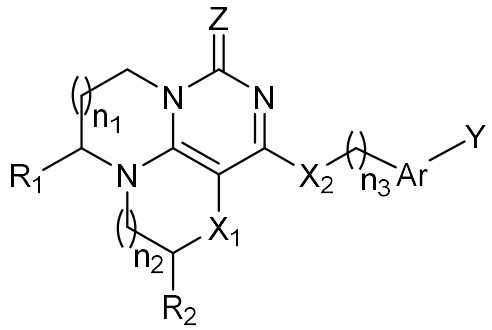
What is claimed is:

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



(I)

wherein

n_1, n_2, and n_3 are each independently 0, 1, or 2;

R_1 and R_2 are each independently selected from -H, hydroxyl, cyano, halogen, alkyl, deuterated alkyl, hydroxyalkyl, haloalkyl, cycloalkyl, alkoxy, haloalkoxy, deuterated alkoxy;

X_1 and X_2 are each independently selected from alkylene, -O-, -S-, or -NR'-,

R' is selected from -H, alkyl, deuterated alkyl, or cycloalkyl;

Ar is an arylene group or a heteroarylene group， wherein hydrogen atoms in the arylene or heteroarylene are optionally substituted by 0, 1 or more substituents, and the substituents are each independently selected from halogen, alkyl, deuteroalkyl, haloalkyl, alkoxy, deuteroalkoxy, haloalkoxy, hydroxy, hydroxyalkyl, cyano, amino, monoalkyl- or dialkyl-substituted amino, nitro, carboxyl, aldehyde, cycloalkyl, heterocyclyl, aryl, or heteroaryl;

Y is -H, halogen, alkyl, haloalkyl, haloalkoxy, cycloalkyl, alkoxy, deuterated alkyl, deuterated alkoxy, -OAr', -SAr', -NH-Ar', -NMe-Ar', –NR”-Ar’ or -R'"-Ar’.

Ar’ is selected from aryl or heteroaryl, wherein hydrogen atoms in the aryl or heteroaryl are optionally substituted with one or more substituents, the substituents are each independently selected from halogen, alkyl, deuterated alkyl, haloalkyl, alkoxy,

deuterated alkoxy, hydroxy, hydroxyalkyl, haloalkoxy, cyano, amino, nitro, carboxyl, aldehyde, cycloalkyl, heterocyclyl, aryl, or heteroaryl;

R" is alkyl;

R'" is alkylene;

Z is O or S.

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

Optionally, halogens in the "halogen" "haloalkyl" and "haloalkoxy" are each independently selected from F, Cl, Br, or I;

optionally, alkyls in the "alkyl" "deuterated alkyl" "hydroxyalkyl" "haloalkyl" "haloalkoxy", "alkoxy" and "mono- or di-alkyl substituted amino" are each independently C_1-C_{10} linear or branched alkyl; optionally each independently C_1-C_7 linear or branched alkyl; optionally each independently C_1-C_4 linear or branched alkyl; and optionally selected from methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, sec-butyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, isopentyl, 1-ethylpropyl, neopentyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, isohexyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3,3-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,3-dimethylbutyl, 2-ethylbutyl, n-heptyl, 2-methylhexyl, 3-methylhexyl, 2,2-dimethylpentyl, 3,3-dimethylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 3-ethylpentyl, or 2,2,3-trimethylbutyl;

optionally, "alkylenes" are each independently C_1-C_{10} linear or branched alkylene; optionally each C_1-C_7 linear or branched alkylene; optionally each C_1-C_5 linear or branched alkylene; and optionally each selected from methylene, ethylene, n-propylene, iso-propylene, n-butylene, iso-butylene, tert-butylene, sec-butylene, n-pentylene, 1-methylbutylene, 2-methylbutylene, 3-methylbutylene, isopentylene, 1-ethylpropylene, neopentylene, n-hexylene, 1-methylpentylene, 2-methylpentylene, 3-methylpentylene, isohexylene, 1,1-dimethylbutylene, 2,2-dimethylbutylene, 3,3-dimethylbutylene, 1,2-dimethylbutylene, 1,3-dimethylbutylene, 2,3-dimethylbutylene, 2-ethylbutylene, n-heptylene, 2-methylhexylene, 3-methylhexylene, 2,2-dimethylpentylene, 3,3-dimethylpentylene, 2,3-dimethylpentylene, 2,4-dimethylpentylene, 3-ethylpentylene,

or 2,2,3-trimethylbutylene;

optionally, "cycloalkyl" is C_3-C_{10} monocyclic or bicyclic cycloalkyl, optionally C_3-C_7 monocyclic cycloalkyl, and optionally cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, or cycloheptyl;

optionally, "heterocyclyl" is 3- to 10-membered non-aromatic heterocycle ring containing 1, 2, or 3 heteroatoms selected from N, O, and S; optionally 3- to 10-membered non-aromatic ring containing 1 or 2 heteroatoms selected from N and O; optionally 3- to 6-membered non-aromatic ring containing 1 or 2 heteroatoms selected from N and O; optionally 3- to 10-membered non-aromatic ring containing 1 or 2 heteroatoms selected from N and S; and optionally 3- to 6-membered non-aromatic ring containing 1 or 2 heteroatoms selected from N and S;

optionally, "aryl" is 6- to 10-membered aryl; optionally phenyl or naphthyl, and optionally phenyl, 1-naphthyl, or 2-naphthyl;

optionally, "arylene" is 6- to 10-membered arylene; and optionally phenylene or naphthylene;

optionally, "heteroaryl" is 5- to 10-membered heteroaryl ring containing 1-3 heteroatoms selected from N, O, and S; optionally 5- to 10-membered heteroaryl ring containing 1-2 heteroatoms selected from N, O, and S; optionally the heteroaryl ring is selected from pyridine ring, pyrrole ring, pyrazole ring, pyrimidine ring, pyrazine ring, pyridazine ring, thiophene ring, and furan ring; optionally selected from pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyridazin-3-yl, pyridazin-4-yl, pyrimidin-2-yl, pyrimidin-4-yl, pyrimidin-5-yl, pyrazin-2-yl, pyrazin-3-yl, indolyl, isoindolyl, indazolyl, indolizinyl, purinyl, quinolizinyl, quinolinyl, isoquinolinyl, cinnolinyl, phthalazinyl, naphthyridinyl, quinazolinyl, quinoxalinyl, thieno[2,3-b] furanyl, furo[3,2-b]-pyranyl, pyrido[2,3-d]oxazinyl, pyrazolo[4,3-d]oxazolyl, imidazo[4,5-d]thiazolyl, pyrazino[2,3-d]pyridazinyl, imidazo[2,1-b]thiazolyl, imidazo[1,2-b][l,2,4]triazinyl, benzothienyl, benzoxazolyl, benzimidazolyl, benzothiazolyl, benzoxepinyl, benzoxazinyl, benzofuranyl, benzotriazolyl, pyrrolo[2,3-b]pyridyl, pyrrolo[3,2-c]pyridinyl, pyrrolo[3,2-b]pyridyl, imidazo[4,5-b]pyridyl, imidazo[4,5-c]pyridyl, pyrazolo[4,3-

d]pyridyl, pyrazolo[4,3-c]pyridyl, pyrazolo[3,4-c]pyridinyl, pyrazolo[3,4-d]pyridyl, pyrazolo[3,4-b] pyridinyl, imidazo[1,2-a]pyridinyl, pyrazolo[1,5-a]pyridinyl, pyrrolo[1,2-b]pyridazinyl, imidazo[1,2-c]pyrimidinyl, pyrido[3,2-d]pyrimidinyl, pyrido[4,3-d]pyrimidinyl, pyrido[3,4-d]pyrimidinyl, pyrido[2,3-d]pyrimidinyl, pyrido[2,3-b]pyrazinyl, pyrido[3,4-b]pyrazinyl, pyrimido[5,4-d]pyrimidinyl, pyrazolo[2,3-b]pyrazinyl, or pyrimido[4,5-d]pyrimidinyl; and is optionally selected from pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrimidin-2-yl, pyrimidin-4-yl, or pyrimidin-5-yl;

optionally, "heteroarylene" is 5- to 10-membered heteroarylene ring containing 1-3 heteroatoms selected from N, O, and S; optionally 5- to 10-membered heteroaromatic ring containing 1-2 heteroatoms selected from N, O, and S; and optionally the heteroarylene ring is selected from pyridine ring, pyrrole ring, pyrazole ring, pyrimidine ring, pyrazine ring, pyridazine ring, thiophene ring, furan ring

3. The compound or a salt thereof according to claim 1 or 2, wherein

Optionally, n_1, n_2, and n_3 are each independently 0, 1, or 2; optionally, n_1 is 0 or 1; optionally, n_2 is 1; optionally, n_3 is 1.

Optionally, R_1 and R_2 are each independently selected from -H, fluorine, chlorine, bromine, hydroxyl, cyano, C_1-C_7 alkyl (such as methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, sec-butyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, isopentyl, 1-ethylpropyl, neopentyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, isohexyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3,3-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,3-dimethylbutyl, 2-ethylbutyl, n-heptyl, 2-methylhexyl, 3-methylhexyl, 2,2-dimethylpentyl, 3,3-dimethylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 3-ethylpentyl, or 2,2,3-trimethylbutyl), C_1-C_3 deuteroalkyl (such as -CD_3, -C_2D_5, or -C_3D_7), C_1-C_3 deuteroalkoxyl (such as -OCD_3, -OC_2D_5, or -OC_3D_7), haloalkyl, haloalkoxyl, cyclopropanyl, cyclobutanyl, cyclopentanyl; optionally, R_1 is -H or -CH_3; and optionally, R_1 is-H，R_2 is-H;

Optionally, X_1 and X_2 are each independently selected from C_1-C_7 alkylene (optionally, -CH_2-, ethylene, n-propylene, isopropylene, n-butylene, or isobutylene), -O-, -S-, or -

NR'-; optionally, X_1 is $-CH_2-$, or -O-; optionally, X_1 is -O-; optionally, X_2 is -O-;

optionally, R' is selected from -H, C_1-C_7 alkyl (optionally, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, sec-butyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, isopentyl, 1-ethylpropyl, neopentyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, isohexyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3,3-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,3-dimethylbutyl, 2-ethylbutyl, n-heptyl, 2-methylhexyl, 3-methylhexyl, 2,2-dimethylpentyl, 3,3-dimethylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 3-ethylpentyl, or 2,2,3-trimethylbutyl), deuterated alkyl (optionally, $-CD_3$, $-C_2D_5$, or $-C_3D_7$), or C_3-C_6 cycloalkyl (optionally, cyclopropanyl, cyclobutanyl, cyclopentanyl, or cyclohexanyl);

Optionally, Ar is phenylene or pyridyl, wherein hydrogen atoms in the phenylene or pyridyl are optionally substituted with 0，1, 2, or 3 substituents, the substituents are each independently selected from F, Cl, Br, I, -CN, -Me, $-C_2H_5$, cyclopropyl, $-CD_3$, -OMe, $-OCD_3$, $-CF_3$, or $-OCF_3$; optionally, Ar is phenylene, wherein the hydrogen atom in the phenylene is optionally substituted by 2 substituents, and the substituent is F;

Optionally, Y is -H, -F, -Cl, -Br, methyl, ethyl, n-propyl, isopropyl, $-CD_3$, $-CF_3$, $-CH_2CF_3$, $-OCF_3$, $-OCHF_2$, $-OCH_2F$, cyclopropyl, cyclobutyl, cyclopentyl, $-OCH_3$, $-OCD_3$, $-OC_2H_5$, $-OC_3H_7$, or -OAr';

Optionally, Y is H, halogen, or -OAr'; and optionally, Y is H, -F, or -OAr';

Ar' is selected from phenyl, pyridyl, pyrimidyl, pyrrolyl, pyrazolyl, thienyl or quinolinyl, and the phenyl, pyridyl, pyrimidyl, pyrrolyl, pyrazolyl, thienyl or quinoline

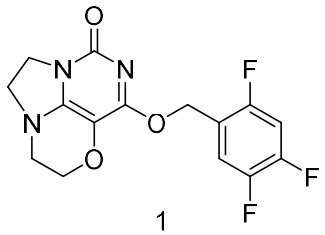
Optionally, Ar' is selected from phenyl, pyridyl, pyrimidyl, pyrrolyl, pyrazolyl, thienyl or quinolinyl, wherein hydrogen atoms in the phenyl, pyridyl, pyrimidyl, pyrrolyl, pyrazolyl, thienyl or quinolinyl ring are each independently optionally substituted with 1, 2, or 3 substituents, the substituents are each independently selected from F, Cl, Br, -CN, C_1-C_7 alkyl (optionally, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, sec-butyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, isopentyl, 1-ethylpropyl, neopentyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl,

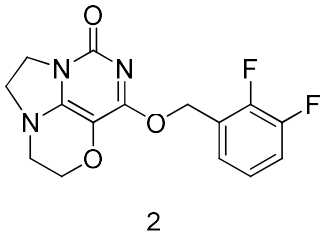
isohexyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3,3-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,3-dimethylbutyl, 2-ethylbutyl, n-heptyl, 2-methylhexyl, 3-methylhexyl, 2,2-dimethylpentyl, 3,3-dimethylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 3-ethylpentyl, or 2,2,3-trimethylbutyl), $-CD_3$, C_1-C_6 haloalkyl, $-OCH_3$, $-OCD_3$, $-OC_2H_7$, $-OC_3H_7$, C_1-C_6 haloalkoxyl, or C_3-C_6 cycloalkyl (optionally, cyclopropanyl, cyclobutanyl, cyclopentanyl, or cyclohexanyl);

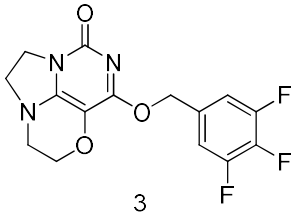
Optionally, Ar' is selected from phenyl, pyridin-3-yl, pyridin-4-yl, or pyrimidin-5-yl, and is optionally substituted with 1 or 2 substituents, the substituents are selected from F, Cl, $-CH_3$, $-CF_3$, or-OCF_3;

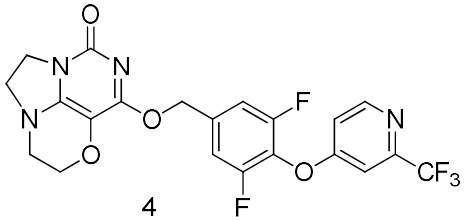
Optionally, Z is O.

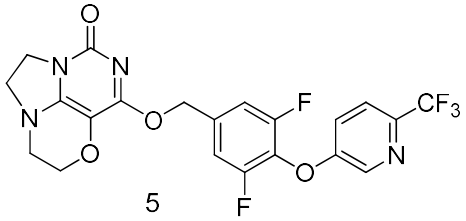
4. The compound of Formula (I) or a pharmaceutically acceptable salt thereof according to any one of claims 1-3, wherein the compound of Formula (I) is selected from the following compounds:

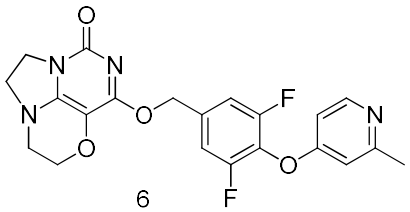

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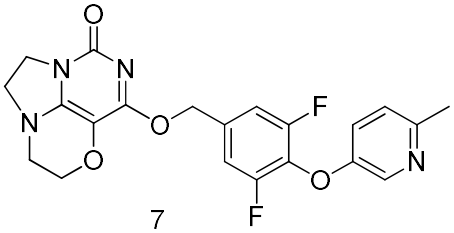

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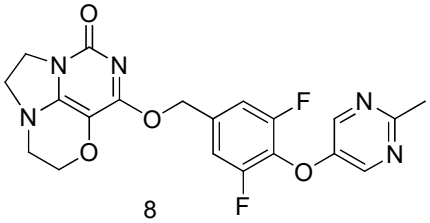

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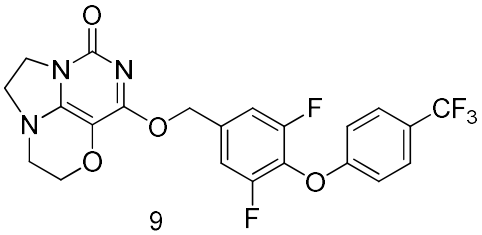
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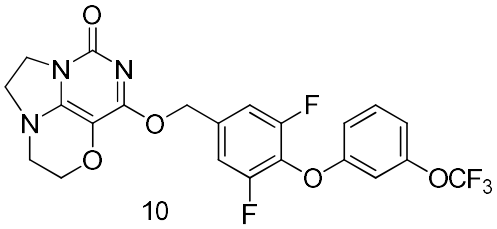
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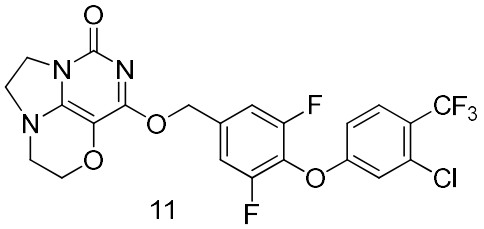
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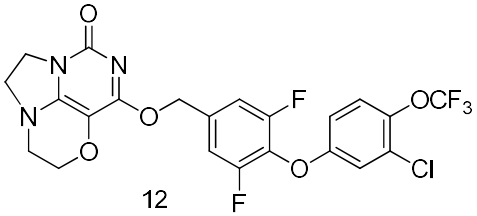
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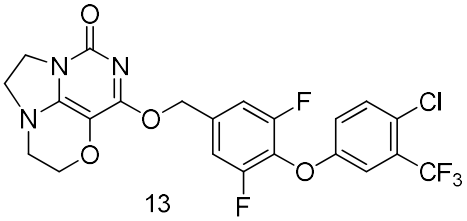
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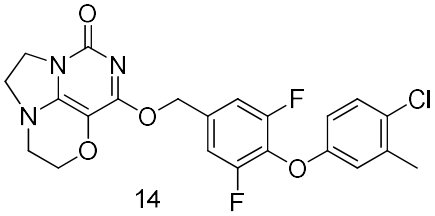
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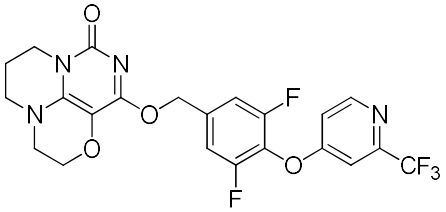
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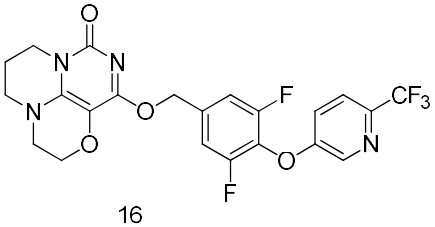
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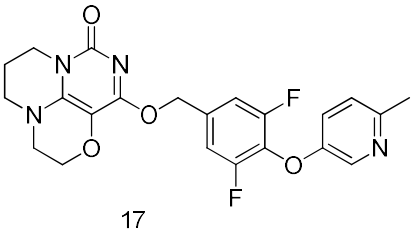
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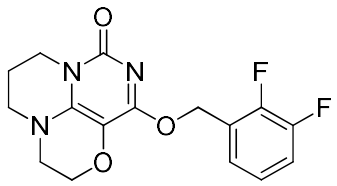
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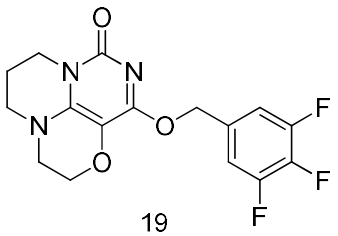
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5. The compound of Formula (I) or a pharmaceutically acceptable salt thereof according to any one of claims 1-4, wherein the pharmaceutically acceptable salt includes an anionic salt or cationic salt of the compound of Formula (I);

optionally, the pharmaceutically acceptable salt includes alkali metal salt, alkaline earth metal salt, or ammonium salt of the compound of Formula (I); optionally, the alkali metal includes sodium, potassium, lithium, or cesium, and the alkaline earth metal includes magnesium, calcium, or strontium;

optionally, the pharmaceutically acceptable salt includes salt formed by the compound of Formula (I) and an organic base;

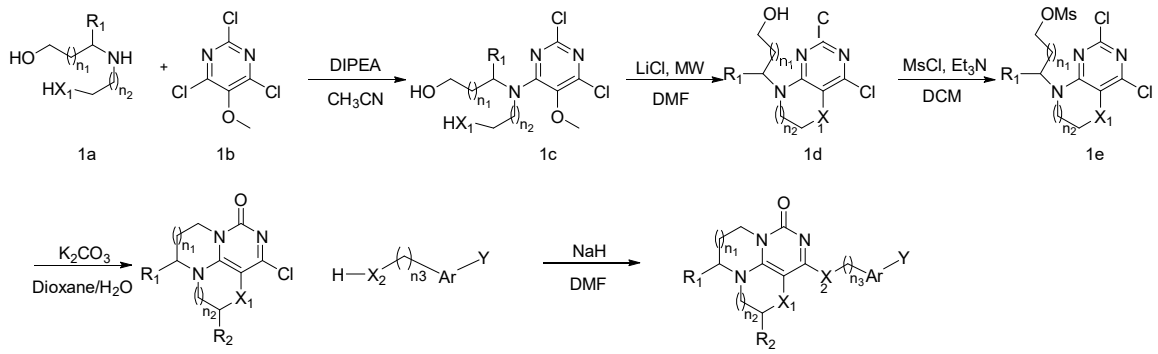
optionally, the organic base includes trialkylamine, pyridine, quinoline, piperidine, imidazole, picoline, dimethylaminopyridine, dimethylaniline, N-alkylmorpholine, 1,5-diazabicyclo[4.3.0]nonene-5, 1,8-diazabicyclo[5.4.0]undecene-7, 1,4-diazabicyclo[2.2.2] octane; optionally, the trialkylamine includes trimethylamine, triethylamine, or N-ethyldiisopropylamine; and optionally, the N-alkyl morpholine includes N-methylmorpholine;

optionally, the pharmaceutically acceptable salt includes salt formed by the compound of Formula (I) and an acid;

optionally, the acid includes inorganic acid, or organic acid; optionally, the inorganic acid includes hydrochloric acid, hydrobromic acid, hydroiodic acid, sulfuric acid, nitric acid, phosphoric acid, or carbonic acid; optionally, the organic acid includes formic acid, acetic acid, propionic acid, oxalic acid, malonic acid, succinic acid, fumaric acid, maleic acid, lactic acid, malic acid, citric acid, citric acid, tartaric acid, carbonic acid, picric acid, methanesulfonic acid, ethanesulfonic acid, p-toluenesulfonic acid, glutamic acid, or pamoic acid.

6. A preparation method of the compound of Formula (I) or its tautomer, mesomer, racemate,

enantiomer, diastereoisomer, its mixture form or its pharmaceutically acceptable salt according to any one of claims 1-5, comprises the following synthetic route:



7. A pharmaceutical composition comprises the compound of formula (I) according to any one of claims 1-5 or its tautomer, mesoform, racemate, enantiomer, diastereomer or mixtures thereof, or pharmaceutically acceptable salts thereof, and optionally a pharmaceutically acceptable carrier, wherein the composition is in the form of an oral, parenteral, solid or liquid formulation.

8. The pharmaceutical composition according to claim 7, comprises the compound of formula (I) or its tautomer, mesomer, racemate, enantiomer, diastereomer , or a mixture thereof, or one or more of a pharmaceutically acceptable salt thereof and optionally a pharmaceutically acceptable carrier;

optionally, the oral formulation includes solid or liquid formulation;

optionally, the solid formulation includes tablet, powder, granule, or capsule;

optionally, the liquid formulation includes aqueous or oily suspension, or syrup;

optionally, the parenteral formulation includes solution for injection, or aqueous or oily suspension.

9. Use of the compound of Formula (I) or a pharmaceutically acceptable salt thereof according to any one of claims 1-5, or the pharmaceutical composition according to claim 7 or 8, in the preparation of an Lp-PLA2 inhibitor.

10. Use of the compound of Formula (I) or a pharmaceutically acceptable salt thereof according to any one of claims 1-5, or the pharmaceutical composition according to claim 7 or 8, in the preparation of a medicament for treatment of neurodegeneration-related diseases;

optionally, the neurodegeneration-related diseases include Alzheimer's disease (AD),

glaucoma, and age-related macular degeneration (AMD).

11. Use of the compound of Formula (I) or a pharmaceutically acceptable salt thereof according to any one of claims 1-5, or the pharmaceutical composition according to claim 7 or 8, in the preparation of a medicament for the treatment of cardiovascular diseases, diabetic macular edema (DME), or prostate diseases;

optionally, the cardiovascular diseases include atherosclerosis.