

LCMS m/z = 550.3[(M+2H)/2]$^+$.

^{1}H NMR (400 MHz, DMSO-d_6) δ 12.68 (s, 1H), 11.05 (s, 1H), 8.88 - 8.75 (m, 3H), 8.37 (s, 1H), 8.27 (s, 1H), 7.97 (s, 1H), 7.78 (s, 1H), 7.65 (d, 1H), 7.62 - 7.50 (m, 2H), 7.30 (d, 1H), 7.23 (dd, 1H), 6.85 (s, 1H), 5.06 (dd, 1H), 4.09 - 3.98 (m, 2H), 3.81 (s, 3H), 3.75 (s, 3H), 3.03 - 2.82 (m, 9H), 2.69 - 2.52 (m, 6H), 2.24 - 2.08 (m, 3H), 2.07 - 1.96 (m, 7H), 1.93 - 1.73 (m, 7H), 1.51 - 1.37 (m, 2H), 1.21 - 1.08 (m, 2H).

Example 32: Preparation of compound 32

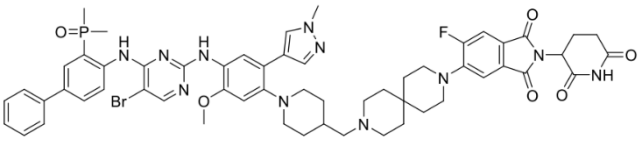


Step 1: 5-(9-(1-(4-((5-bromo-4-((5-(dimethylphosphoryl)quinoxalin-6-yl)amino)pyrimidin-2-yl)amino)-5-methoxy-2-(1-methyl-1H-pyrazol-4-yl)phenyl)piperidin-4-yl)-2,9-diazaspiro[5.5]undecan-2-yl)-2-(2,6-dioxopiperidin-3-yl)isoindoline-1,3-dione (**compound 32**)

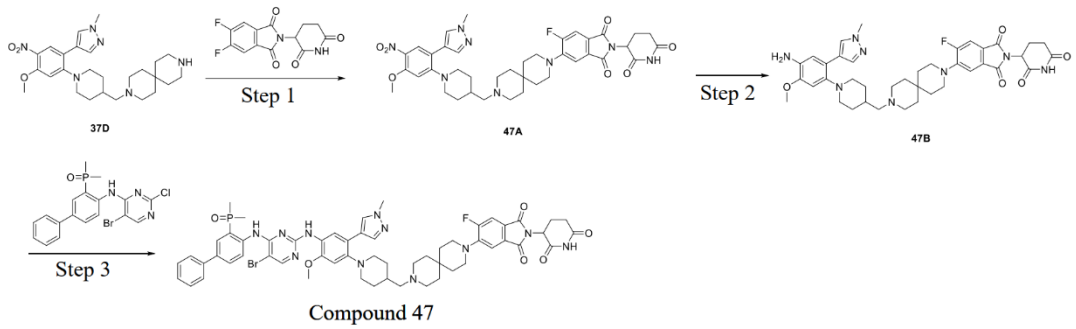
[0226] **11D** (100 mg, 0.14 mmol) and **2J** (0.21 g, 0.51 mmol) were dissolved in DMF (10 mL); p-toluenesulfonic acid monohydrate (87 mg, 0.46 mmol) was added; and under nitrogen protection, the mixture was reacted at 100°C for 16 h, and cooled to room temperature. 20 mL of saturated aqueous sodium bicarbonate solution and 50 mL

1H), 7.59 (s, 1H), 7.55 (d, 2H), 7.48 - 7.43 (m, 3H), 7.36 (t, 1H), 7.18 (m, 1H), 6.85 (s, 1H), 5.10 (dd, 1H), 3.78 (d, 3H), 3.75 (s, 3H), 3.61 (d, 2H), 2.92 - 2.83 (m, 8H), 2.66 - 2.56 (m, 5H), 2.54 - 2.52 (m, 1H), 2.25 - 2.14 (m, 3H), 2.09 - 2.00 (m, 1H), 1.94 - 1.72 (m, 13H), 1.48 - 1.39 (m, 2H), 1.33 - 1.20 (m, 3H).

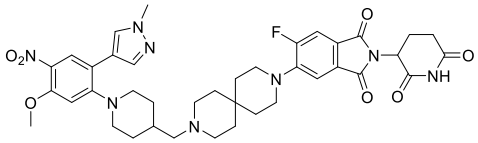
Example 47: Preparation of compound 47



Compound 47



Step 1: 2-(2,6-dioxopiperidin-3-yl)-5-fluoro-6-(9-((1-(5-methoxy-2-(1-methyl-1H-pyrazol-4-yl)-4-nitrophenyl)piperidin-4-yl)methyl)-3,9-diazaspiro[5.5]undecan-3-yl)isoindoline-1,3-dione (**47A**)



47A

[0275] The crude hydrochloride of **37D** (333 mg) was dissolved in DMSO (10 mL); 2-(2,6-dioxopiperidin-3-yl)-5,6-difluoroisoindoline-1,3-dione (**5A-1**) (265 mg, 0.90 mmol) and sodium bicarbonate (232 mg, 2.76 mmol) were successively added; and the mixture was stirred at 100°C for 5 h, and cooled to room temperature. 10 mL of water was added, and the mixture was filtered. The filter cake was dried under reduced pressure and then purified by silica gel column chromatography (mobile phase: dichloromethane/methanol (V/V) = 100/1-20/1) to obtain **47A** (420 mg).

Step 2: 5-(9-((1-(4-amino-5-methoxy-2-(1-methyl-1H-pyrazol-4-yl)phenyl) piperidin-4-yl)methyl)-3,9-diazaspiro[5.5]undecan-3-yl)-2-(2,6-dioxopiperidin-3-yl)-6-fluoroisoindoline-1,3-dione (**47B**)

CLAIMS

1. A compound or a stereoisomer, a deuterated compound, a solvate, a prodrug, a metabolite, a pharmaceutically acceptable salt or a co-crystal thereof, wherein, the compound is selected from a compound shown in general formula (I),

B-L-K (I);

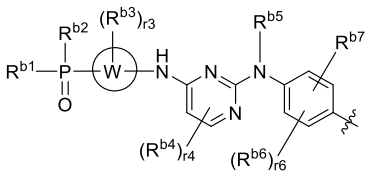
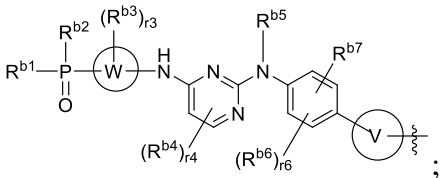
L is selected from a bond or -C_{1-50} hydrocarbyl-, wherein the hydrocarbyl has 0 to 20 methylene units optionally further replaced by -Ak- or -Cy-;

each -Ak- is independently selected from -$(CH_2)_q$-, -$(CH_2)_q$-O-, -O-$(CH_2)_q$-, -$(CH_2)_q$-NR^L-, -NR^L-$(CH_2)_q$-, -$(CH_2)_q$-NR^LC(=O)-, -$NR^L(CH_2)_q$C(=O)-, -$(CH_2)_q$-C(=O)NR^L-, -C(=O)-, -C(=O)-$(CH_2)_q$-NR^L-, -$(C\equiv C)_q$-, -CH=CH-, -$Si(R^L)_2$-, -Si(OH)(R^L)-, -$Si(OH)_2$-, -P(=O)(OR^L)-, -P(=O)(R^L)-, -S-, -S(=O)-, -$S(=O)_2$- or a bond, wherein the -CH_2- is optionally further substituted with 0 to 2 substituents selected from H, halogen, OH, CN, NH_2, C_{1-6} alkyl, C_{1-6} alkoxy, halogen-substituted C_{1-6} alkyl, hydroxyl-substituted C_{1-6} alkyl or cyano-substituted C_{1-6} alkyl;

each q is independently selected from 0, 1, 2, 3, 4, 5 or 6;

each R^L is independently selected from H, C_{1-6} alkyl, 3- to 7-membered heterocyclyl, 3- to 7-membered cycloalkyl, phenyl or 5- to 6-membered heteroaryl;

each -Cy- is independently selected from a bond, a 4- to 8-membered mono-heterocyclic ring, a 4- to 10-membered fused-heterocyclic ring, a 5- to 12-membered spiro-heterocyclic ring, a 7- to 10-membered bridged-heterocyclic ring, 3- to 7-membered monocycloalkyl, 4- to 10-membered fused cycloalkyl, 5- to 12-membered spiro cycloalkyl, 7- to 10-membered bridged cycloalkyl, 5- to 10-membered heteroaryl or 6- to 10-membered aryl, wherein the aryl, heteroaryl, cycloalkyl, mono-heterocyclic ring, fused-heterocyclic ring, spiro-heterocyclic ring or bridged-heterocyclic ring is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, COOH, CN, NH_2, =O, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl or C_{1-4} alkoxy, and the heteroaryl, mono-heterocyclic ring, fused-heterocyclic ring, spiro-heterocyclic ring or bridged-heterocyclic ring contains 1 to 4 heteroatoms selected from O, S or N, and is optionally further substituted with 0, 1 or 2 =O when the heteroatom is selected from S;

B is selected from  or  ;

r3 is selected from 0, 1, 2, 3 or 4;

r4 is selected from 0, 1 or 2;

r6 is selected from 0, 1, 2 or 3;

ring W is selected from C_{6-10} carbocycle, 5- to 10-membered heterocycle, a C_{6-10} aromatic ring or a 5- to 10-membered heteroaromatic ring, wherein the heterocycle or heteroaromatic ring contains 1 to 5 heteroatoms selected from O, S or N;

ring V is selected from 4- to 10-membered heterocycle or C_{3-10} carbocycle, wherein the heterocycle or carbocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl;

R^{b1} and R^{b2} are each independently selected from H, OH or C_{1-4} alkyl;

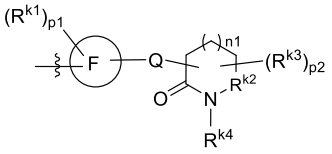
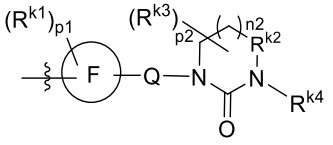
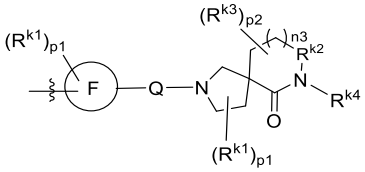
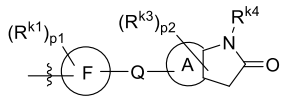
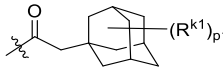
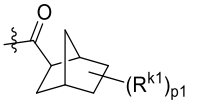
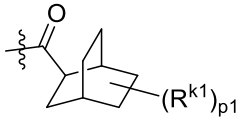
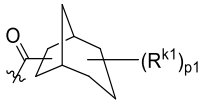
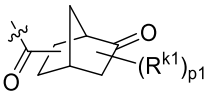
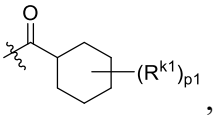
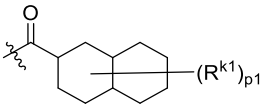
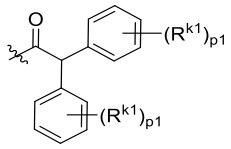
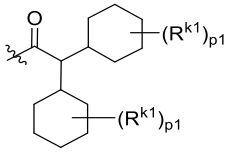
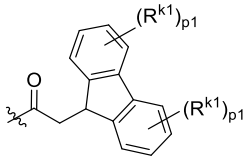
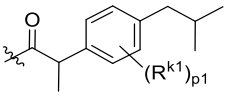
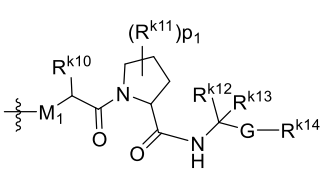
each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{2-4} alkynyl, C_{1-4} alkoxy, C_{3-6} cycloalkyl, 3- to 6-membered heterocyclyl, phenyl or 5- to 6-membered heteroaryl, wherein the alkyl, alkynyl, alkoxy, cycloalkyl, phenyl, heterocyclyl or heteroaryl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heterocyclyl or heteroaryl contains 1 to 3 heteroatoms selected from O, S or N;

each R^{b4} is independently selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl or C_{1-4} alkoxy, wherein the alkyl or alkoxy is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

R^{b5} is selected from H or C_{1-4} alkyl, wherein the alkyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

each R^{b6} is independently selected from H, F, Cl, Br, I, C_{1-4} alkyl, C_{2-4} alkynyl or C_{1-4} alkoxy, wherein the alkyl, alkynyl or alkoxy is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

R^{b7} is selected from 4- to 7-membered heterocycle or C_{3-7} carbocycle, wherein the carbocycle or heterocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN, C_{1-4} alkyl, deuterated C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heterocyclyl contains 1 to 3 heteroatoms selected from O, S or N;

K is selected from  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  , ; each Q is independently selected from a bond, -O-, -S-, -CH_2-, -NR^q-, -CO-, -NR^qCO-, -$CONR^q$- or 3- to 12-membered heterocycle, wherein the heterocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocycle contains 1 to 4 heteroatoms selected from O, S or N;

R^q is selected from H or C_{1-6} alkyl;

A is selected from C_{3-10} carbocycle, a C_{6-10} aromatic ring, 3- to 10-membered heterocycle or a 5- to 10-membered heteroaromatic ring, wherein the heterocycle or heteroaromatic ring contains 1 to 4 heteroatoms selected from O, S or N;

each F is independently selected from C_{3-20} carbocycle, a C_{6-20} aromatic ring, 3- to 20-membered heterocycle or a 5- to 20-membered heteroaromatic ring, wherein the heterocycle or heteroaromatic ring contains 1 to 4 heteroatoms selected from O, S or N;

each R^{k2} is independently selected from a bond, -CO-, -SO_2-, -SO- or -$C(R^{k3})_2$-;

each R^{k1} is independently selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-6} alkyl, C_{1-6} alkoxy or C_{3-6} cycloalkyl, wherein the alkyl, alkoxy or cycloalkyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

each R^{k3} is independently selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-6} alkyl, C_{1-6} alkoxy, C_{3-8} cycloalkyl or 3- to 8-membered heterocyclyl, wherein the alkyl, alkoxy, cycloalkyl or heterocyclyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocyclyl contains 1 to 4 heteroatoms selected from O, S or N;

or two R^{k3} together with the carbon atoms or ring backbones to which they are directly attached form 3- to 8-membered carbocycle or 3- to 8-membered heterocycle, and two R^{k1} together with the carbon atoms or ring backbones to which they are directly attached form 3- to 8-membered carbocycle or 3- to 8-membered heterocycle, wherein the carbocycle or heterocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocycle contains 1 to 4 heteroatoms selected from O, S or N;

each R^{k4} is independently selected from H, OH, NH_2, CN, $CONH_2$, C_{1-6} alkyl, C_{3-8} cycloalkyl or 3- to 8-membered heterocyclyl, wherein the alkyl, cycloalkyl or heterocyclyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocyclyl contains 1 to 4 heteroatoms selected from O, S or N;

M_1 is selected from a bond, -CH_2-C(=O)NH- or -C(=O)CH_2NH-;

M_2 is selected from -NHC(=O)-C_{1-6} alkyl, -NHC(=O)-C_{3-6} cycloalkyl or 4- to 10-membered heterocyclyl, wherein the alkyl, cycloalkyl or heterocyclyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, =O, OH, NH_2, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocyclyl contains 1 to 4 heteroatoms selected from O, S or N;

M_3 is selected from -NH- or -O-;

R^{k10} is selected from C_{1-6} alkyl, wherein the alkyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, =O, OH, C_{1-6} alkyl or C_{3-6} cycloalkyl;

each R^{k11} is independently selected from H, F, Cl, Br, I, =O, OH, SH, C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkylthio or -O-C(=O)-C_{1-6} alkyl, wherein the alkyl, alkoxy or alkylthio is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, C_{1-4} alkyl or C_{1-4} alkoxy;

R^{k12} and R^{k13} are each independently selected from H, C_{1-6} alkyl or C_{3-6} cycloalkyl, wherein the alkyl or cycloalkyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, =O, OH, NH_2, C_{1-4} alkyl or C_{1-4} alkoxy;

R^{k14} is selected from 5- to 6-membered heteroaryl, wherein the heteroaryl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CF_3, CN,

C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl, and the heteroaryl contains 1 to 4 heteroatoms selected from N, O or S;

G is selected from a 6- to 10-membered aromatic ring or a 5- to 10-membered heteroaromatic ring, wherein the aromatic ring or heteroaromatic ring is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CF_3, CN, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl, and the heteroaromatic ring contains 1 to 4 heteroatoms selected from N, O or S;

n1, n2 and n3 are each independently selected from 0, 1, 2 or 3;

each p1 or p2 is independently selected from 0, 1, 2, 3, 4 or 5.

2. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 1, wherein,

L is selected from -Cy1-Ak1-Cy2-Ak2-Cy3-Ak3-Cy4-Ak4-Cy5-Ak5-, -Cy1-Cy2-Cy3-Cy4-Ak1-Ak2-Ak3-Ak4-Ak5-, -Cy1-Ak1-Cy2-Ak2-Cy3-Ak3-Cy4-Ak4-Ak5-, -Ak1-Cy1-Ak2-Cy2-Ak3-Cy3-Ak4-Cy4-Ak5-, -Cy1-Ak1-Cy2-Ak2-Cy3-Cy4-Ak3-Ak4-Ak5-, -Cy1-Ak1-Cy2-Ak2-Ak3-Cy3-Cy4-Ak4-Ak5-, -Cy1-Ak1-Ak2-Ak3-Ak4-Ak5-Cy2-Cy3-Cy4-, -Cy1-Cy2-Ak1-Ak2-Ak3-Ak4-Ak5-Cy3-Cy4-, -Cy1-Cy2-Cy3-Ak1-Ak2-Ak3-Ak4-Ak5-Cy4-, -Cy1-Cy2-Cy3-Cy4-Ak1-Ak2-Ak3-Ak4-Ak5-, -Cy1-Ak1-Cy2-Cy3-Cy4-Ak2-Ak3-Ak4-Ak5-, -Cy1-Cy2-Ak1-Cy3-Cy4-Ak2-Ak3-Ak4-Ak5-, -Cy1-Cy2-Cy3-Ak1-Cy4-Ak2-Ak3-Ak4-Ak5-, -Cy1-Ak1-Ak2-Cy2-Cy3-Cy4-Ak3-Ak4-Ak5-, -Cy1-Cy2-Ak1-Ak2-Cy3-Cy4-Ak3-Ak4-Ak5-, -Cy1-Cy2-Cy3-Ak1-Ak2-Cy4-Ak3-Ak4-Ak5-, -Cy1-Ak1-Ak2-Ak3-Cy2-Cy3-Cy4-Ak4-Ak5-, -Cy1-Cy2-Ak1-Ak2-Ak3-Cy3-Cy4-Ak4-Ak5-, -Cy1-Cy2-Cy3-Ak1-Ak2-Ak3-Cy4-Ak4-Ak5-, -Cy1-Ak1-Ak2-Ak3-Ak4-Cy2-Cy3-Cy4-Ak5-, -Cy1-Cy2-Ak1-Ak2-Ak3-Ak4-Cy3-Cy4-Ak5-, -Cy1-Cy2-Cy3-Ak1-Ak2-Ak3-Ak4-Cy4-Ak5-, -Ak1-Ak2-Ak3-Ak4-Ak5-Cy1-Cy2-Cy3-Cy4-, -Ak1-Cy1-Cy2-Cy3-Cy4-Ak2-Ak3-Ak4-Ak5-, -Ak1-Ak2-Cy1-Cy2-Cy3-Cy4-Ak3-Ak4-Ak5-, -Ak1-Ak2-Ak3-Cy1-Cy2-Cy3-Cy4-Ak4-Ak5-, -Ak1-Ak2-Ak3-Ak4-Cy1-Cy2-Cy3-Cy4-Ak5-, -Ak1-Cy1-Ak2-Ak3-Ak4-Ak5-Cy2-Cy3-Cy4-, -Ak1-Cy1-Cy2-Ak2-Ak3-Ak4-Ak5-Cy3-Cy4-, -Ak1-Cy1-Cy2-Cy3-Ak2-Ak3-Ak4-Ak5-Cy4-, -Ak1-Ak2-Cy1-Ak3-Ak4-Ak5-Cy2-Cy3-Cy4-, -Ak1-Ak2-Cy1-Cy2-Ak3-Ak4-Ak5-Cy3-Cy4-, -Ak1-Ak2-Cy1-Cy2-Cy3-Ak3-Ak4-Ak5-Cy4-, -Ak1-Ak2-Ak3-Cy1-Ak4-Ak5-Cy2-Cy3-Cy4-, -Ak1-Ak2-Ak3-Cy1-Cy2-Ak4-Ak5-Cy3-Cy4-, -Ak1-Ak2-Ak3-Cy1-Cy2-Cy3-Ak4-Ak5-Cy4-, -Ak1-Ak2-Ak3-Ak4-Cy1-Ak5-Cy2-Cy3-Cy4-, -Ak1-Ak2-Ak3-Ak4-Cy1-Cy2-Ak5-Cy3-Cy4-, or -Ak1-Ak2-Ak3-Ak4-Cy1-Cy2-Cy3-Ak5-Cy4-;

Ak1, Ak2, Ak3, Ak4 and Ak5 are each independently selected from $-(CH_2)_q-$, $-(CH_2)_q-O-$, $-O-(CH_2)_q-$, $-(CH_2)_q-NR^L-$, $-NR^L-(CH_2)_q-$, $-(CH_2)q-NR^LC(=O)-$, $-(CH_2)_q-C(=O)NR^L-$, $-C(=O)-$, $-C(=O)-(CH_2)_q-NR^L-$, $-(C\equiv C)_q-$ or a bond, wherein the $-CH_2-$ is optionally further substituted with 0 to 2 substituents selected from H, halogen, OH, CN, NH_2, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl or cyano-substituted C_{1-4} alkyl;

each Cy1, Cy2, Cy3, Cy4 or Cy5 is independently selected from a bond, a 4- to 7-membered mono-heterocyclic ring, a 4- to 10-membered fused-heterocyclic ring, a 5- to 12-membered spiro-heterocyclic ring, a 7- to 10-membered bridged-heterocyclic ring, 3- to 7-membered monocycloalkyl, 4- to 10-membered fused cycloalkyl, 5- to 12-membered spiro cycloalkyl, 7- to 10-membered bridged cycloalkyl, 5- to 10-membered heteroaryl or 6- to 10-membered aryl, wherein the aryl, heteroaryl, cycloalkyl, mono-heterocyclic ring, fused-heterocyclic ring, spiro-heterocyclic ring or bridged-heterocyclic ring is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, COOH, CN, NH_2, =O, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl or C_{1-4} alkoxy, and the heteroaryl, mono-heterocyclic ring, fused-heterocyclic ring, spiro-heterocyclic ring or bridged-heterocyclic ring contains 1 to 4 heteroatoms selected from O, S or N, and is optionally further substituted with 0, 1 or 2 =O when the heteroatom is selected from S;

each q is independently selected from 0, 1, 2, 3 or 4;

each R^L is independently selected from H or C_{1-6} alkyl.

3. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 2, wherein,

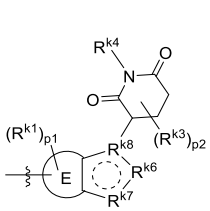
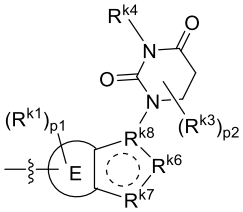
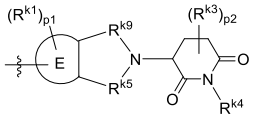
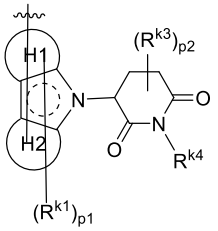
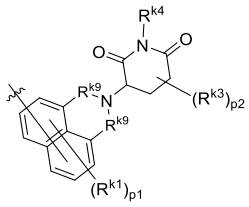
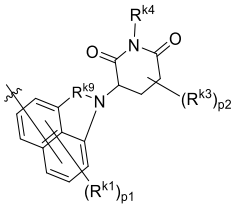
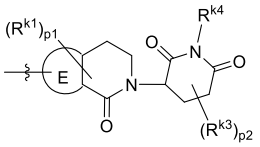
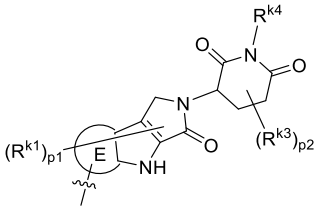
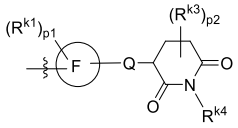
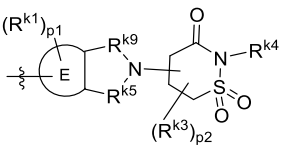
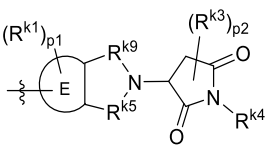
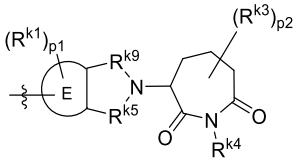
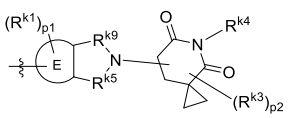
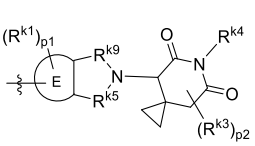
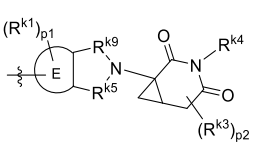
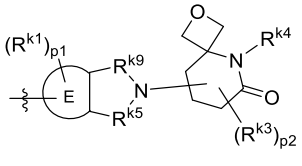
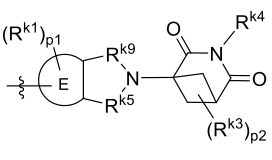
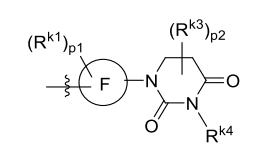
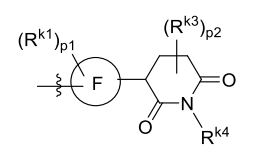
each Cy1, Cy2, Cy3, Cy4 or Cy5 is independently selected from a bond, a 4- to 7-membered nitrogen-containing mono-heterocyclic ring, a 4- to 10-membered nitrogen-containing fused-heterocyclic ring, a 5- to 12-membered nitrogen-containing spiro-heterocyclic ring, a 7- to 10-membered nitrogen-containing bridged-heterocyclic ring, 3- to 7-membered monocycloalkyl, 4- to 10-membered fused cycloalkyl, 5- to 12-membered spiro cycloalkyl, 7- to 10-membered bridged cycloalkyl, 5- to 10-membered heteroaryl or 6- to 10-membered aryl, wherein the mono-heterocyclic ring, fused-heterocyclic ring, bridged-heterocyclic ring, spiro-heterocyclic ring, cycloalkyl, aryl or heteroaryl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, COOH, CN, NH_2, =O, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl or C_{1-4} alkoxy, and

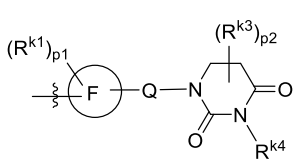
the mono-heterocyclic ring, fused-heterocyclic ring, bridged-heterocyclic ring, spiro-heterocyclic ring or heteroaryl contains 1 to 4 heteroatoms selected from O, S or N, and is optionally further substituted with 0, 1 or 2 =O when the heteroatom is selected from S;

each R^L is independently selected from H or C_{1-4} alkyl;

ring W is selected from a benzene ring, a naphthalene ring, a 5- to 6-membered monocyclic heteroaromatic ring, a 9- to 10-membered fused heteroaromatic ring or 9- to 10-membered heterocycle, wherein the heterocycle or heteroaromatic ring contains 1 to 5 heteroatoms selected from O, S or N;

ring V is selected from 4- to 6-membered heterocycle or C_{3-6} carbocycle, wherein the heterocycle or carbocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl;

K is selected from  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  , , , , .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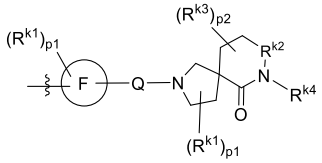
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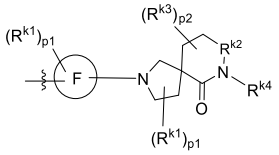
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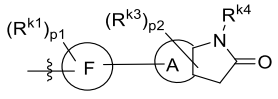
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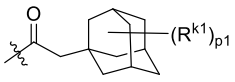
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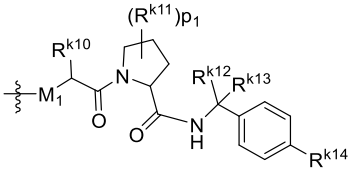
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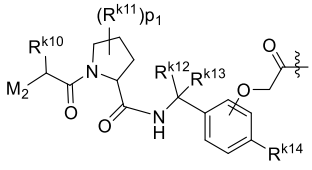
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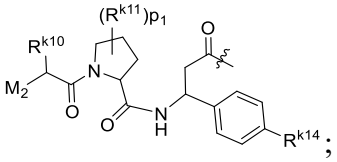

;

 represents a ring selected from an aromatic ring or a non-aromatic ring;

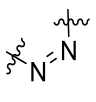
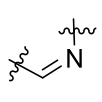
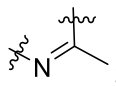
each Q is independently selected from -O-, -S-, -CH_2-, -NR^q-, -CO-, -NR^qCO-, -$CONR^q$- or 4- to 7-membered heterocycle, wherein the heterocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocycle contains 1 to 4 heteroatoms selected from O, S or N;

R^q is selected from H or C_{1-4} alkyl;

R^{k1} and R^{k3} are each independently selected from H, F, Cl, Br, I, OH, =O, NH_2, CF_3, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, wherein the alkyl or alkoxy is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH or NH_2;

or two R^{k3} together with the carbon atoms or ring backbones to which they are directly attached form 3- to 6-membered carbocycle or 3- to 7-membered heterocycle, and two R^{k1} together with the carbon atoms or ring backbones to which they are directly attached form 3- to 6-membered carbocycle or 3- to 7-membered heterocycle, wherein the carbocycle or heterocycle is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, COOH, $CONH_2$, C_{1-4} alkyl or C_{1-4} alkoxy, and the heterocycle contains 1 to 4 heteroatoms selected from O, S or N;

each R^{k4} is independently selected from H, OH, NH_2, CF_3, CN or C_{1-4} alkyl;

each R^{k5} is independently selected from  , $C(CH_3)_2$, CO, CH_2, SO_2,  ,  or  ;

each R^{k6} is independently selected from CO, CH, SO, SO_2, CH_2 or N;

each R^{k7} is independently selected from  , $C(CH_3)_2$, CO, CH, N, CH_2, O, S, $N(CH_3)$, $N(CH_2CH_3)$, N(cyclopropyl) or NH;

each R^{k8} is independently selected from C, N or CH;

each R^{k9} is independently selected from a bond,  , $C(CH_3)_2$, CO, CH_2, CH_2CH_2 or SO_2;

each A, H1 or H2 is independently selected from C_{3-8} carbocycle, a benzene ring, 4- to 7-membered heterocycle or a 5- to 6-membered heteroaromatic ring, wherein the heterocycle or heteroaromatic ring contains 1 to 4 heteroatoms selected from O, S or N;

each E is independently selected from C_{3-8} carbocycle, a benzene ring, 4- to 7-membered heterocycle, 8- to 12-membered heterocycle, a 7- to 12-membered heteroaromatic ring or a 5- to 6-membered heteroaromatic ring, wherein the heterocycle or heteroaromatic ring contains 1 to 4 heteroatoms selected from O, S or N;

each F is independently selected from 3- to 7-membered monocycloalkyl, 4- to 10-membered fused cycloalkyl, 5- to 12-membered spiro cycloalkyl, 5- to 10-membered bridged cycloalkyl, a 4- to 7-membered mono-heterocyclic ring, a 4- to 10-membered fused-heterocyclic ring, a 5- to 12-membered spiro-heterocyclic ring, a 5- to 10-membered bridged-heterocyclic ring, C_{6-14} aryl or 5- to 10-membered heteroaryl, wherein the mono-heterocyclic ring, fused-heterocyclic ring, spiro-heterocyclic ring, bridged-heterocyclic ring or heteroaryl contains 1 to 4 heteroatoms selected from O, S or N .

4. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 3, wherein,

R^L is selected from H, methyl or ethyl;

each q is independently selected from 0, 1 or 2;

each Cy1, Cy2, Cy3, Cy4 or Cy5 is independently selected from a bond or one of the following substituted or unsubstituted groups: cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, azetidinyl, azacyclopentyl, azacyclohexenyl, piperidine, morpholine, piperazine, phenyl, cyclopropyl-fused-cyclopropyl, cyclopropyl-fused-cyclobutyl, cyclopropyl-fused-cyclopentyl, cyclopropyl-fused-cyclohexyl, cyclobutyl-fused-cyclobutyl, cyclobutyl-fused-cyclopentyl, cyclobutyl-fused-cyclohexyl, cyclopentyl-fused-cyclopentyl, cyclopentyl-fused-cyclohexyl, cyclohexyl-fused-cyclohexyl, cyclopropyl-spiro-cyclopropyl, cyclopropyl-spiro-

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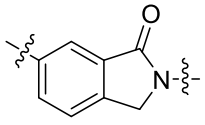
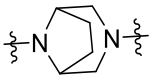
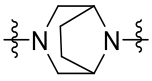
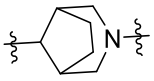
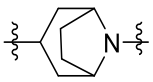
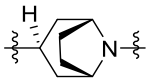
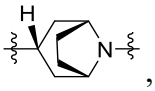
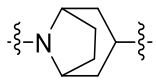
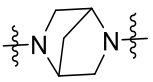
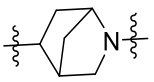
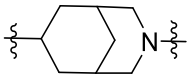
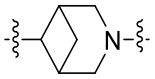
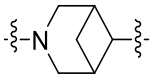
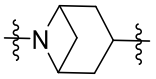
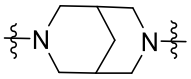
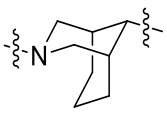
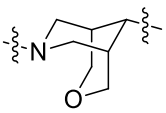
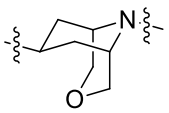
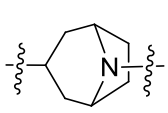
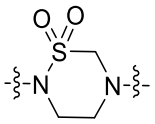
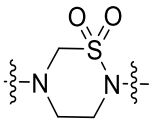
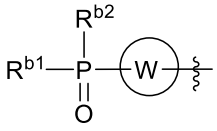
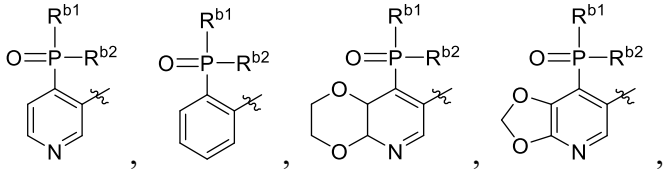
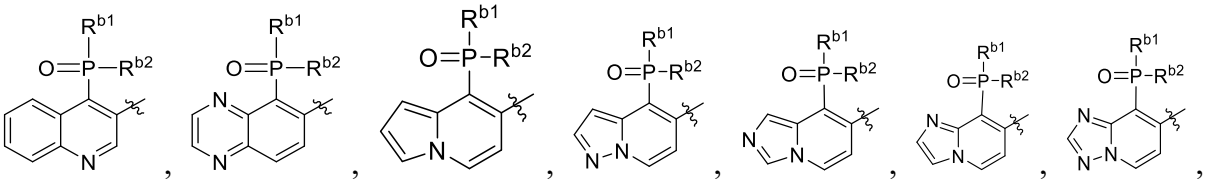
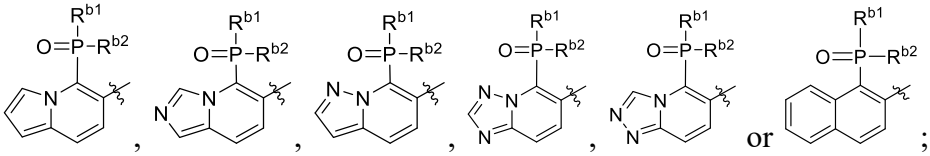
cyclobutyl-spiro-azacyclohexyl, cyclopentyl-spiro-azetidinyl, cyclopentyl-spiro-azacyclopentyl, cyclopentyl-spiro-azacyclohexyl, cyclohexyl-spiro-azetidinyl, cyclohexyl-spiro-azacyclopentyl, cyclohexyl-spiro-azacyclohexyl, azetidinyl-spiro-azetidinyl, azetidinyl-spiro-azacyclopentyl, azetidinyl-spiro-azacyclohexyl, azacyclopentyl-spiro-azetidinyl, azacyclopentyl-spiro-azacyclopentyl, azacyclopentyl-spiro-azacyclohexyl, azacyclohexyl-spiro-azetidinyl, azacyclohexyl-spiro-azacyclopentyl, azacyclohexyl-spiro-azacyclohexyl,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  , or  , which, when substituted, is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, NH_2, COOH, CN, =O, C_{1-4} alkyl, halogen-substituted C_{1-4} alkyl, hydroxyl-substituted C_{1-4} alkyl or C_{1-4} alkoxy;


is selected from 


or ;

ring V is selected from azetidinyl, azacyclopentyl, piperidyl or piperazinyl, wherein the azetidinyl, azacyclopentyl, piperidyl or piperazinyl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN or C_{1-4} alkyl;

R^{b1} and R^{b2} are each independently selected from methyl or ethyl;

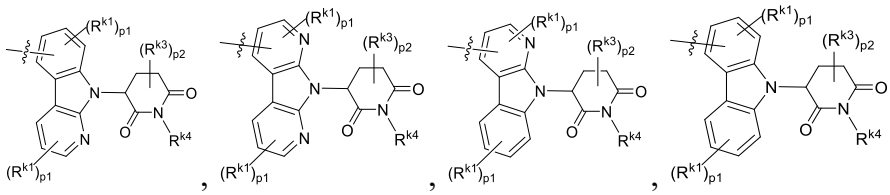
each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl, wherein the methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy, isopropyloxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, NH_2, CN, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl, and the heteroaryl contains 1 to 3 heteroatoms selected from O, S or N;

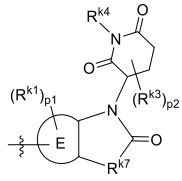
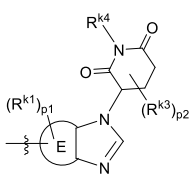
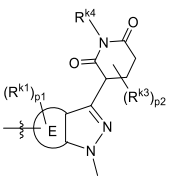
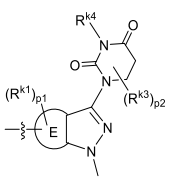
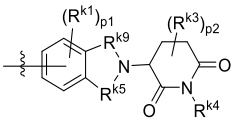
each R^{b4} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy, wherein the methyl, ethyl, isopropyl, propyl, methoxy, ethoxy, propoxy or isopropoxy is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

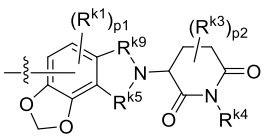
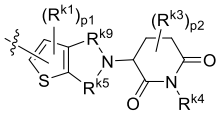
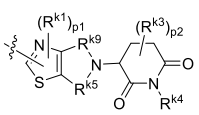
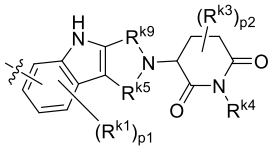
R^{b5} is selected from H;

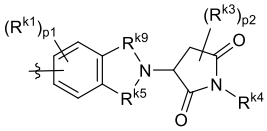
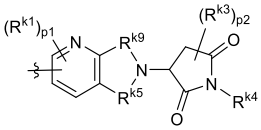
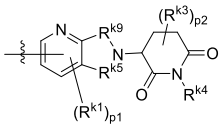
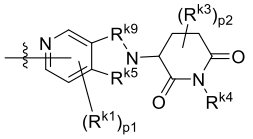
each R^{b6} is independently selected from H, F, Cl, Br, I, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy or isopropoxy, wherein the methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, ethoxy, propoxy or isopropoxy is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, CN, C_{1-4} alkyl, C_{1-4} alkoxy or C_{3-6} cycloalkyl;

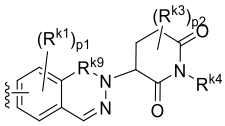
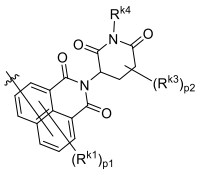
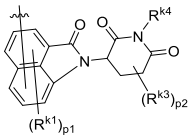
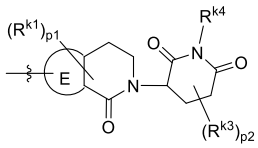
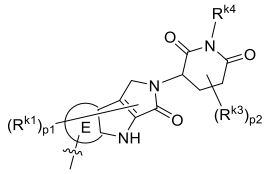
R^{b7} is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, pyrrole, pyrazole, pyridine or phenyl, wherein the R^{b7} is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN, deuterated C_{1-4} alkyl, C_{1-4} alkyl, C_{1-4} alkoxy, halogen-substituted C_{1-4} alkyl, cyano-substituted C_{1-4} alkyl or C_{3-6} cycloalkyl;

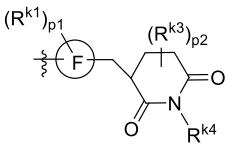
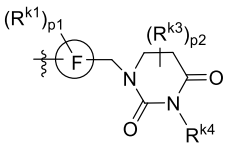
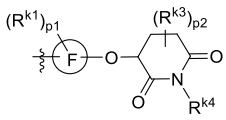
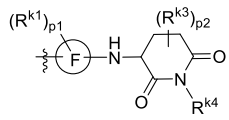
K is selected from 

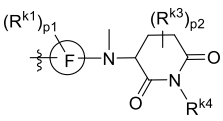
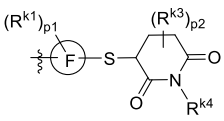
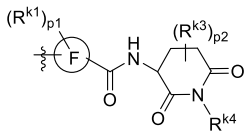
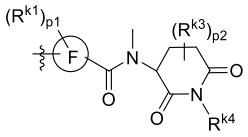
,,  ,  ,  ,  ,  ,

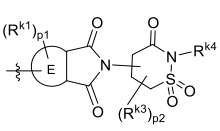
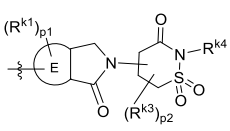
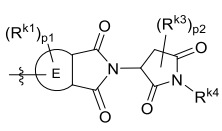
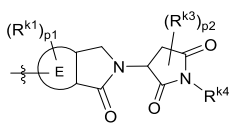
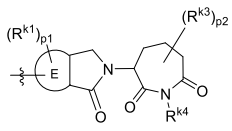
 ,  ,  ,  ,

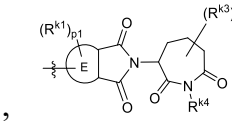
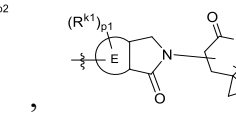
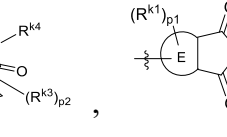
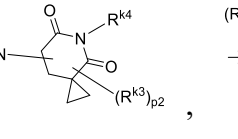
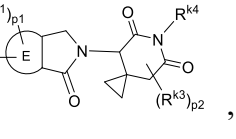
 ,  ,  ,  ,

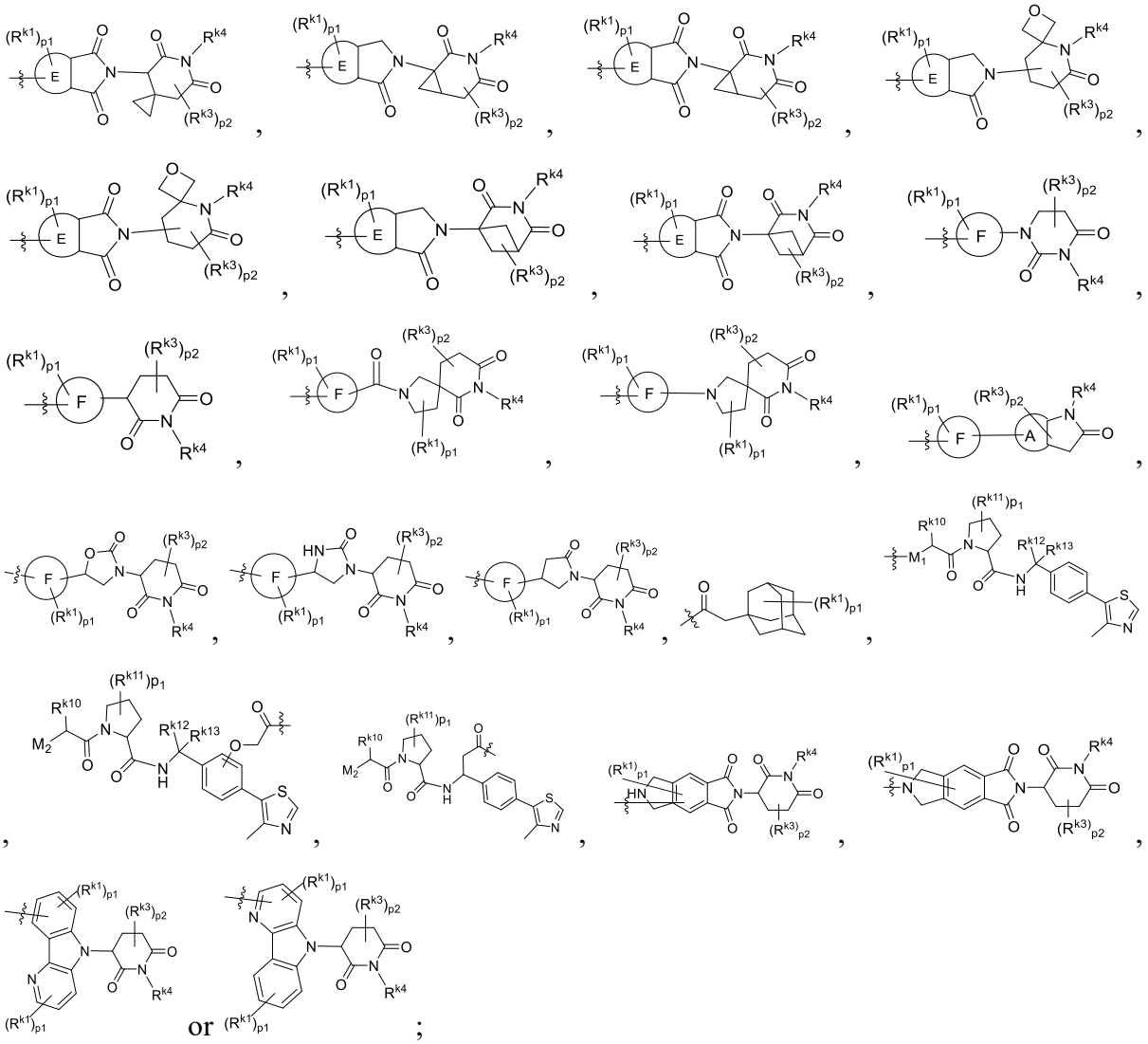
 ,  ,  ,  ,  ,

 ,  ,  ,  ,

 ,  ,  ,  ,

 ,  ,  ,  ,  ,

 ,  ,  ,  ,  ,



each E is independently selected from phenyl, pyridyl, pyridazinyl, pyrazinyl, pyrimidinyl, pyrrolyl, pyrazolyl, imidazolyl, thiazolyl, furyl, thienyl or oxazolyl;

each A is independently selected from phenyl, pyridyl, pyridazinyl, pyrazinyl, pyrimidinyl, pyrrolyl, pyrazolyl, imidazolyl, thiazolyl, furyl, thienyl or oxazolyl;

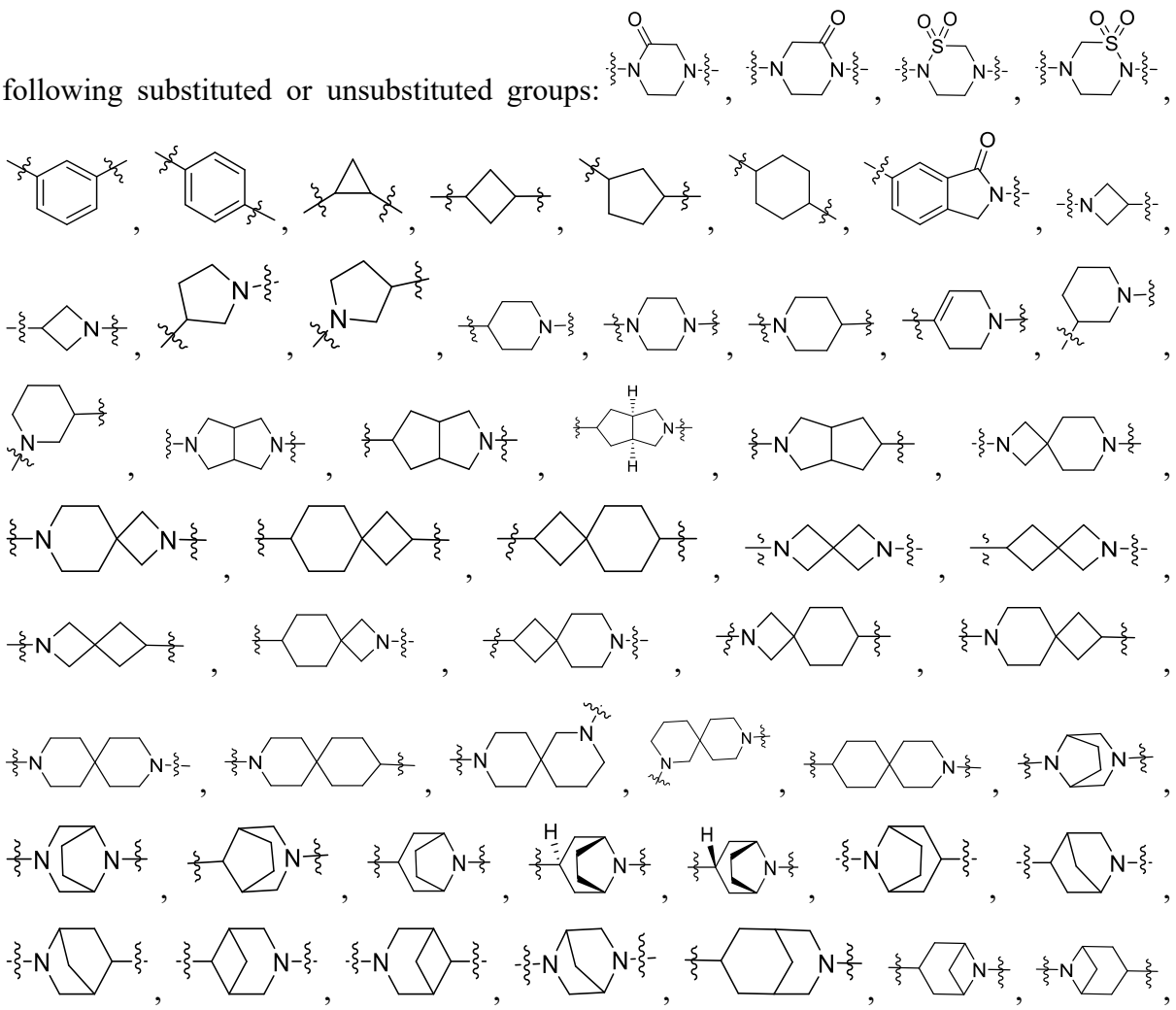
each F is independently selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, bicyclo[1.1.1]pentyl, 6,7-dihydro-5H-cyclopenta[c]pyridyl, 2,3-dihydro-1H-indenyl, phenyl, naphthyl, anthryl, phenanthryl, azetidinyl, azacyclopentyl, piperidyl, morpholinyl, pyridyl, pyrimidinyl, pyridazinyl, pyrazinyl, triazinyl, pyrrolyl, pyrazolyl, imidazolyl, triazolyl, oxazolyl, furyl, thienyl, thiazolyl, 2-pyridone, benzoxazolyl, pyridoimidazolyl, benzoimidazolyl, benzopyrazolyl, benzothiazolyl, benzothienyl, benzofuryl, benzopyrrolyl, benzopyridyl, benzopyrazinyl, benzopyrimidinyl, benzopyridazinyl, benzotriazinyl, pyrrolopyrrolyl, pyrrolopyridyl, pyrrolopyrimidinyl, pyrrolopyridazinyl, pyrrolopyrazinyl, imidazopyrimidinyl, imidazopyridyl, imidazopyrazinyl, imidazopyridazinyl, pyrazolopyridyl,

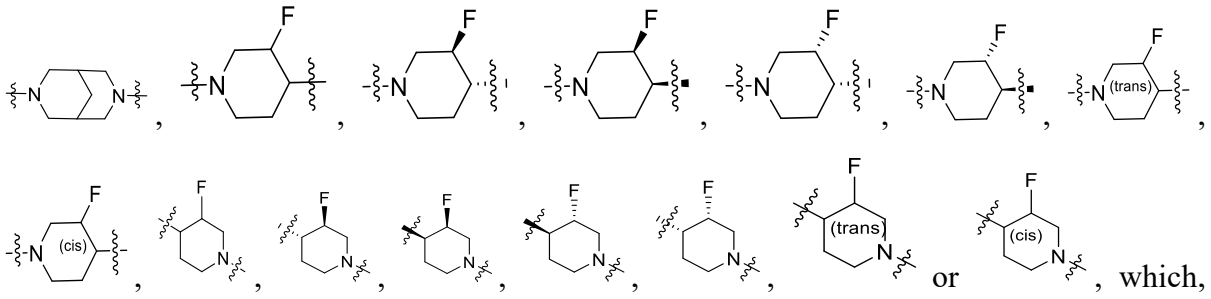
pyrazolopyrimidinyl, pyrazolopyridazinyl, pyrazolopyrazinyl, pyrimidopyridyl, pyrimidopyrazinyl, pyrimidopyridazinyl, pyrimidopyrimidinyl, pyridopyridyl, pyridopyrazinyl, pyridopyridazinyl, pyridazinopyridazinyl, pyridazinopyrazinyl or pyrazinopyrazinyl;

each R^{k7} is independently selected from  , $C(CH_3)_2$, CH_2, O, $N(CH_3)$, $N(CH_2CH_3)$, N(cyclopropyl) or NH;

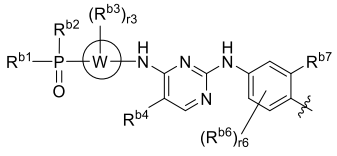
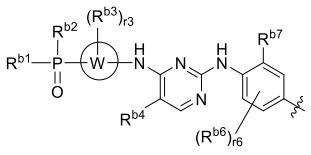
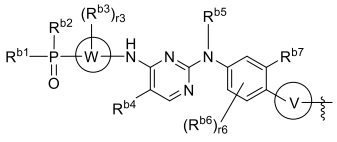
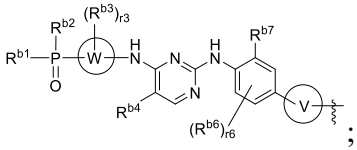
each p1 or p2 is independently selected from 0, 1 or 2.

5. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 4, wherein,

each Cy1, Cy2, Cy3, Cy4 or Cy5 is independently selected from a bond or one of the following substituted or unsubstituted groups: 



which, when substituted, is optionally further substituted with 0 to 4 substituents selected from H, F, CF_3, methyl, =O, hydroxymethyl, COOH, CN or NH_2;

B is selected from  ,  ,  or  ;

ring V is selected from piperidine or piperazine, wherein the piperidine or piperazine is optionally further substituted with 0 to 2 F;

R^{b1} and R^{b2} are selected from methyl;

K is selected from one of the structural fragments shown in Table K-1.

6. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 5, wherein,

L is selected from -Cy1-, -Cy1-Ak1-, -Cy1-Ak1-Ak2-, -Cy1-Ak1-Ak2-Ak3-, -Cy1-Ak1-Ak2-Ak3-Ak4-, -Cy1-Cy2-, -Cy1-Ak1-Cy2-, -Cy1-Cy2-Ak2-, -Cy1-Ak1-Cy2-Ak2-, -Cy1-Ak1-Cy2-Ak2-Ak3-, -Cy1-Ak1-Cy2-Ak2-Ak3-Ak4-, -Cy1-Cy2-Ak2-Ak3-, -Cy1-Cy2-Ak2-Ak3-Ak4-, -Cy1-Ak1-Cy2-Ak2-Ak3-Ak4-, -Cy1-Ak1-Ak2-Cy3-, -Cy1-Ak1-Ak2-Cy3-Ak3-, -Cy1-Cy2-Cy3-, -Cy1-Ak1-Cy2-Cy3-, -Cy1-Cy2-Ak2-Cy3-, -Cy1-Cy2-Cy3-Ak3-, -Cy1-Ak1-Cy2-Cy3-Ak3-, -Cy1-Cy2-Ak2-Cy3-Ak3-, -Cy1-Ak1-Cy2-Ak2-Cy3-, -Cy1-Ak1-Cy2-Ak2-Cy3-Ak3-, -Cy1-Cy2-Cy3-Ak3-Ak4-, -Cy1-Cy2-Cy3-Ak3-Cy4-, -Cy1-Cy2-Cy3-Cy4-, -Cy1-Ak1-Cy2-Cy3-Cy4-, -Cy1-Cy2-Ak2-Cy3-Cy4-, -Cy1-Cy2-Cy3-Ak3-Cy4-, -Cy1-Cy2-Cy3-Cy4-Ak4-, -Cy1-Ak1-Cy2-Ak2-Cy3-Ak3-Cy4-, -Cy1-Ak1-Cy2-Ak2-Cy3-Cy4-, -Ak1-Ak2-Cy3-Cy4-, -Ak1-Cy2-Ak2-Cy3-, -Ak1-Cy2-Cy3-Ak3-Cy4-, -Ak1-Cy2-Cy3-Cy4-Ak4-Cy5-, -Ak1-Cy2-Ak2-, -Ak1-Ak2-Ak3-Ak4-, -Ak1-Ak2-Ak3-, -Ak1-Ak2-, -Ak1-Ak2-Ak3-

Ak4-Ak5-, -Cy1-Cy2-Cy3-Ak3-Ak4-Ak5-, -Cy1-Cy2-Ak2-Cy3-Ak3-Ak4-Ak5-, -Cy1-Ak1-Cy2-Ak2-Ak3-Ak4-Ak5-, -Cy1-Cy2-Cy3-Cy4-Ak4-Ak5-, -Cy1-Ak1-Ak2-Ak3-Ak4-Ak5-, -Ak1-Cy2-Ak2-Ak3-Ak4-Ak5-, -Ak1-Cy2-, -Ak1-Cy2-Ak2-Ak3-Ak4- or -Ak1-Cy2-Ak2-Ak3-;

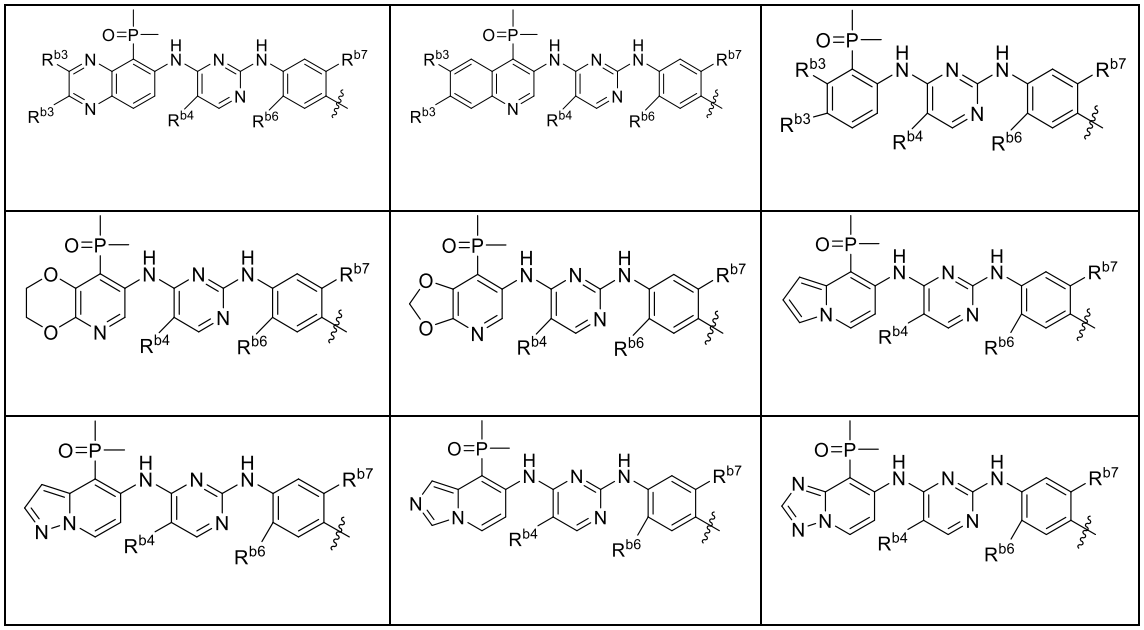
Ak1, Ak2, Ak3, Ak4 and Ak5 are each independently selected from -O-, -OCH_2-, -CH_2O-, -OCH_2CH_2-, -CH_2CH_2O-, -C≡C-, -$C(CH_3)_2$-, -CH_2-, -CH_2CH_2-, -$CH_2CH_2CH_2$-, -$N(CH_3)$-, -NH-, -$CH_2N(CH_3)$-, -CH_2NH-, -$NHCH_2$-, -$CH_2CH_2N(CH_3)$-, -CH_2CH_2NH-, -$NHCH_2CH_2$-, -C(=O)-, -$C(=O)CH_2NH$-, -$CH_2C(=O)NH$-, -$C(=O)N(CH_3)$-, -$N(CH_3)C(=O)$-, -C(=O)NH- or -NHC(=O)-.

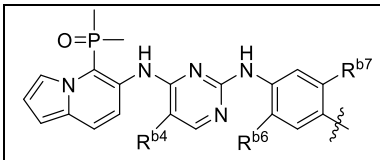
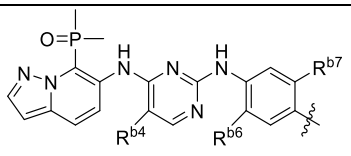
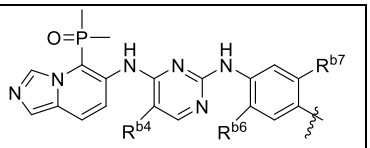
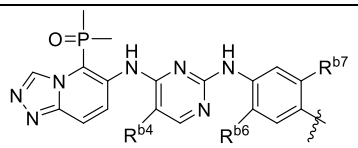
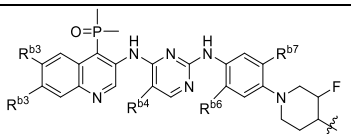
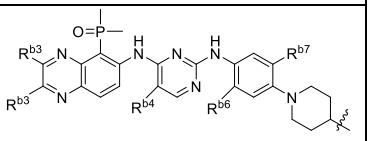
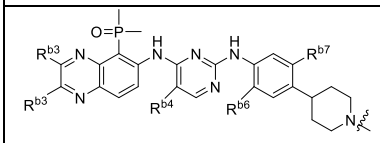
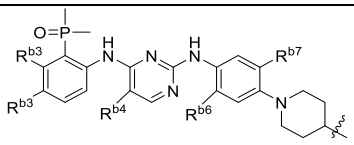
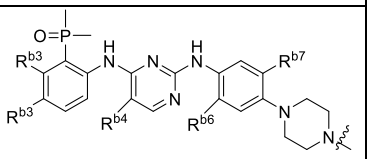
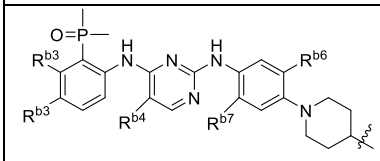
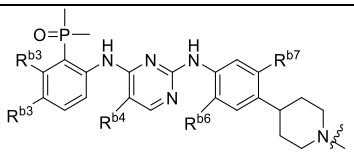
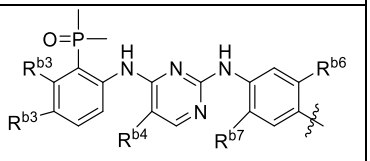
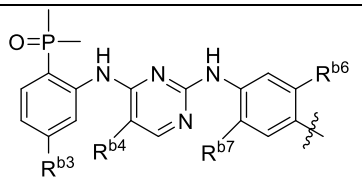
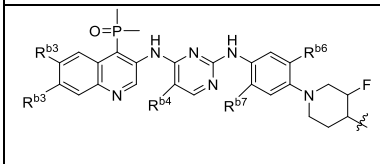
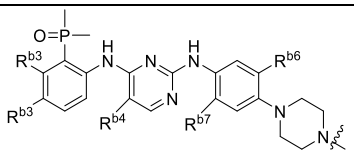
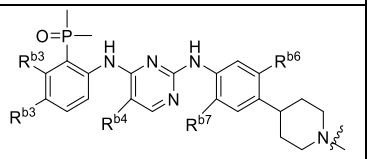
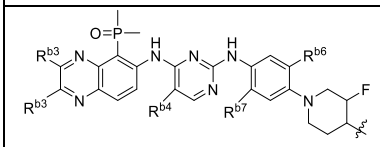
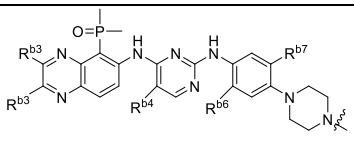
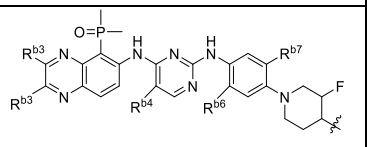
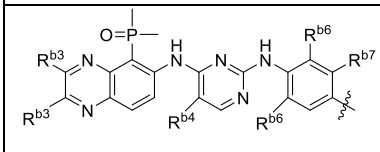
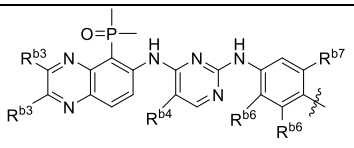
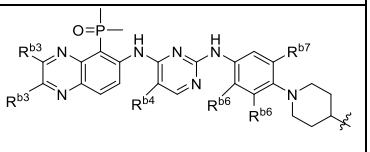
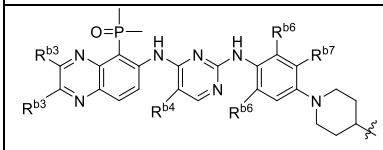
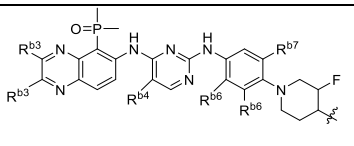
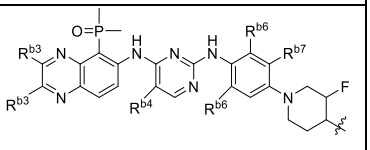
7. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 6, wherein,

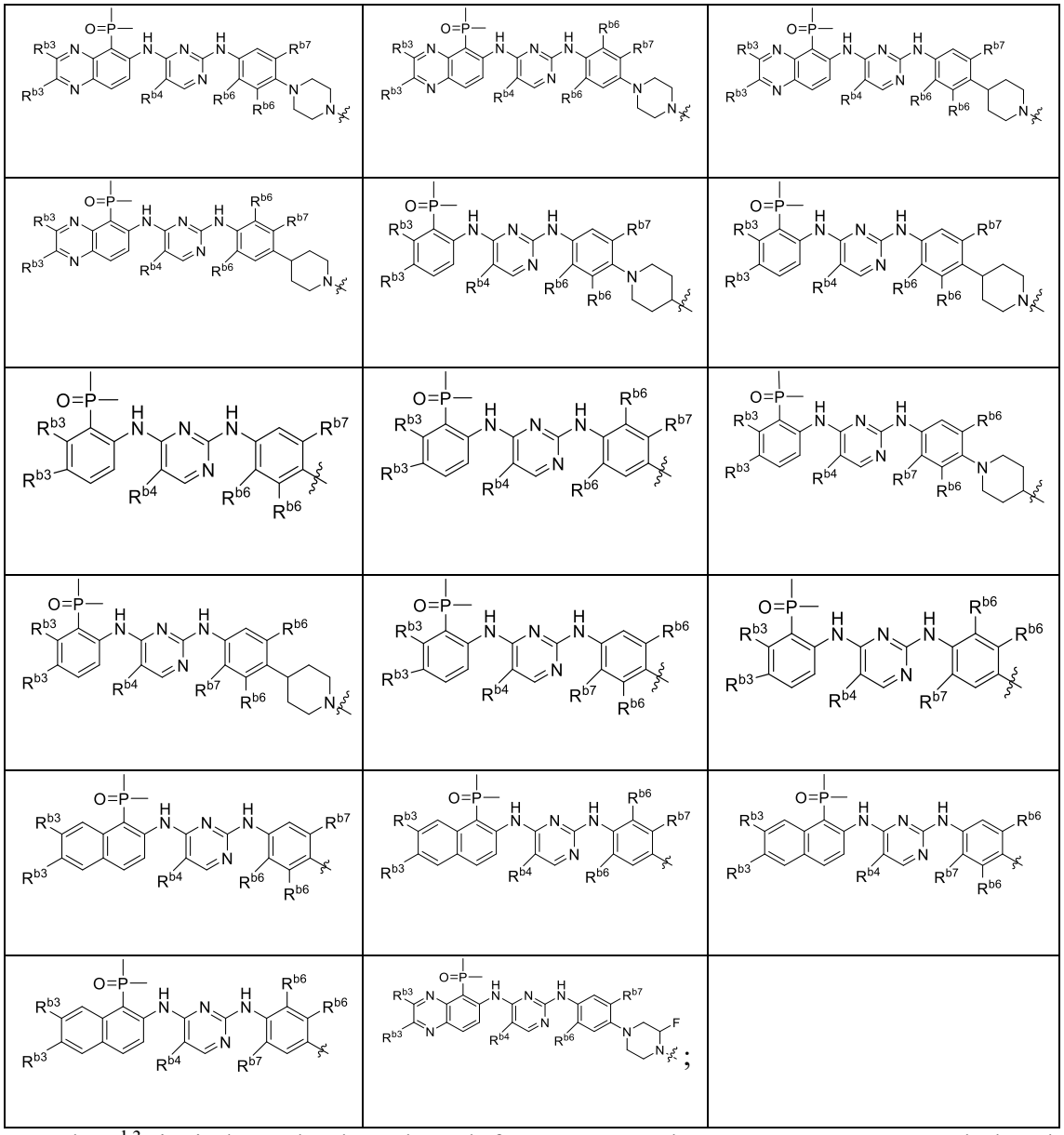
L is selected from a bond or a group in Table A, wherein the left side of the group is linked to B.

8. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 7, wherein,

B is selected from one of the following structural fragments:





each R^{b3} is independently selected from H, F, Cl, Br, I, OH, CN, methyl, ethyl, isopropyl, propyl, ethynyl, methoxy, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, phenyl or 5- to 6-membered heteroaryl, wherein the phenyl or 5- to 6-membered heteroaryl is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, methyl, ethyl, methoxy or ethoxy, and the heteroaryl contains 1 to 3 heteroatoms selected from O, S or N;

R^{b4} is selected from H, F, Cl or Br;

each R^{b6} is independently selected from H, F, Cl, Br, methyl, ethyl, methoxy or ethoxy;

R^{b7} is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, pyrrole, pyrazole, pyridine or phenyl, wherein the R^{b7} is optionally further substituted with 0 to 4 substituents selected from H, F, Cl, Br, I, OH, =O, CN, CH_2D, CHD_2, CD_3, methyl or ethyl;

K is selected from one of the structural fragments shown in Table K-2.

9. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 8, wherein,

B is selected from one of the structural fragments shown in Table B-1;

K is selected from one of the structural fragments shown in Table K-3.

10. The compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to claim 1, wherein the compound is selected from one of the structures shown in Table E-1.

11. A pharmaceutical composition, comprising a therapeutically effective amount of the compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to any one of claims 1 to 10, and a pharmaceutically acceptable carrier, optionally comprising one or more other chemotherapeutic agents.

12. The pharmaceutical composition according to claim 11, wherein the therapeutically effective amount means that the pharmaceutical composition is administered at a dosage suitable for a disease to be treated (or prevented), for example, about 0.5 μg to about 50 mg of at least one compound/kg body weight of a subject, preferably about 10 μg to about 100 mg/kg body weight/day.

13. Use of the compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to any one of claims 1 to 10, or the composition according to claim 11 or 12 in the preparation of a medicament for treating a disease related to EGFR activity or expression level.

14. Use of the compound or the stereoisomer, deuterated compound, solvate, prodrug, metabolite, pharmaceutically acceptable salt or co-crystal thereof according to any one of claims 1 to 10, or the composition according to claim 11 or 12 in the preparation of a medicament for treating a disease related to the inhibition or degradation of EGFR.

15. The use according to claim 13 or 14, wherein the disease is selected from cancer, preferably non-small cell lung cancer.