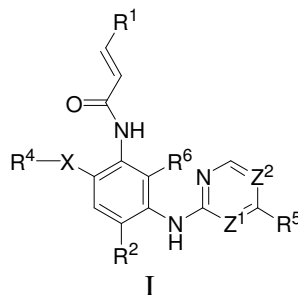


Claims

1. A compound shown in Formula I or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof



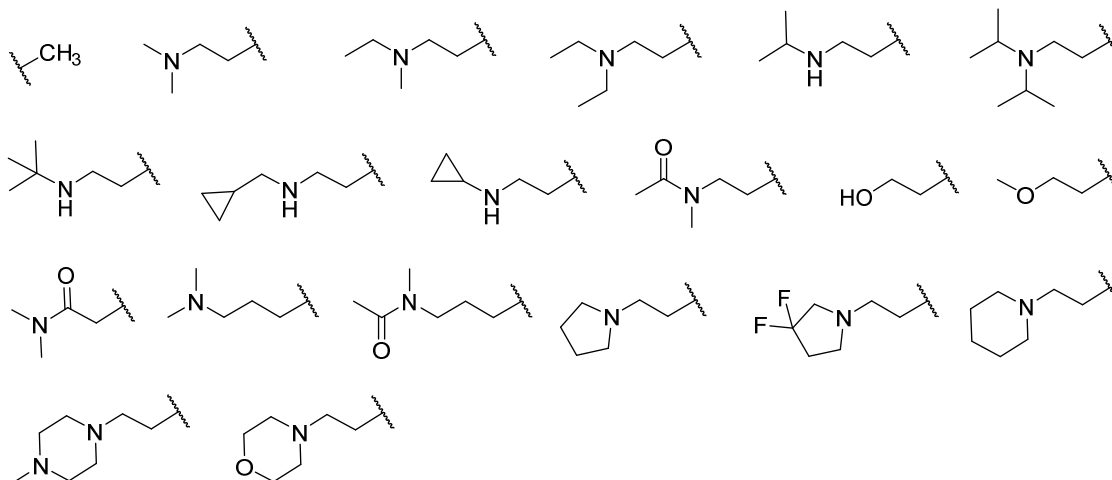
wherein, in Formula I,

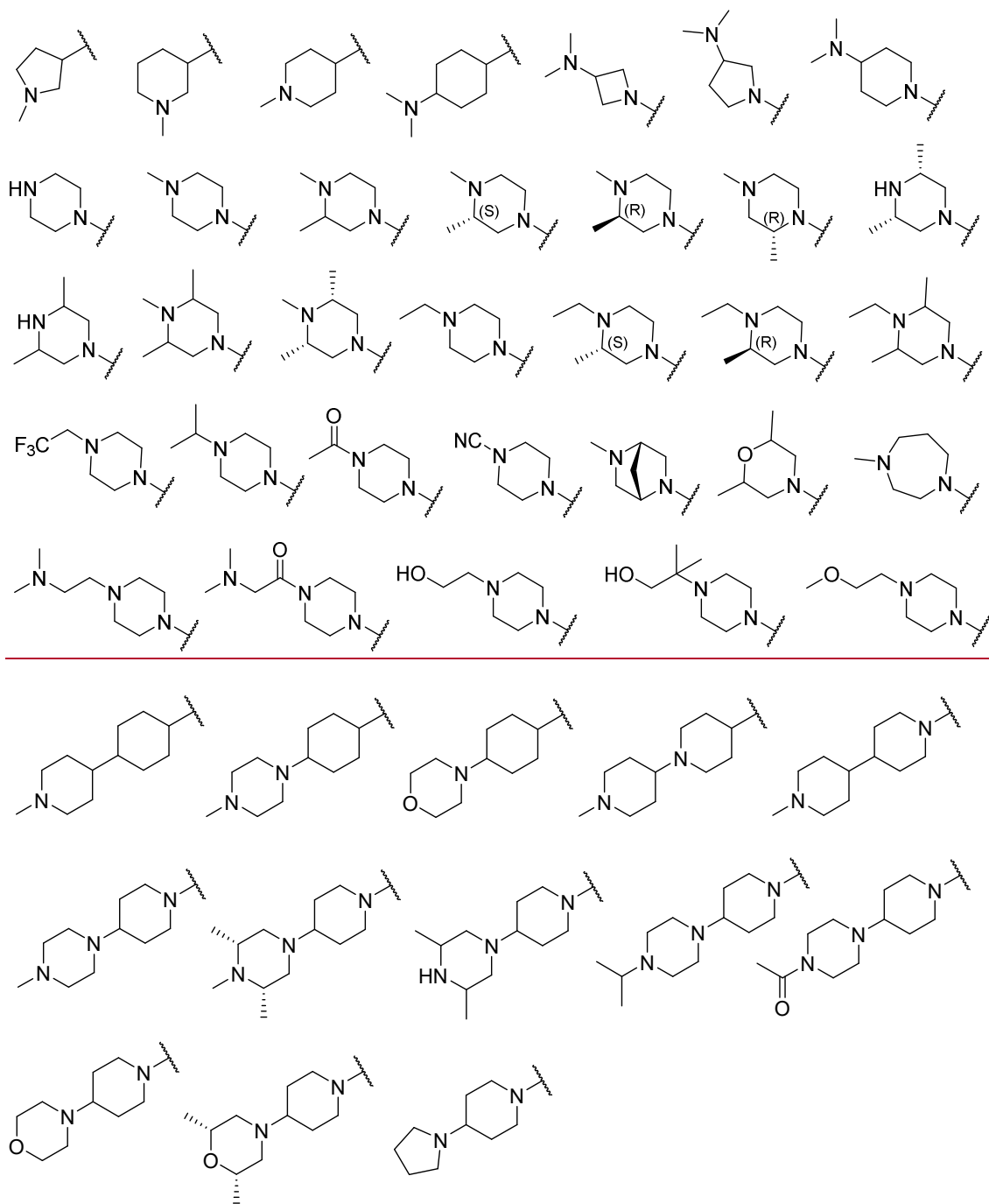
R^1 is hydrogen or ;

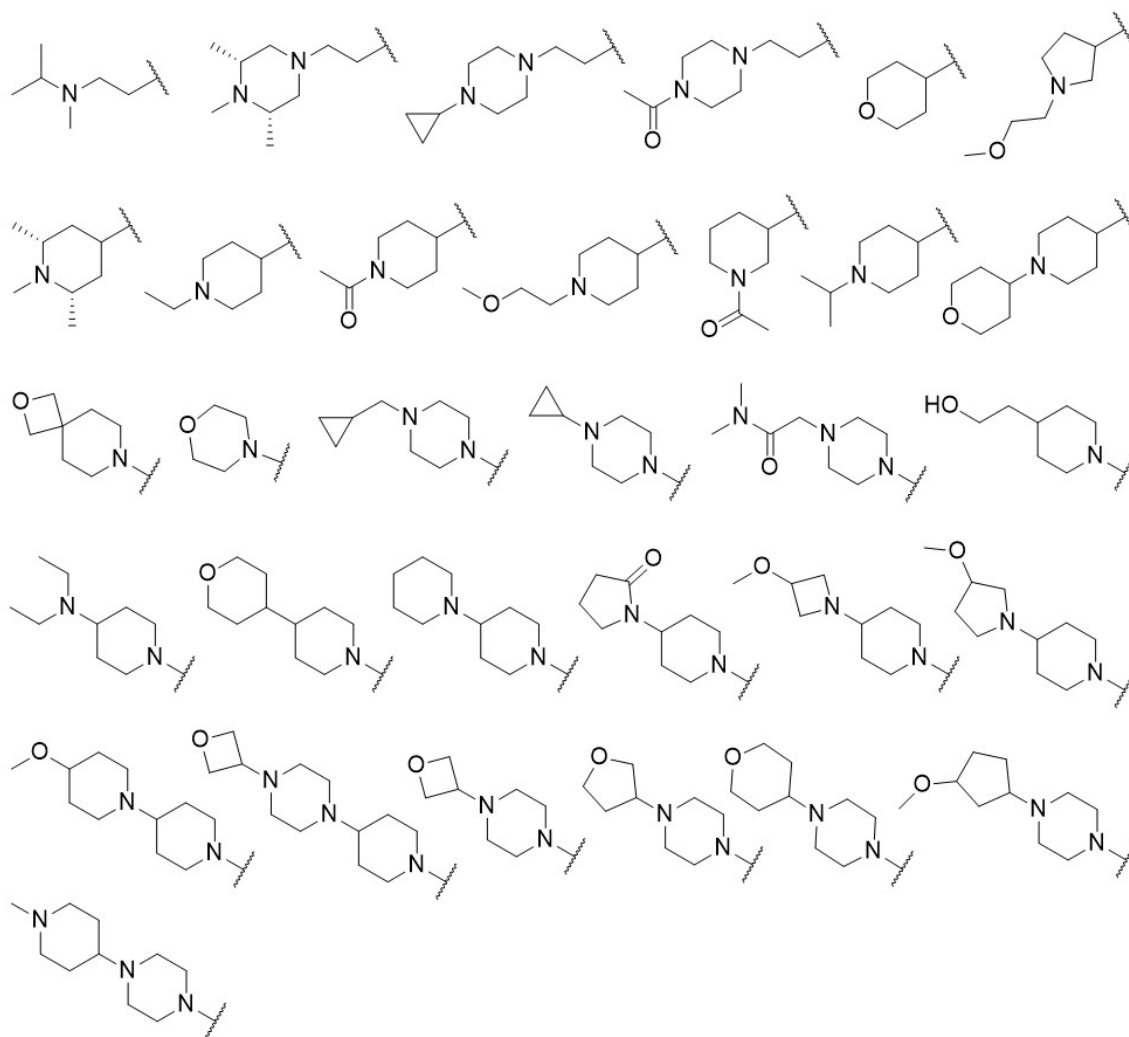
R^2 is C_{1-6} alkyl or OR^8 , R^8 is hydrogen, C_{1-8} alkyl, halogenated C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{3-8} cycloalkyl, C_{3-7} cycloalkyl- C_{1-6} alkyl, substituted or unsubstituted 4-7 membered heterocyclyl containing 1-2 heteroatoms selected from N, O and S, or substituted or unsubstituted 4-7 membered heterocyclyl- C_{1-8} alkyl containing 1-2 heteroatoms selected from N, O and S;

X is a chemical bond, O, S, CO, NR^3 or CR^3 , wherein R^3 is hydrogen, C_{1-6} alkyl, halogenated C_{1-6} alkyl, C_{3-8} cycloalkyl, halogenated C_{3-8} cycloalkyl, C_{1-6} alkoxy- C_{1-6} alkyl, C_{1-8} alkyl-CO or 4-6 membered heterocyclyl;

R^4 is R^4 is selected from the group consisting of:

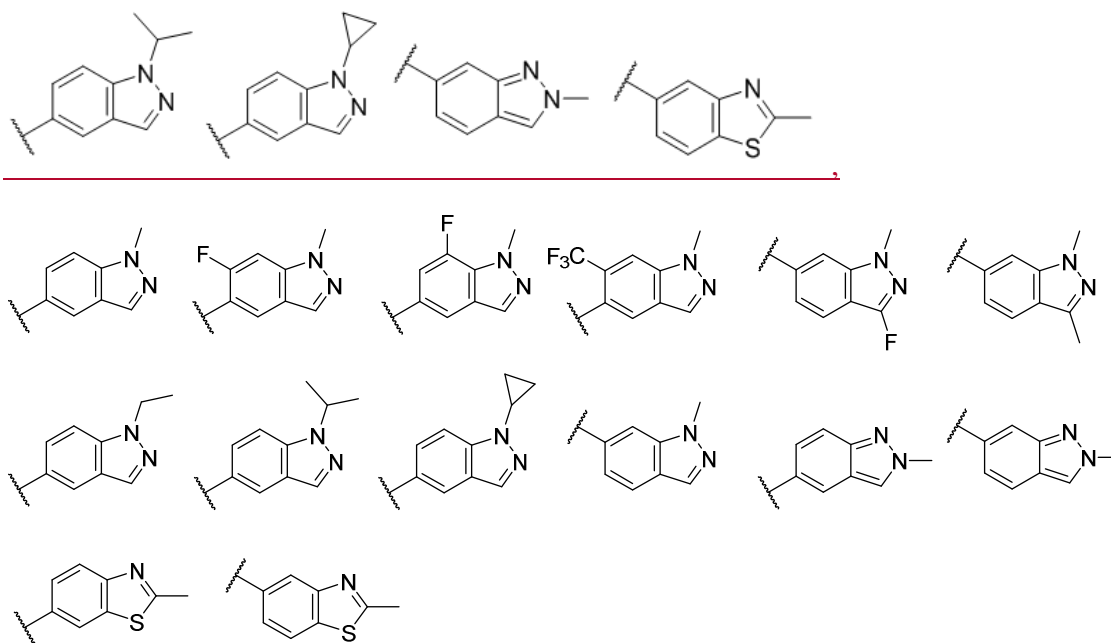






~~C₁₋₆ alkyl, C₃₋₆ cycloalkyl, 4-7 membered heterocyclyl or 4-7 membered bicyclo-bridged heterocyclyl, which can be optionally substituted by 1-3 substituents independently selected from the group consisting of: C₁₋₆ alkyl, halogenated C₁₋₆ alkyl, C₁₋₆ alkoxy, halogenated C₁₋₆ alkoxy, C₃₋₆ cycloalkyl, halogenated C₃₋₆ cycloalkyl, C₃₋₆ cycloalkoxy, halogenated C₃₋₆ cycloalkoxy, C₁₋₆ alkoxy C₁₋₆ alkyl, hydroxyl C₁₋₆ alkyl, amino C₁₋₆ alkyl, C₁₋₆ alkyl amino C₁₋₆ alkyl, halogen, hydroxyl, cyano, cyano C₁₋₈ alkyl, amino, C₁₋₆ alkyl amino, di(C₁₋₆ alkyl) amino, C₃₋₆ cycloalkyl amino, C₁₋₆ alkyl carbonyl, C₁₋₆ alkyl amino acyl, di(C₁₋₆ alkyl) amino acyl, C₃₋₆ cycloalkyl amino acyl, C₁₋₆ acyl amino, substituted or unsubstituted heterocyclyl, and substituted or unsubstituted heterocyclyl alkyl, wherein the substituent can optionally form a ring together with the carbon atom to which they are linked;~~

R⁵ is a fused ring formed by two rings selected from:



R^6 is hydrogen, halogen, hydroxyl, cyano, C_{1-3} alkyl, halogenated C_{1-3} alkyl, C_{3-6} cycloalkyl, halogenated C_{3-6} cycloalkyl, C_{1-3} alkoxy, halogenated C_{1-3} alkoxy, C_{3-6} cycloalkoxy, or halogenated C_{3-6} cycloalkoxy;

Z^1 is $C-R^7$, Z^2 is N, or Z^1 is N, Z^2 is $C-R^7$, wherein R^7 is hydrogen, halogen, cyano, C_{1-3} alkyl, halogenated C_{1-3} alkyl, C_{3-6} cycloalkyl, or halogenated C_{3-6} cycloalkyl.

2. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to claim 1, wherein, in Formula I, R^2 is OR^8 , wherein R^8 is C_{1-5} alkyl, halogenated C_{1-5} alkyl, C_{3-7} cycloalkyl, halogenated C_{3-7} cycloalkyl or C_{3-7} cycloalkyl-methyl.

3. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to claim 1 or 2, wherein, in Formula I, R^2 is OR^8 , R^8 is methyl, ethyl, n-propyl, isopropyl, cyclopropyl, difluoromethyl, trifluoromethyl, cyclobutyl, and cyclopropylmethyl.

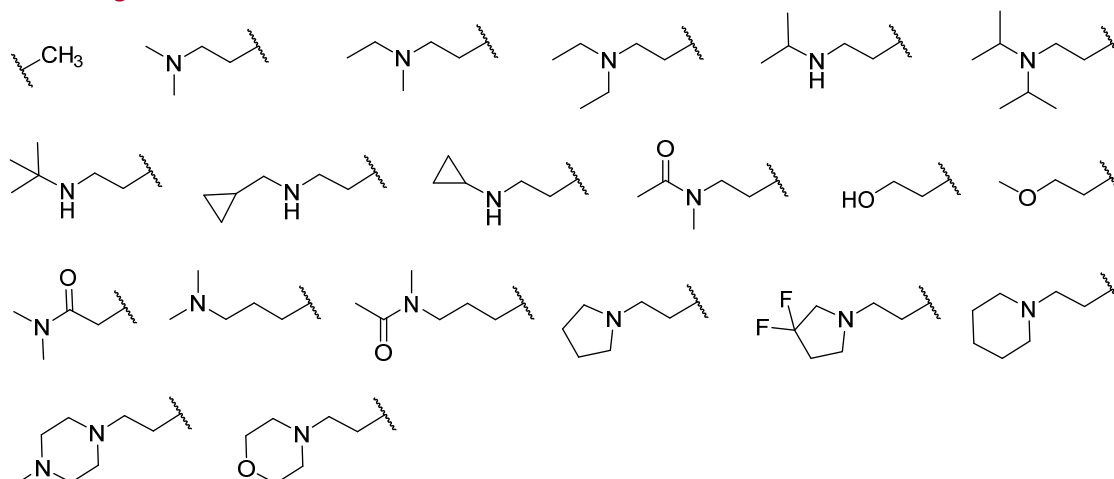
4. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to 3, wherein, in Formula I, X is a chemical bond or NR^3 , wherein R^3 is hydrogen, methyl, ethyl, and methoxyethyl.

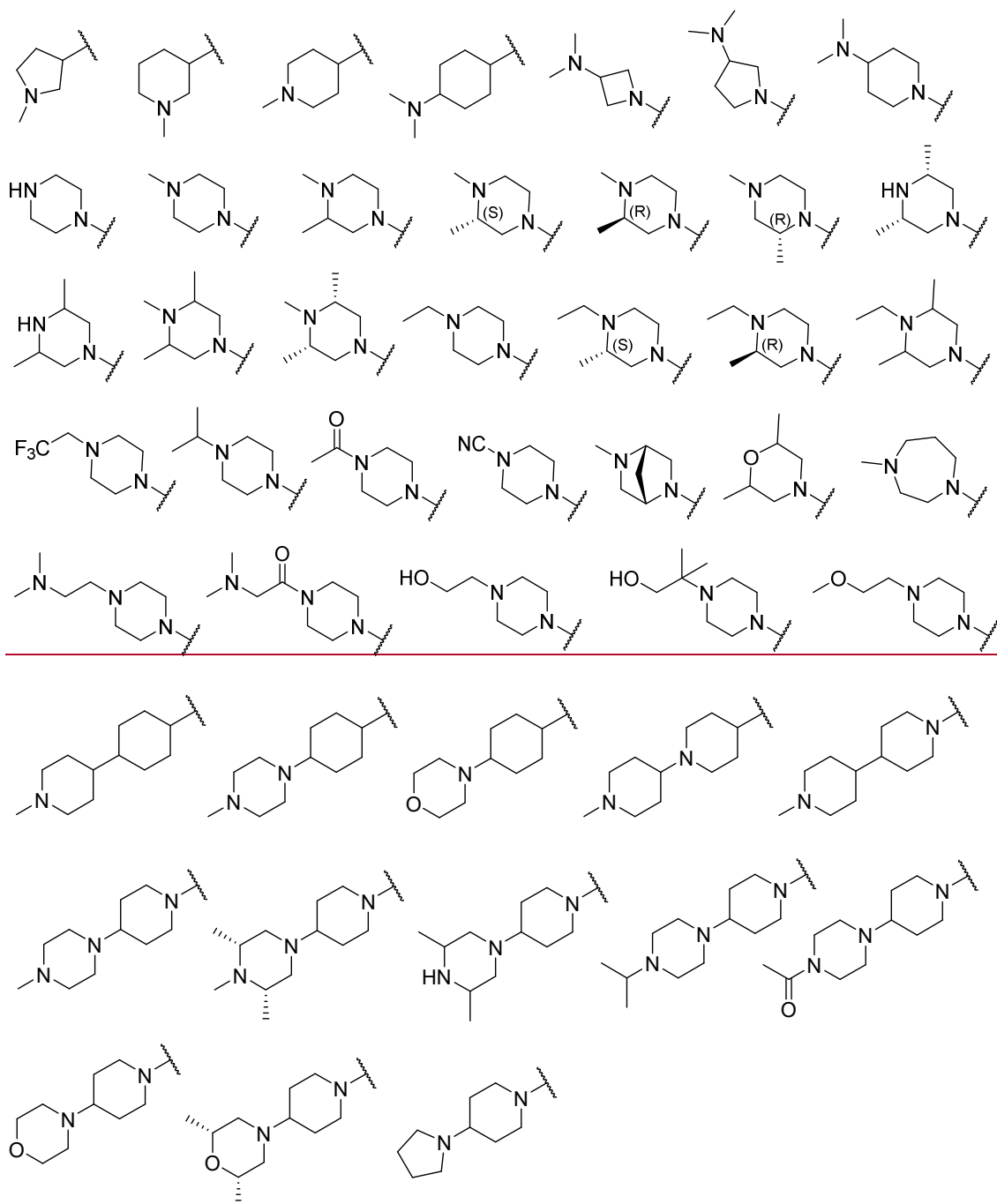
~~5. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof~~

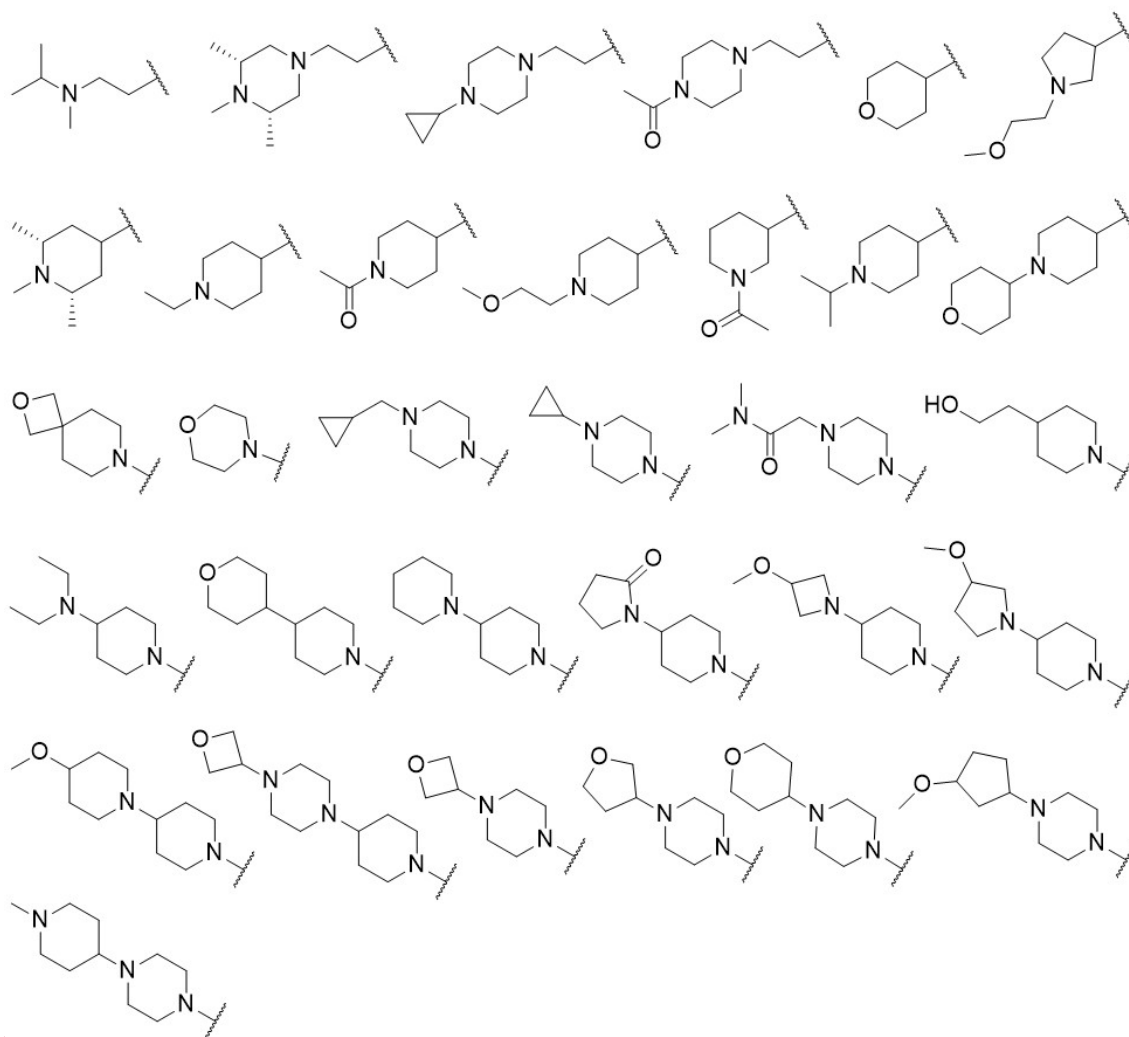
according to any one of claims 1 to 4, wherein, in Formula I, R⁴ is C₁₋₃ alkyl, C₃₋₆ cycloalkyl, 4-7 membered heterocyclyl or 4-7 membered bicyclo bridged heterocyclyl containing 1-2 heteroatoms selected from the group consisting of: N, O and S, which can be optionally substituted by 1-3 substituents independently selected from the group consisting of: C₁₋₆ alkyl, halogenated C₁₋₆ alkyl, C₁₋₆ alkoxy, halogenated C₁₋₆ alkoxy, C₃₋₆ cycloalkyl, halogenated C₃₋₆ cycloalkyl, C₃₋₆ cycloalkoxy, halogenated C₃₋₆ cycloalkoxy, C₁₋₆ alkoxy C₁₋₆ alkyl, hydroxyl C₁₋₆ alkyl, amino C₁₋₆ alkyl, C₁₋₆ alkyl amino C₁₋₆ alkyl, halogen, hydroxyl, cyano, cyano C₁₋₈ alkyl, amino, C₁₋₆ alkyl amino, di(C₁₋₆ alkyl) amino, C₃₋₆ cycloalkyl amino, C₁₋₆ alkylcarbonyl, C₁₋₆ alkyl amino acyl, di(C₁₋₆ alkyl) amino acyl, C₃₋₆ cycloalkyl amino acyl, C₁₋₆ acyl amino, and substituted or unsubstituted 4-7 membered heterocyclyl.

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6. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to 5, wherein, in Formula I, R⁴ is selected from the group consisting of:





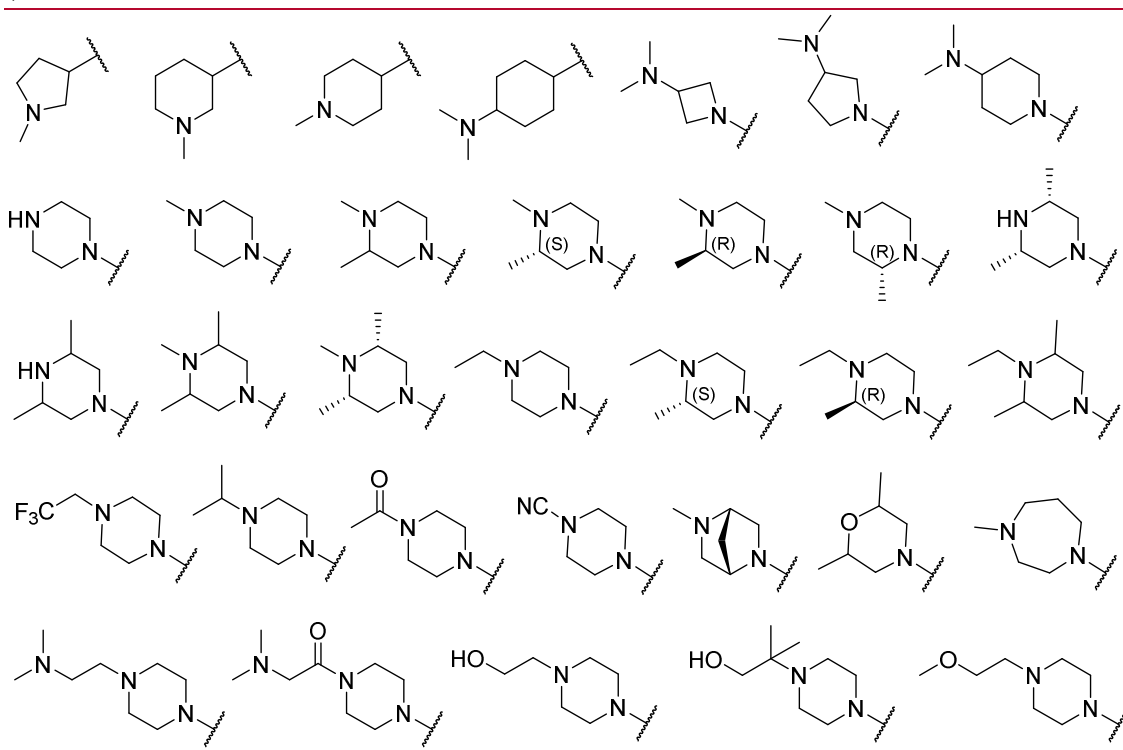


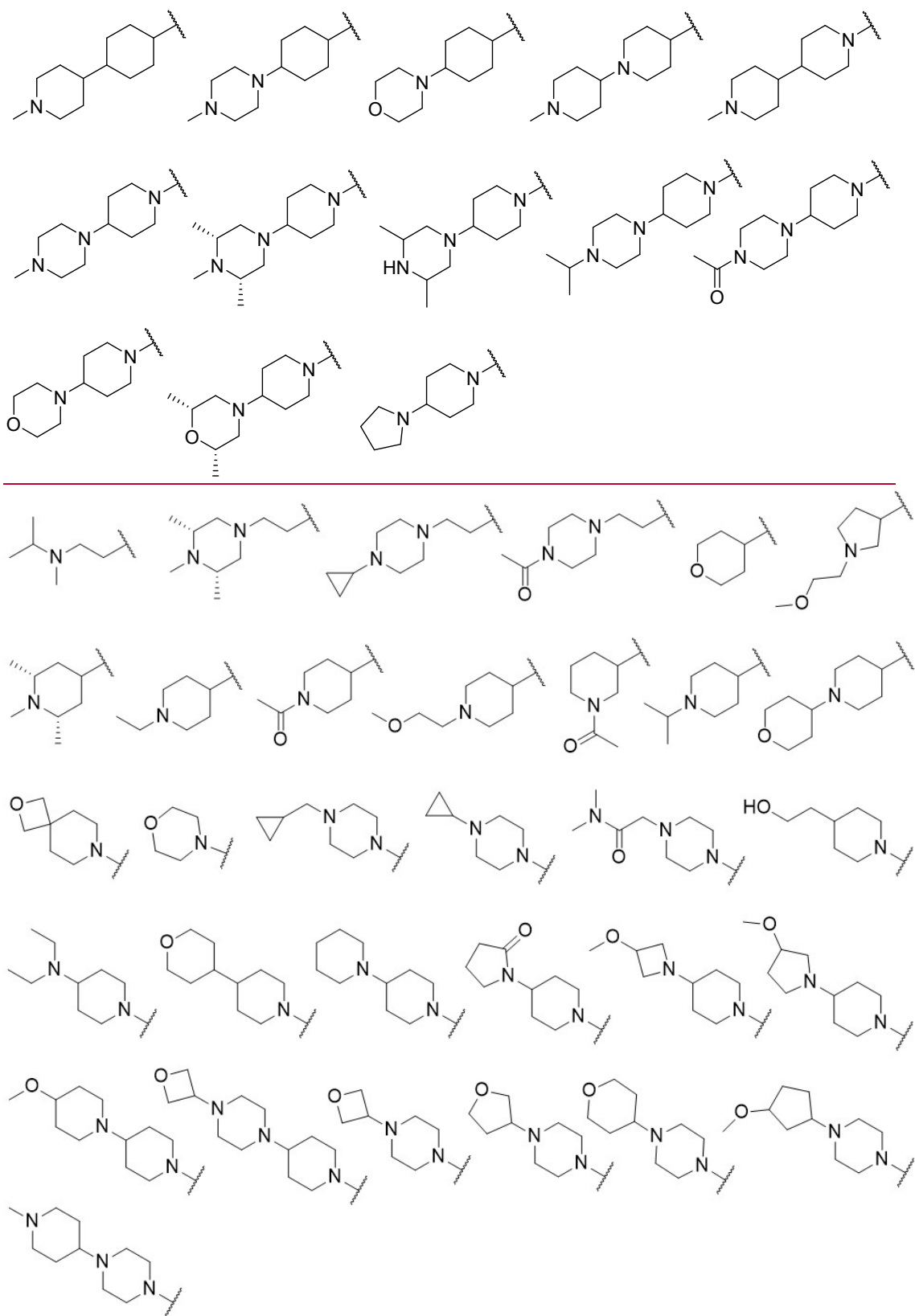
75. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to **64**, wherein, in Formula I, R^6 is hydrogen, halogen, hydroxyl, cyano, C_{1-3} alkyl, halogenated C_{1-3} alkyl, C_{1-3} alkoxy, or halogenated C_{1-3} alkoxy.

86. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to **75**, wherein, in Formula I, Z^1 is $C-R^7$, Z^2 is N, or Z^1 is N, Z^2 is $C-R^7$, wherein R^7 is hydrogen.

97. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to **86**, wherein, in Formula I, R^1 is hydrogen;

X is a chemical bond or NR³, wherein R³ is hydrogen, methyl, ethyl, or methoxyethyl;

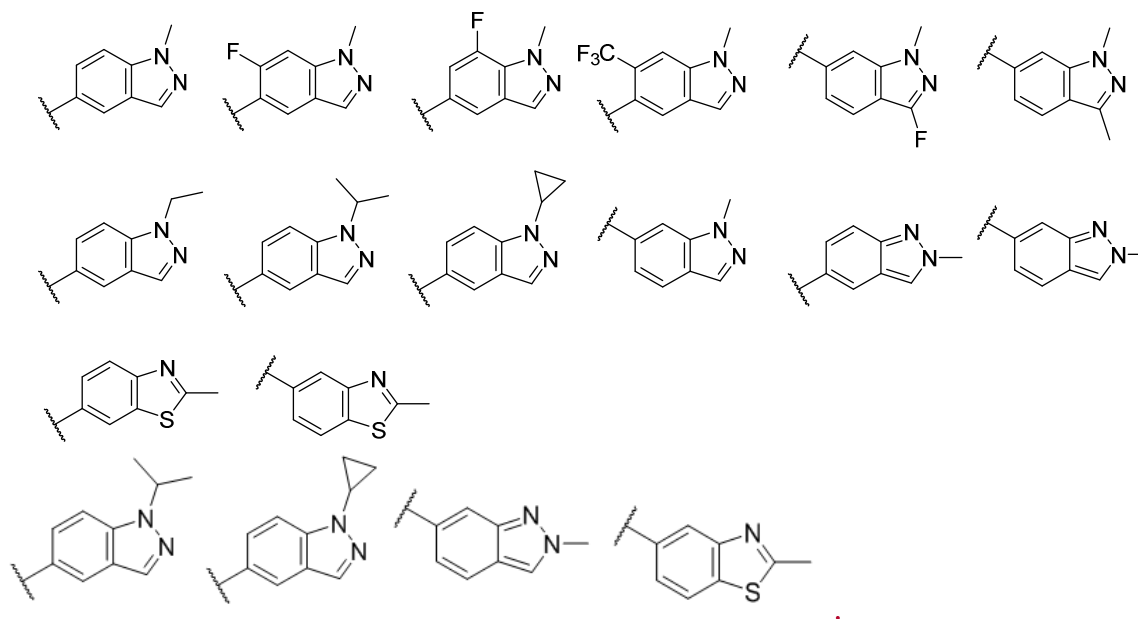




~~C₁₋₃ alkyl, C₃₋₆ cycloalkyl, 4-7 membered heterocyclyl or 4-7 membered bicyclo-bridged~~

heterocyclyl containing 1-2 heteroatoms selected from the group consisting of: N, O and S, which can be optionally substituted by 1-3 substituents independently selected from the group consisting of: C₁₋₆ alkyl, halogenated C₁₋₆ alkyl, C₁₋₆ alkoxy, halogenated C₁₋₆ alkoxy, C₃₋₆ cycloalkyl, halogenated C₃₋₆ cycloalkyl, C₃₋₆ cycloalkoxy, halogenated C₃₋₆ cycloalkoxy, C₁₋₆ alkoxy C₁₋₆ alkyl, hydroxyl C₁₋₆ alkyl, amino C₁₋₆ alkyl, C₁₋₆ alkyl amino C₁₋₆ alkyl, halogen, hydroxyl, cyano, cyano C₁₋₈ alkyl, amino, C₁₋₆ alkyl amino, di(C₁₋₆ alkyl) amino, C₃₋₆ cycloalkyl amino, C₁₋₆ alkyl carbonyl, C₁₋₆ alkyl amino acyl, di(C₁₋₆ alkyl) amino acyl, C₃₋₆ cycloalkyl amino acyl, C₁₋₆ acyl amino, and substituted or unsubstituted 4-7 membered heterocyclyl;

R⁵ is a fused ring formed by two rings and selected from:



÷

R⁶ is hydrogen, halogen, hydroxyl, cyano, C₁₋₃ alkyl, halogenated C₁₋₃ alkyl, C₁₋₃ alkoxy, and halogenated C₁₋₃ alkoxy;

Z¹ is C-R⁷, Z² is N, or Z¹ is N, Z² is C-R⁷, wherein R⁷ is hydrogen.

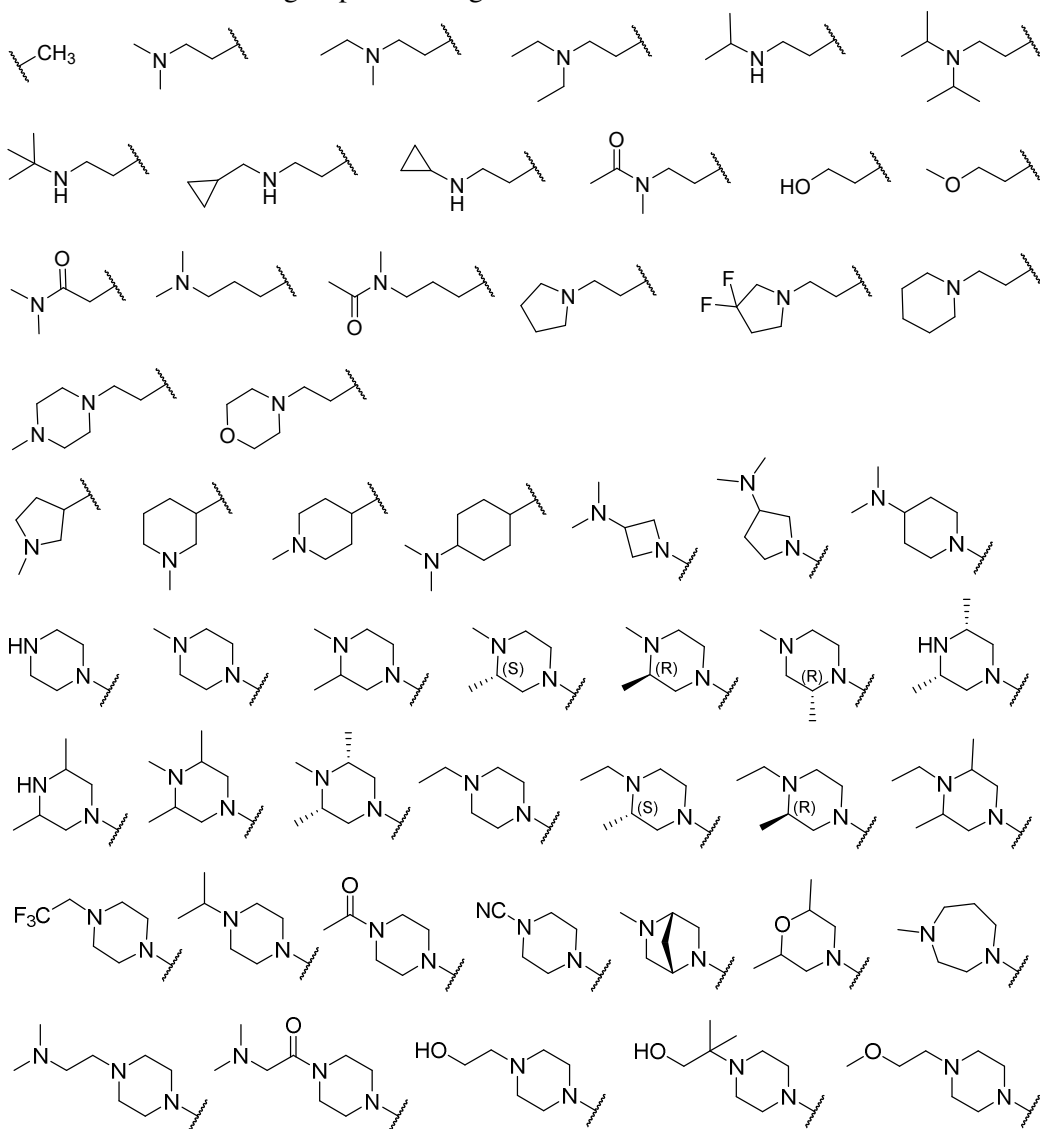
~~108~~. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to ~~97~~, in Formula I,

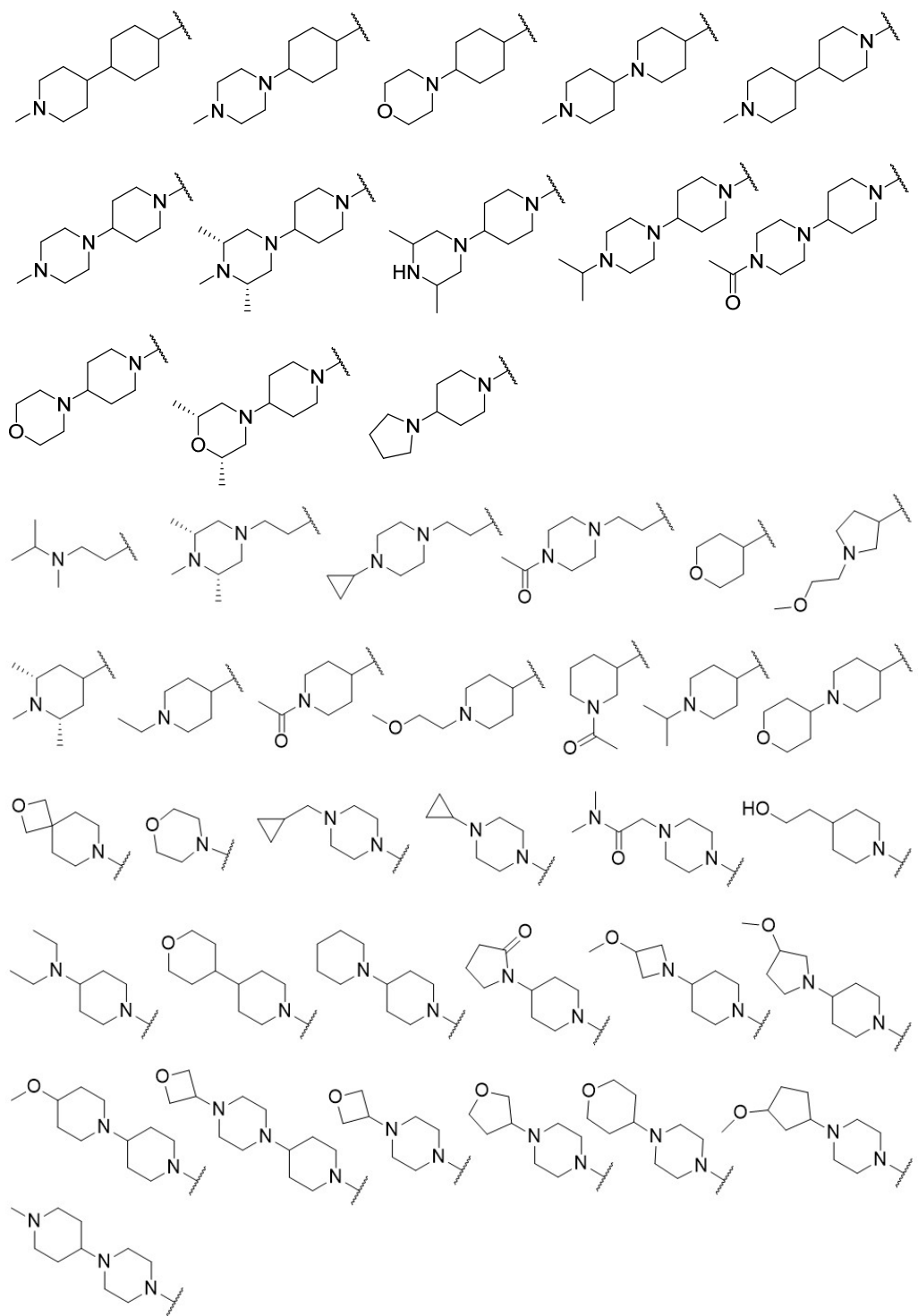
R¹ is hydrogen;

R² is OR⁸, R⁸ is methyl, ethyl, n-propyl, isopropyl, cyclopropyl, difluoromethyl, trifluoromethyl, cyclobutyl, and cyclopropylmethyl;

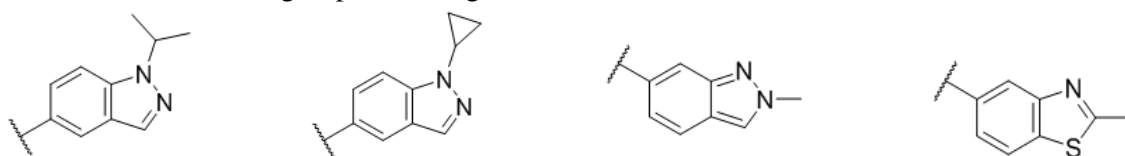
X is a chemical bond or NR³, wherein R³ is hydrogen, methyl, ethyl, and methoxyethyl;

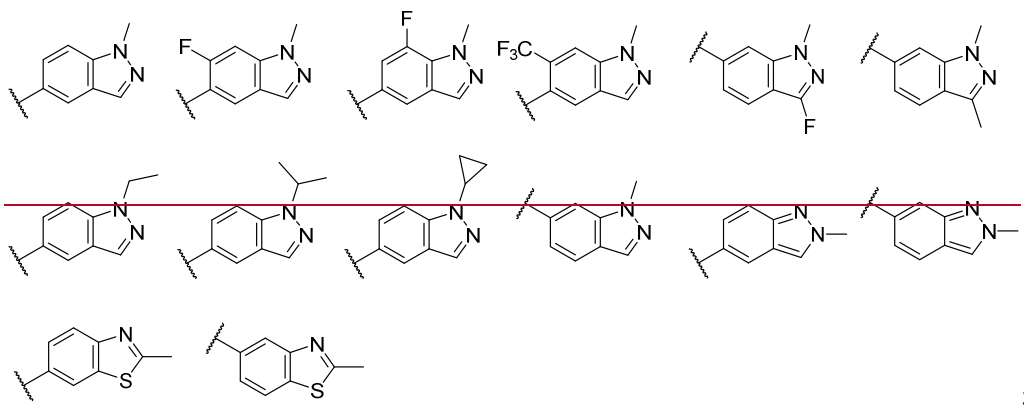
R⁴ is selected from the group consisting of:





R⁵ is selected from the group consisting of:





R^6 is hydrogen and halogen;

Z^1 is $C-R^7$, Z^2 is N, or Z^1 is N, Z^2 is $C-R^7$, wherein R^7 is hydrogen.

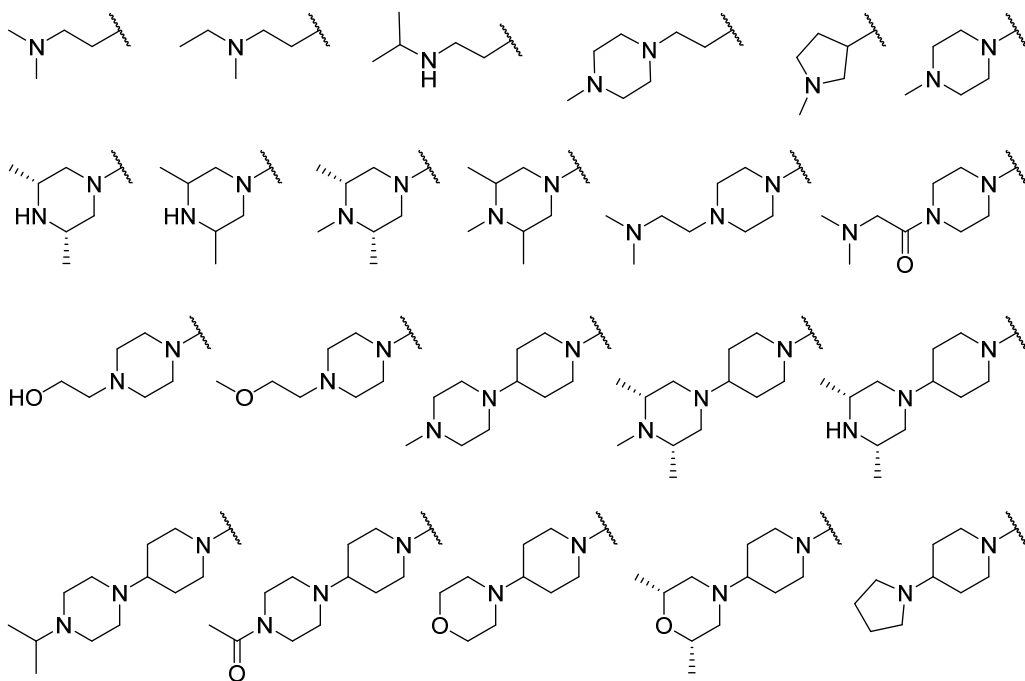
~~419~~. The compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to ~~408~~, in Formula I,

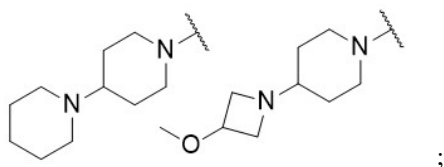
R^1 is hydrogen;

R^2 is OR^8 , R^8 is methyl, ethyl, and difluoromethyl;

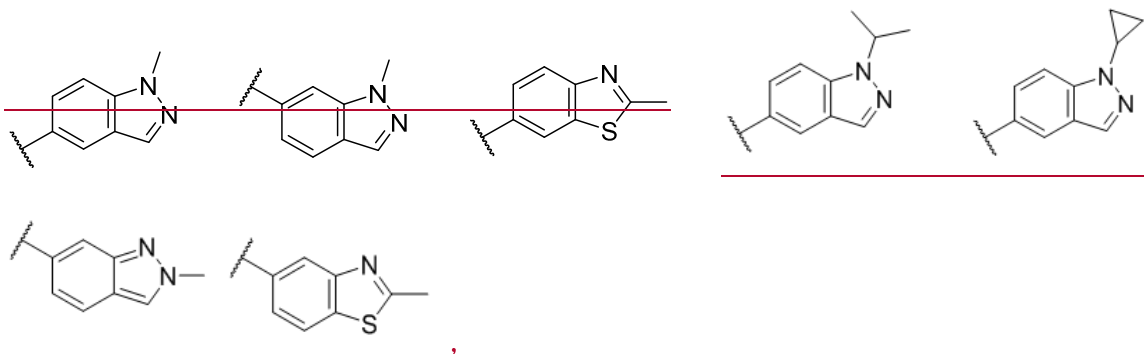
X is a chemical bond or NR^3 , wherein R^3 is hydrogen, C_{1-6} alkyl (for example methyl and ethyl);

R^4 is selected from the group consisting of:





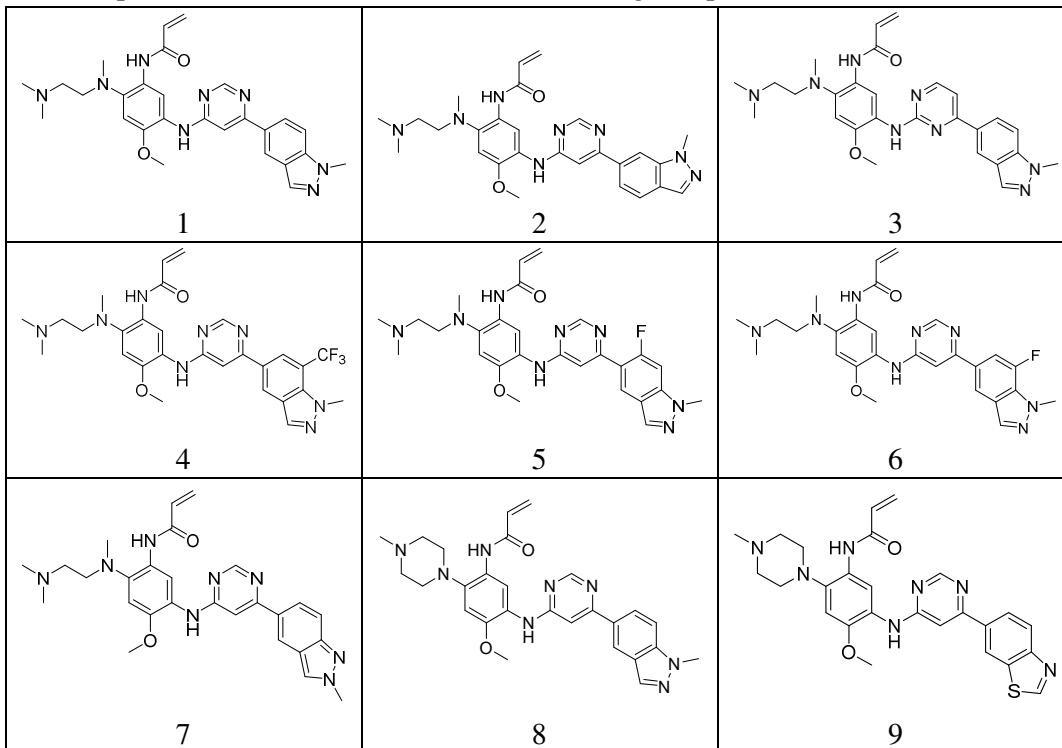
R^5 is selected from the group consisting of:

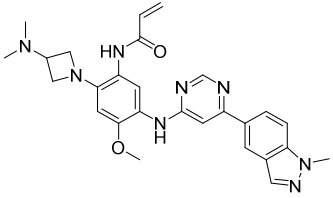
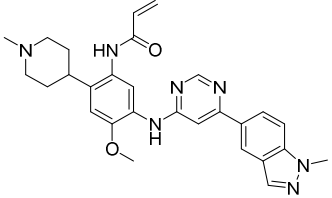
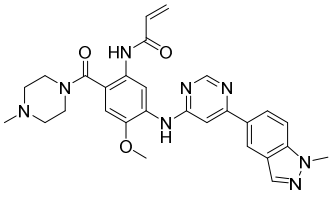
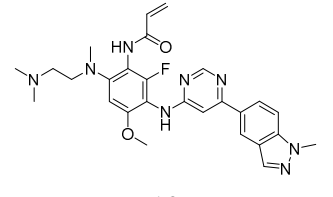
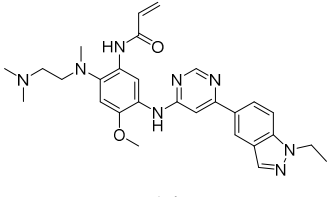
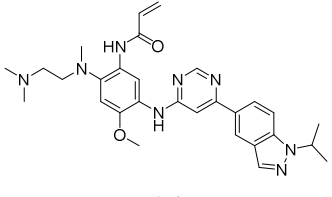
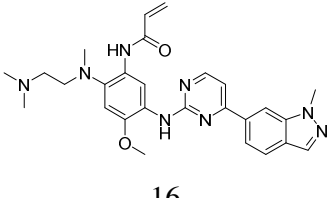
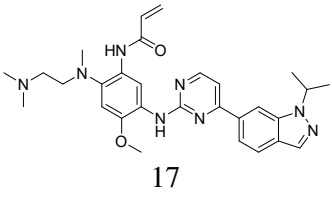
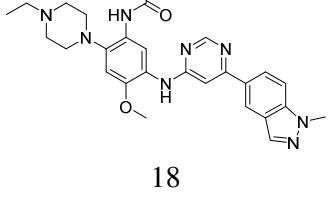
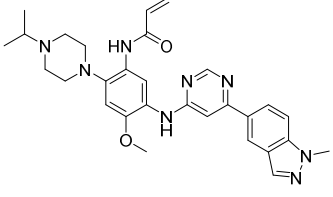
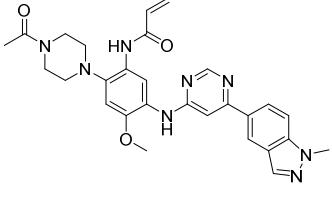
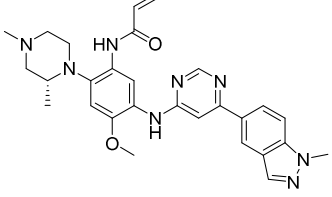
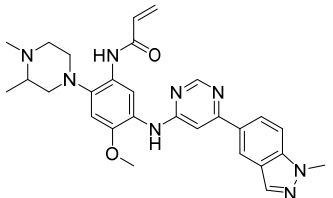
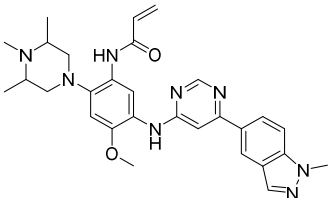
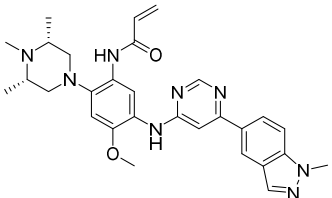
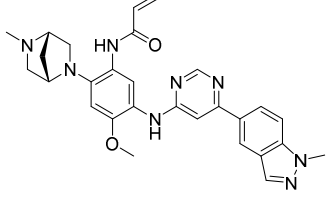
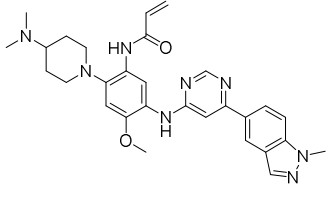
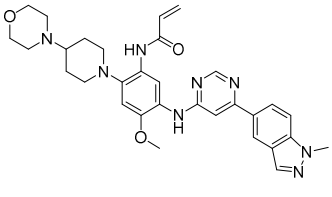


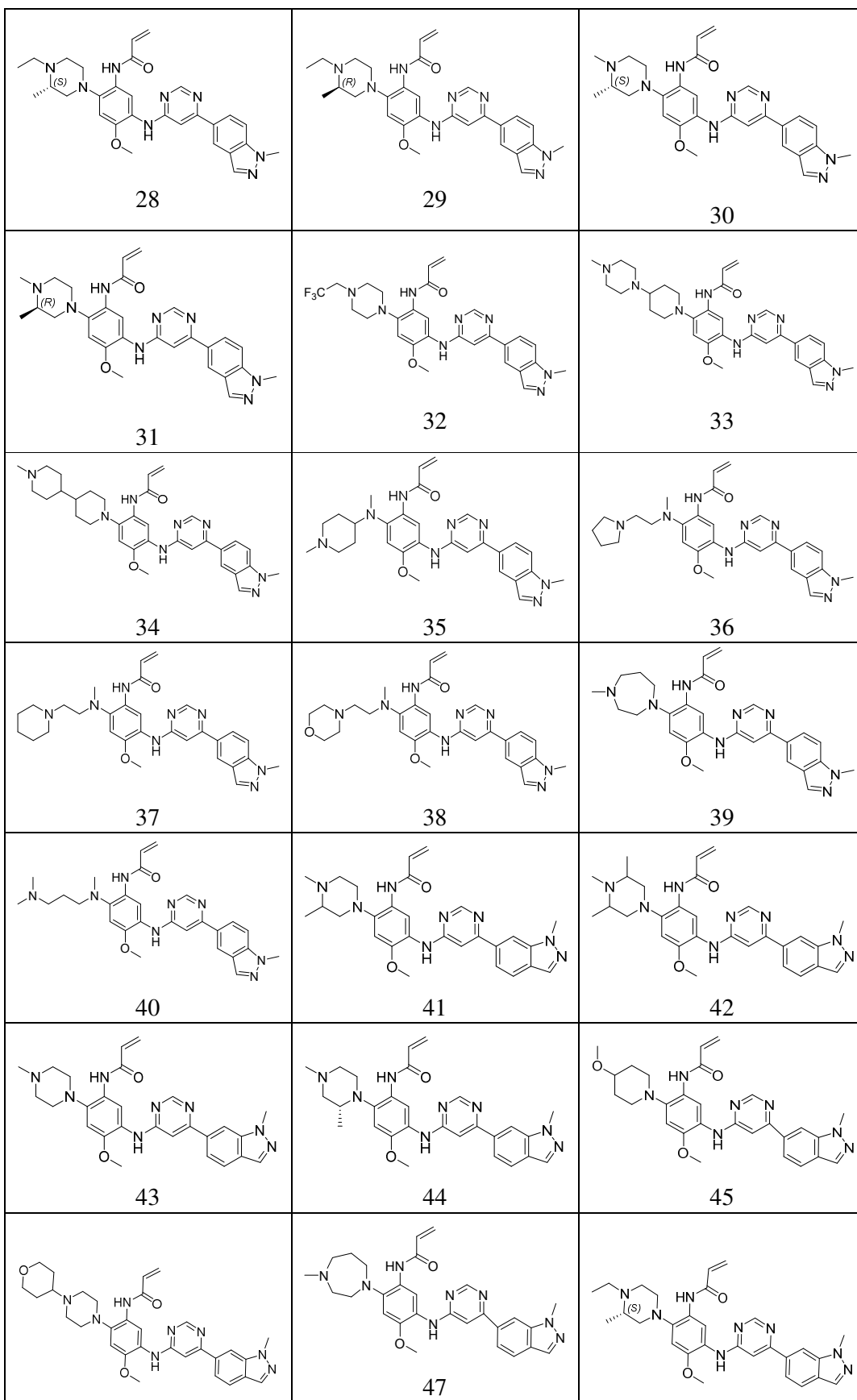
R^6 is hydrogen or halogen;

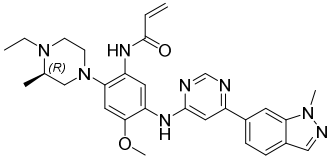
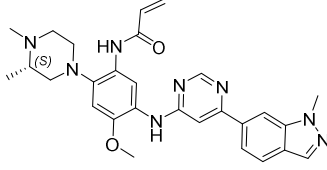
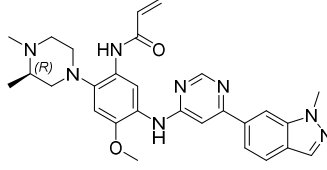
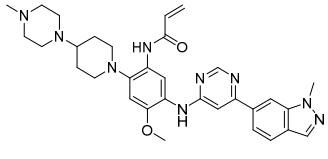
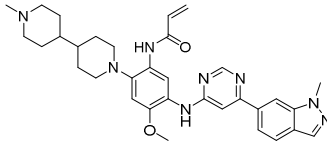
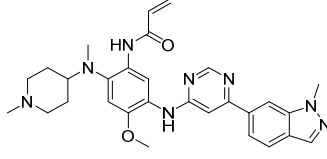
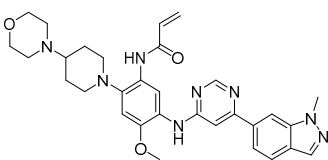
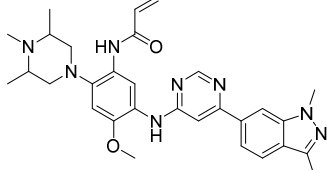
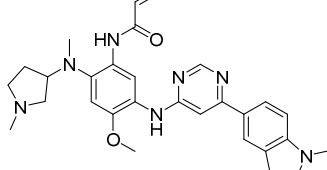
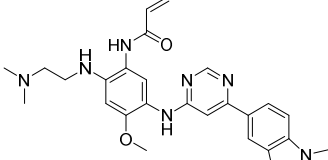
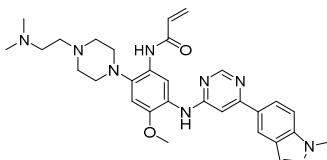
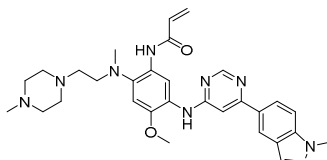
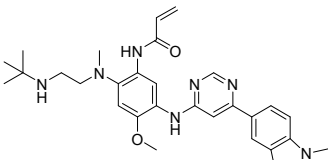
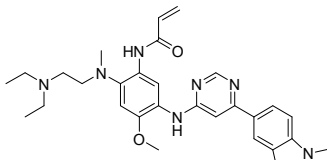
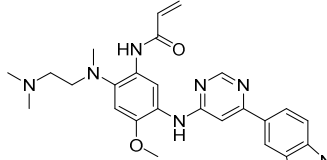
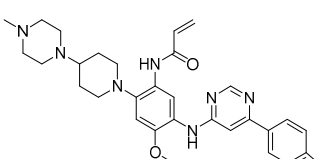
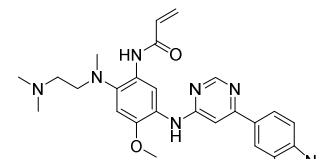
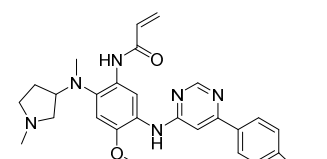
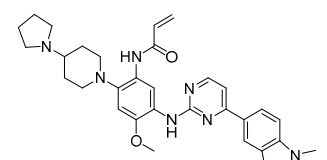
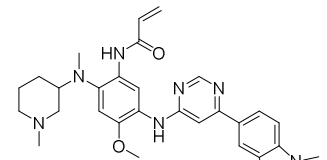
Z^1 is $C-R^7$, Z^2 is N, or Z^1 is N, Z^2 is $C-R^7$, wherein R^7 is hydrogen.

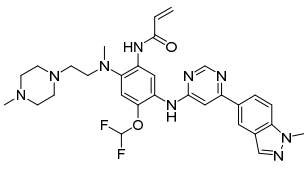
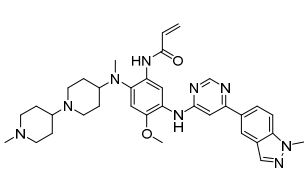
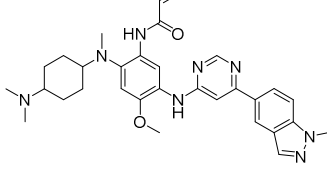
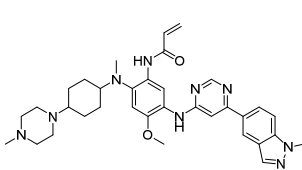
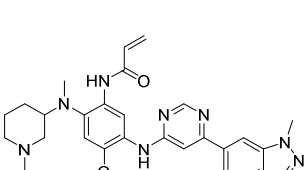
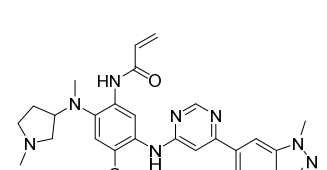
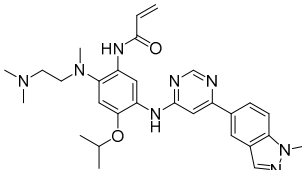
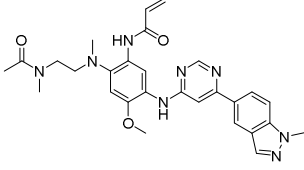
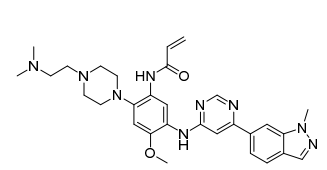
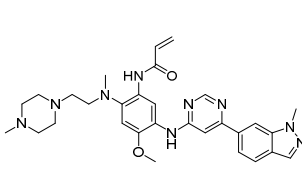
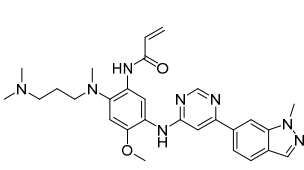
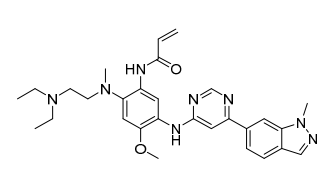
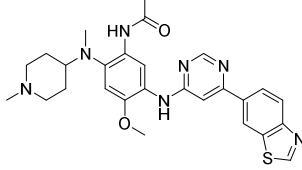
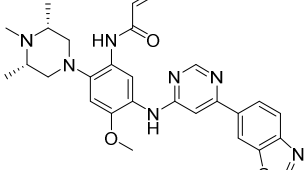
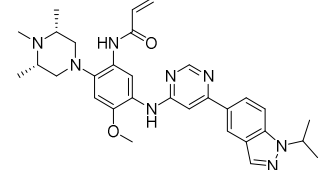
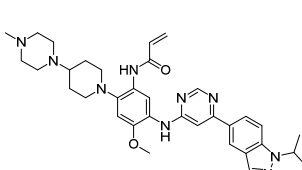
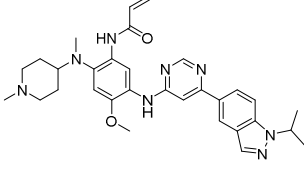
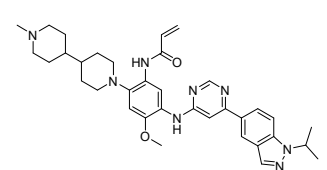
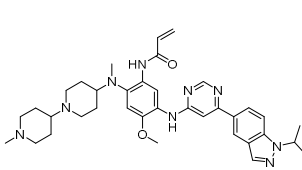
4210. A compound, which is selected from the following compounds:

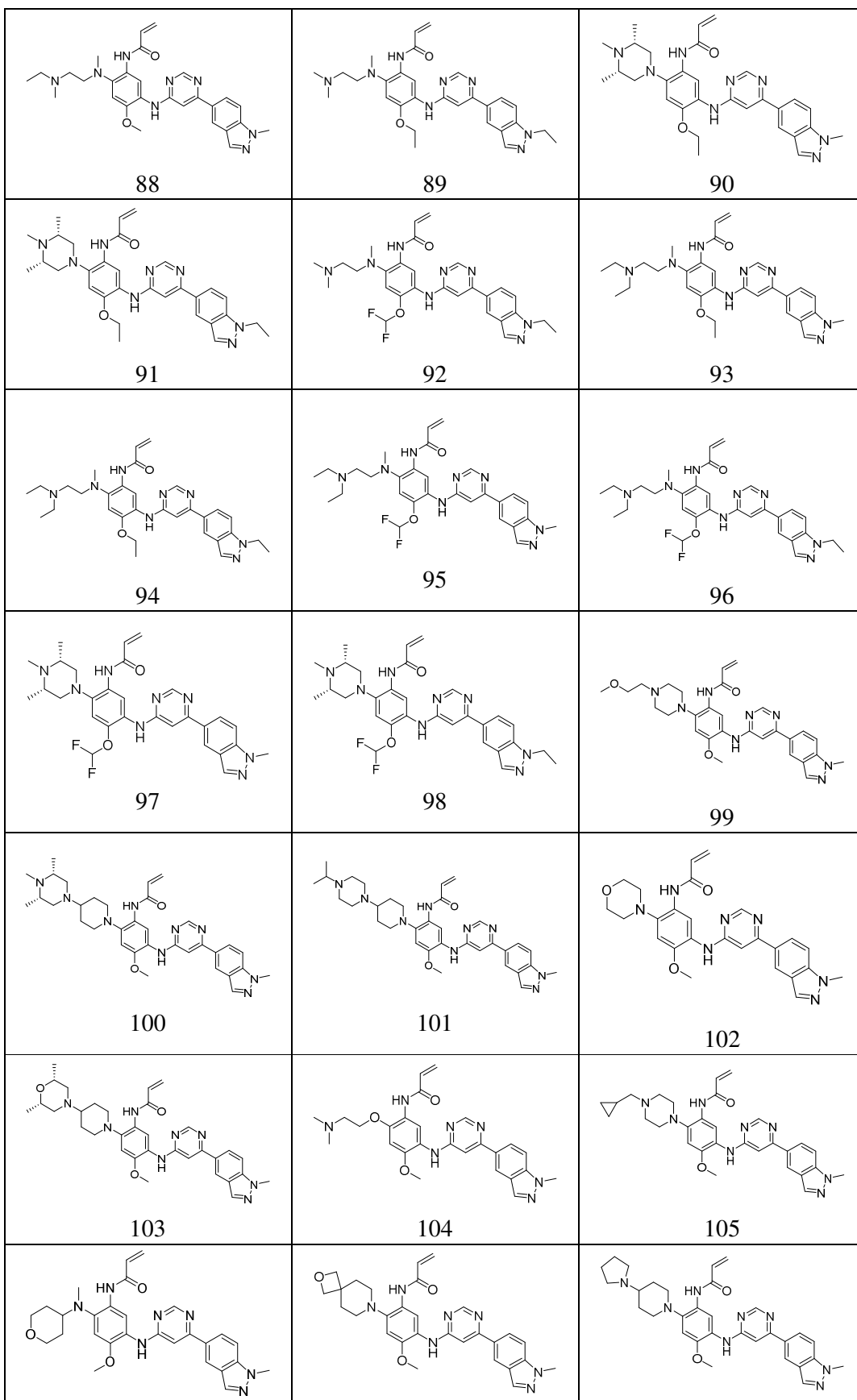


		
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25	26	27

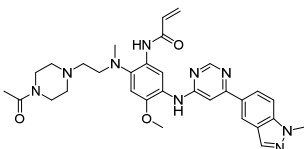
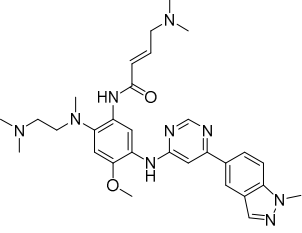
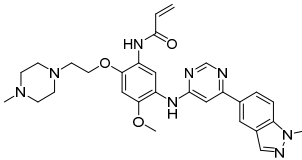
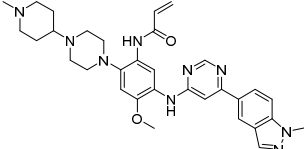
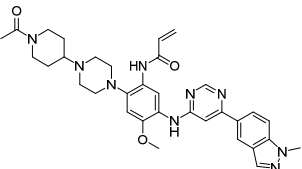
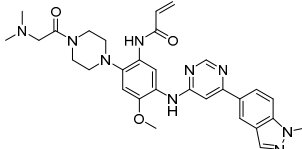
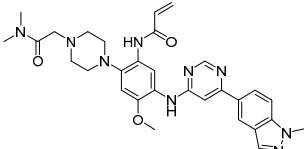
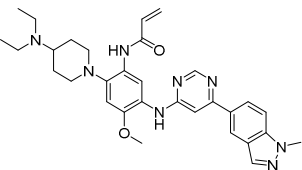
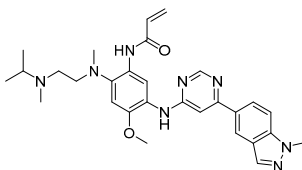
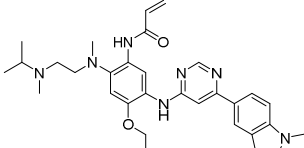
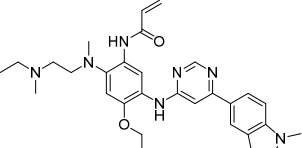
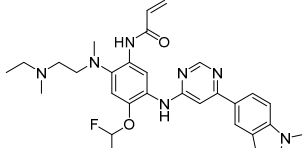
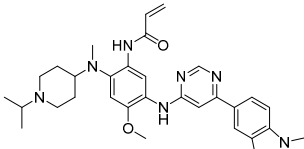
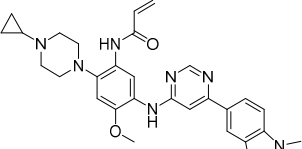
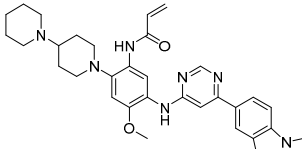
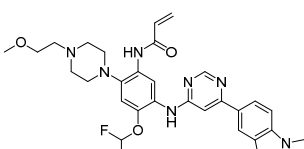
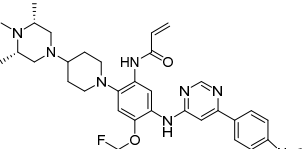
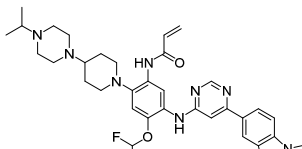


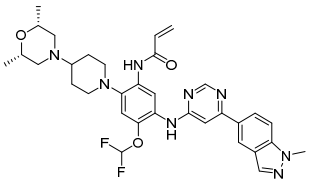
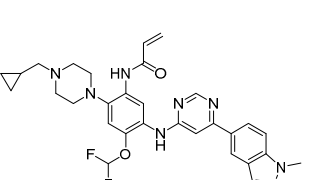
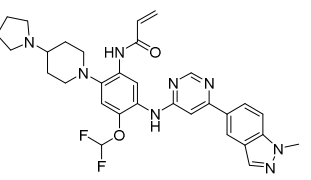
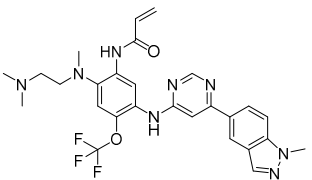
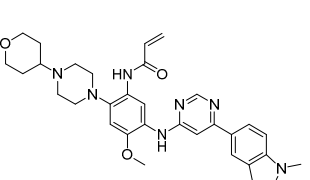
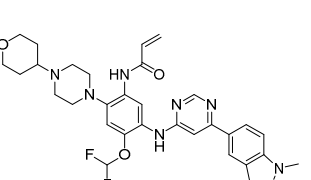
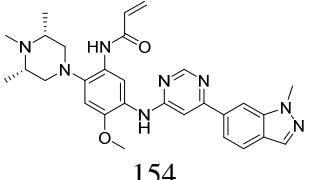
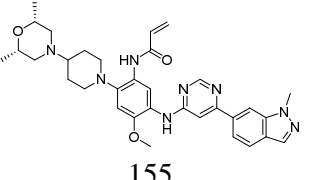
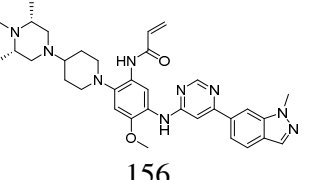
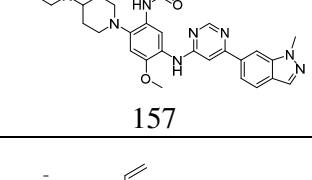
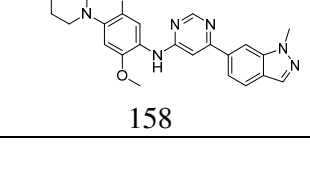
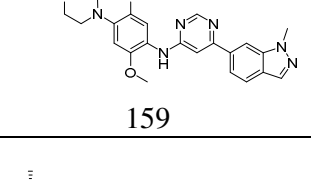
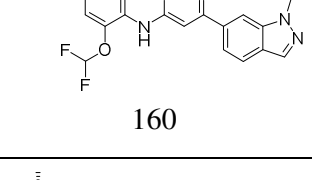
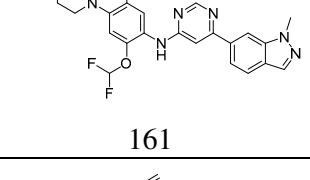
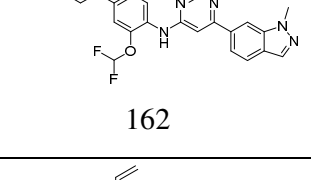
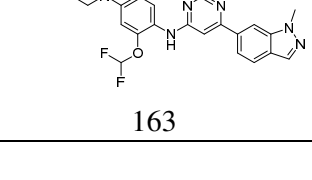
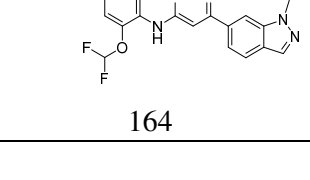
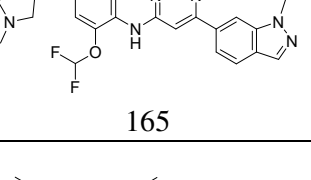
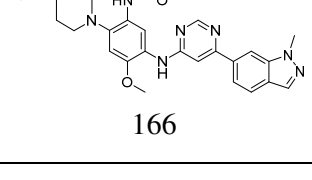
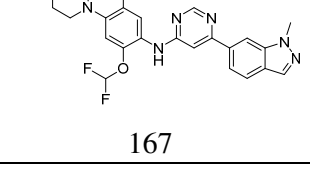
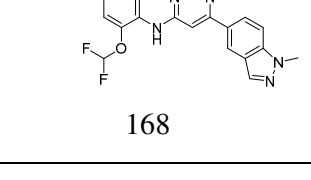
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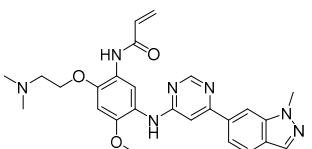
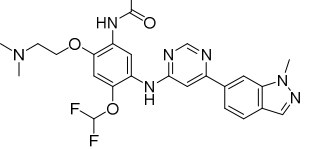
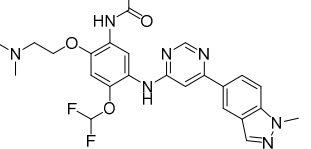
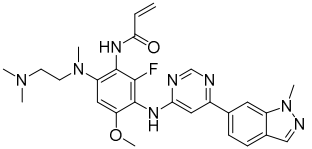
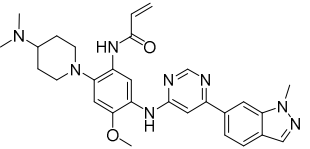
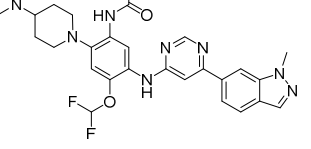
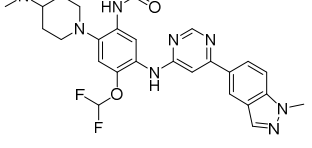
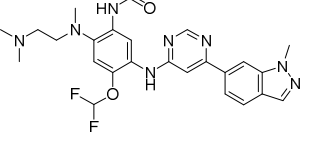
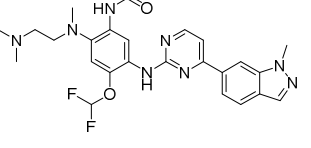
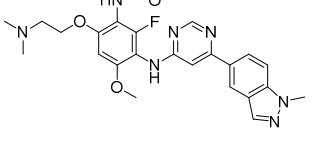
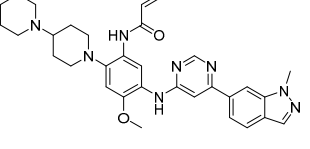
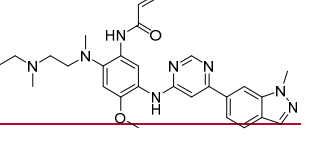
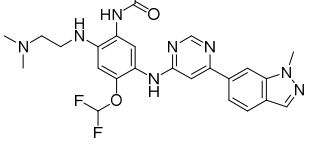
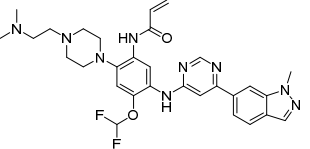
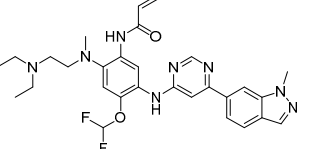
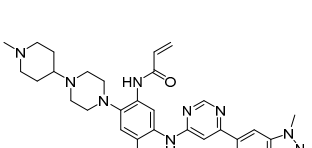
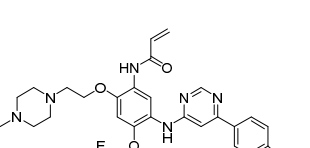
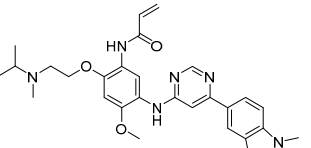
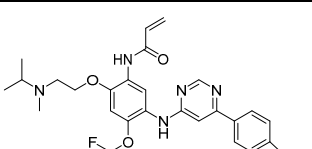
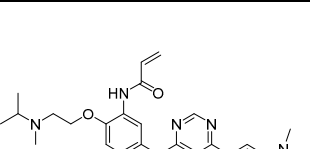
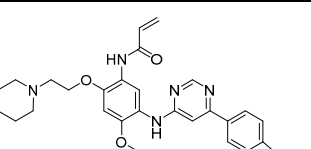
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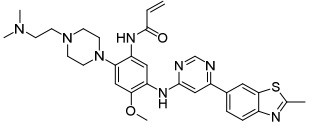
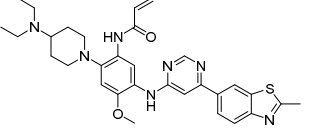
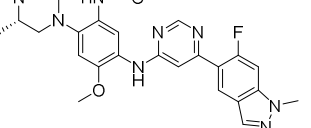
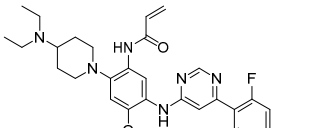
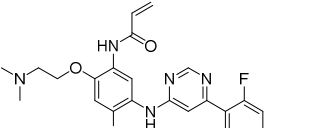
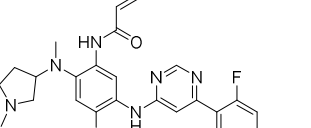
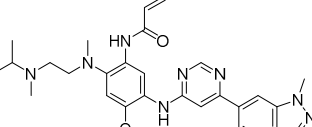
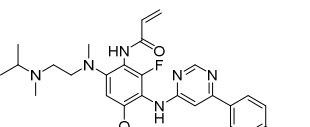
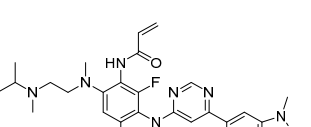
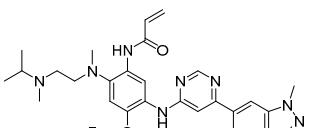
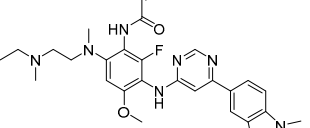
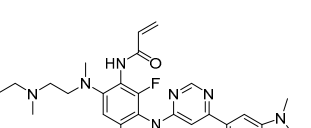
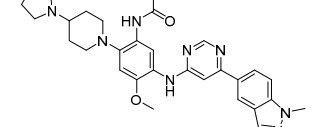
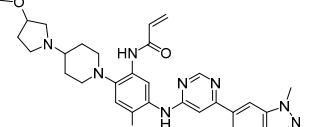
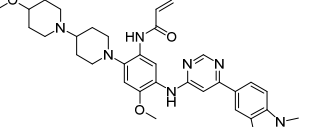
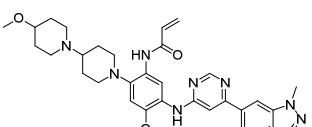
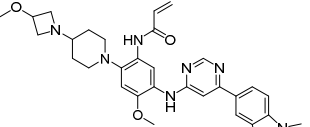
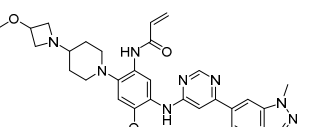
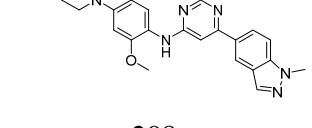
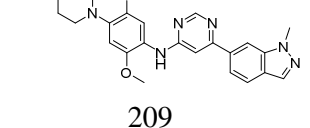
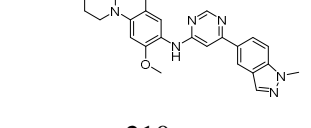


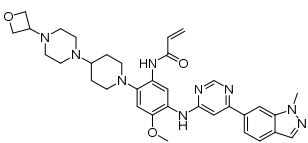
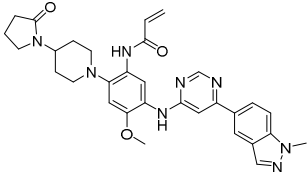
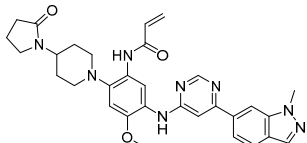
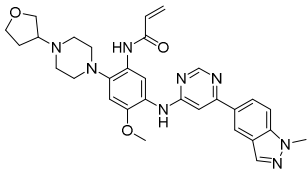
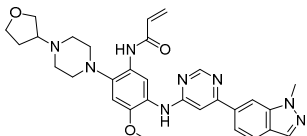
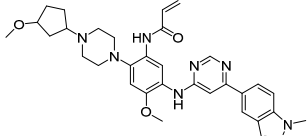
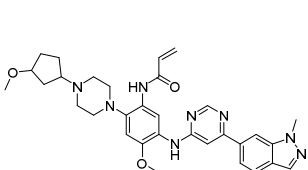
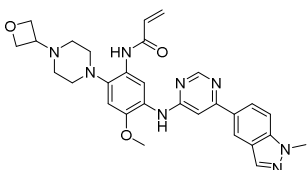
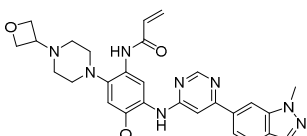
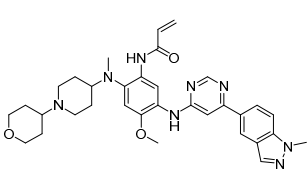
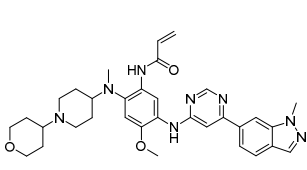
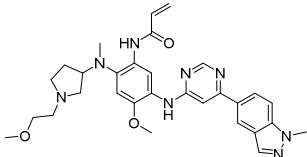
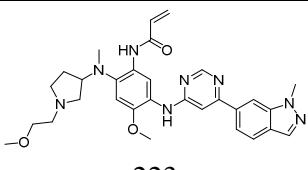
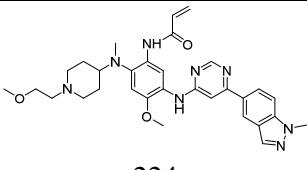
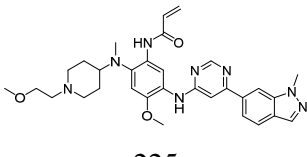
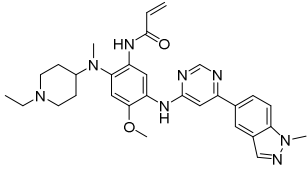
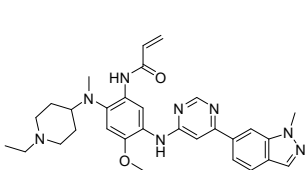
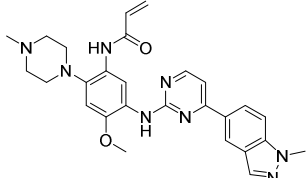
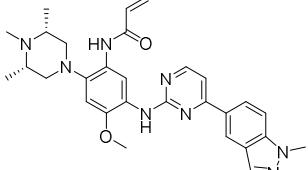
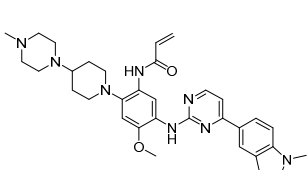
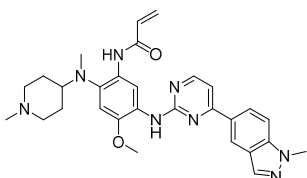
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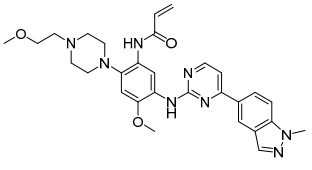
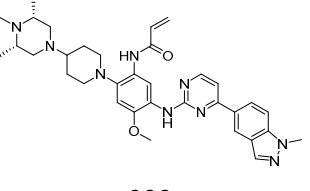
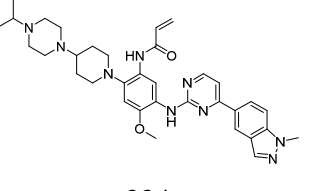
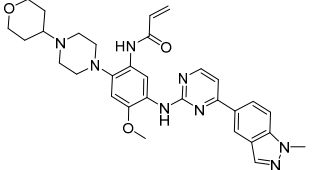
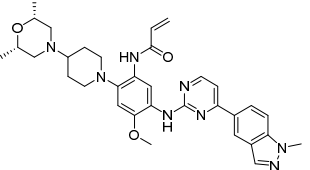
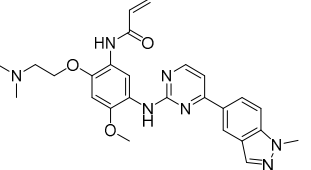
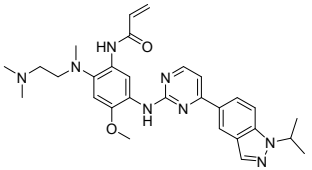
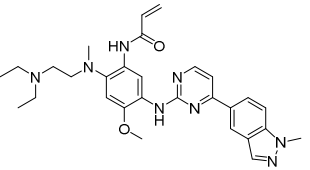
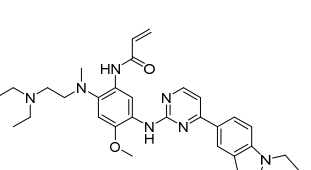
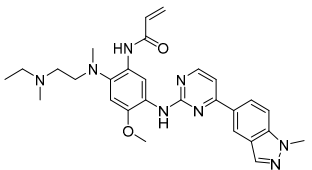
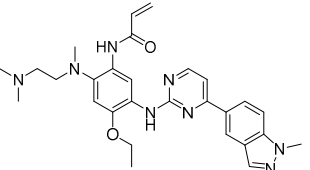
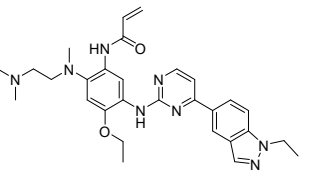
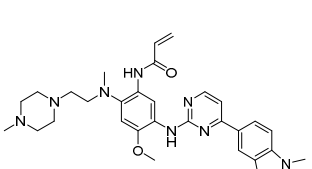
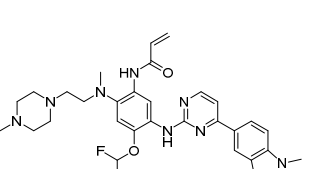
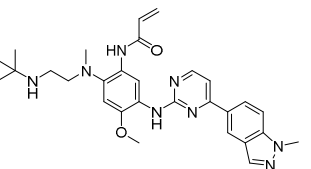
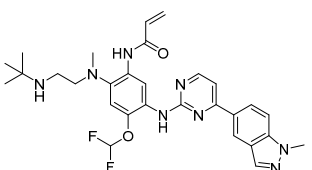
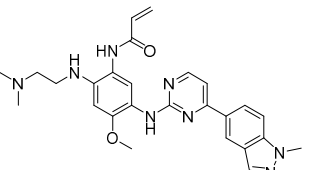
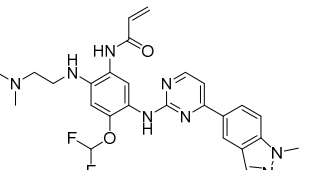
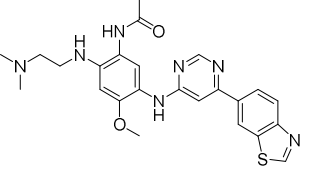
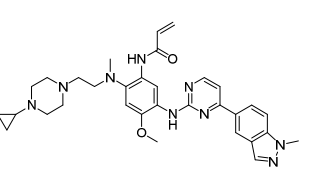
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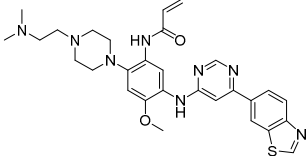
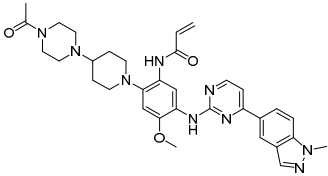
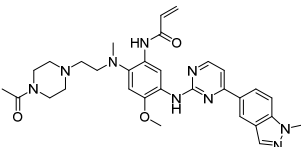
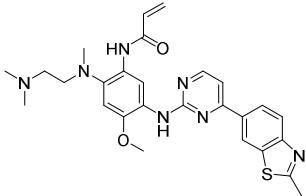
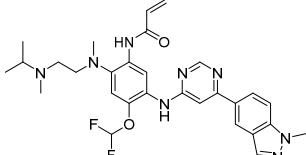
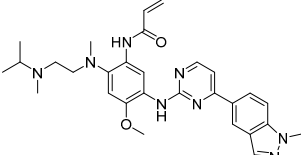
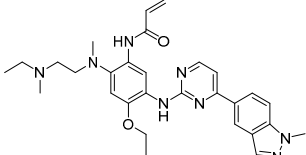
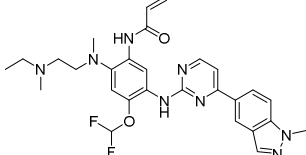
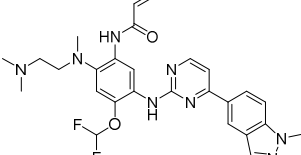
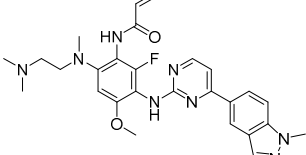
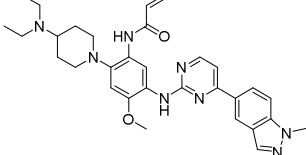
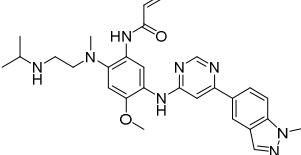
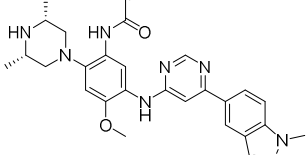
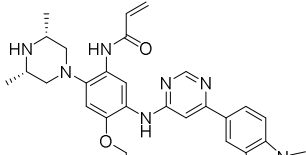
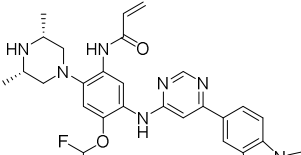
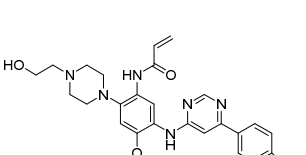
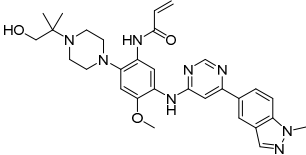
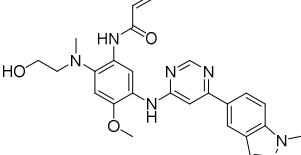
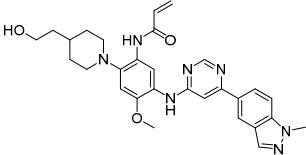
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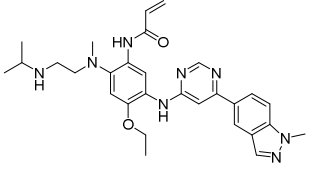
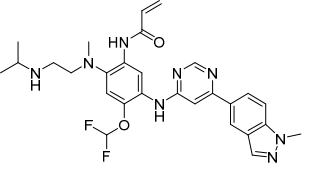
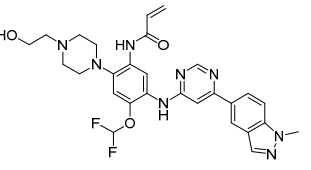
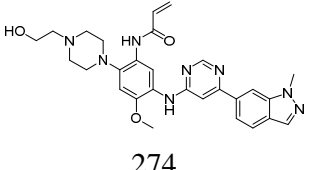
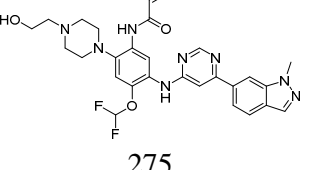
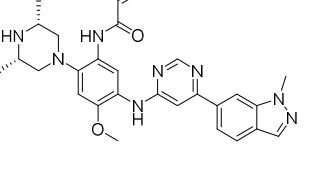
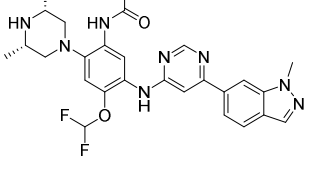
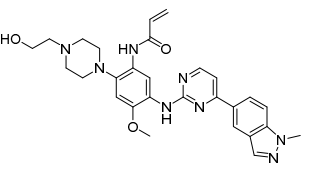
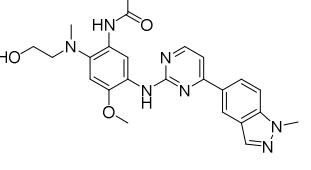
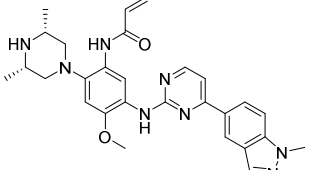
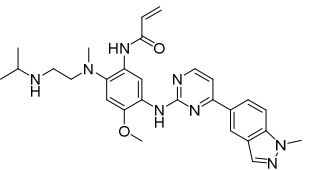
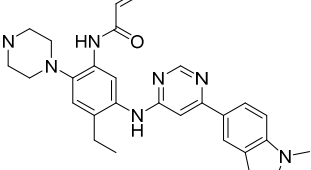
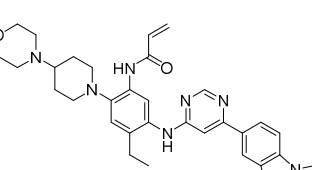
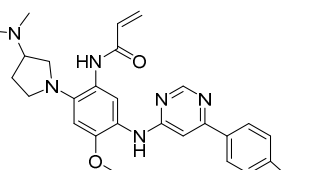
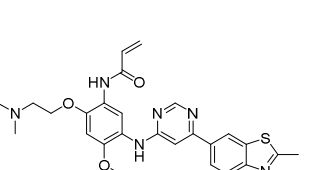
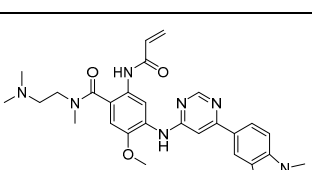
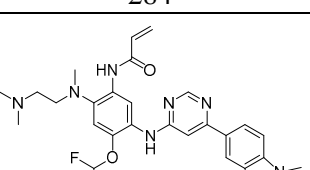
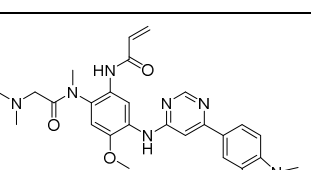
		
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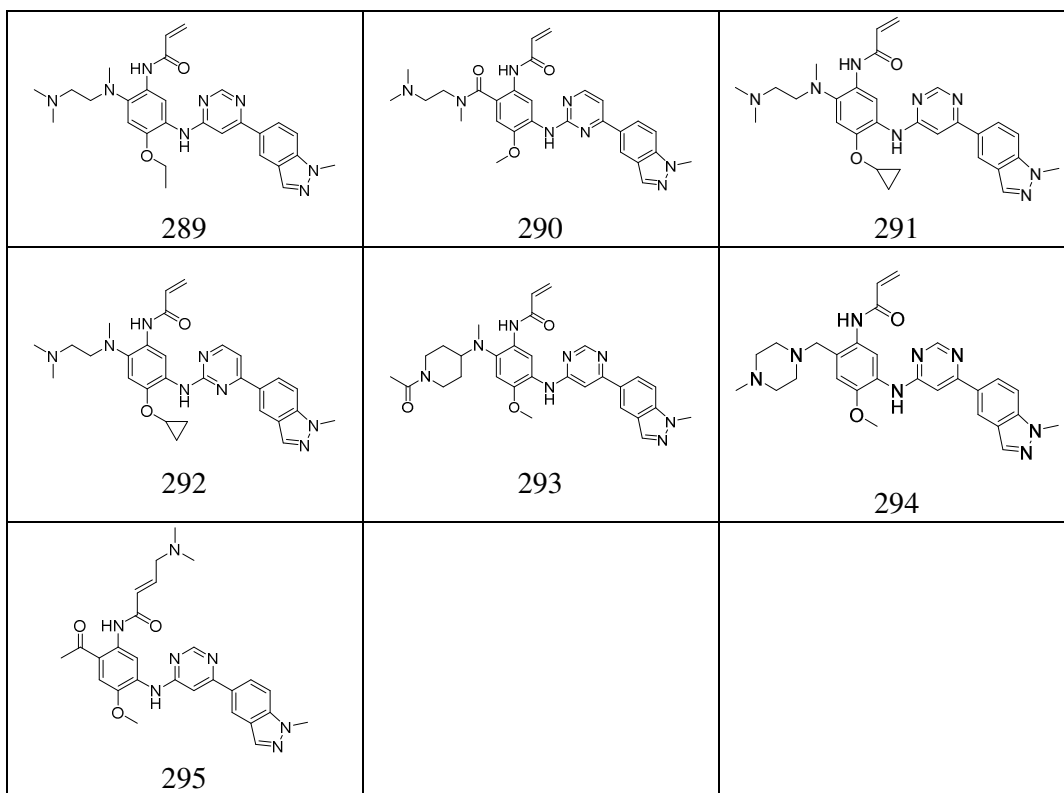
		
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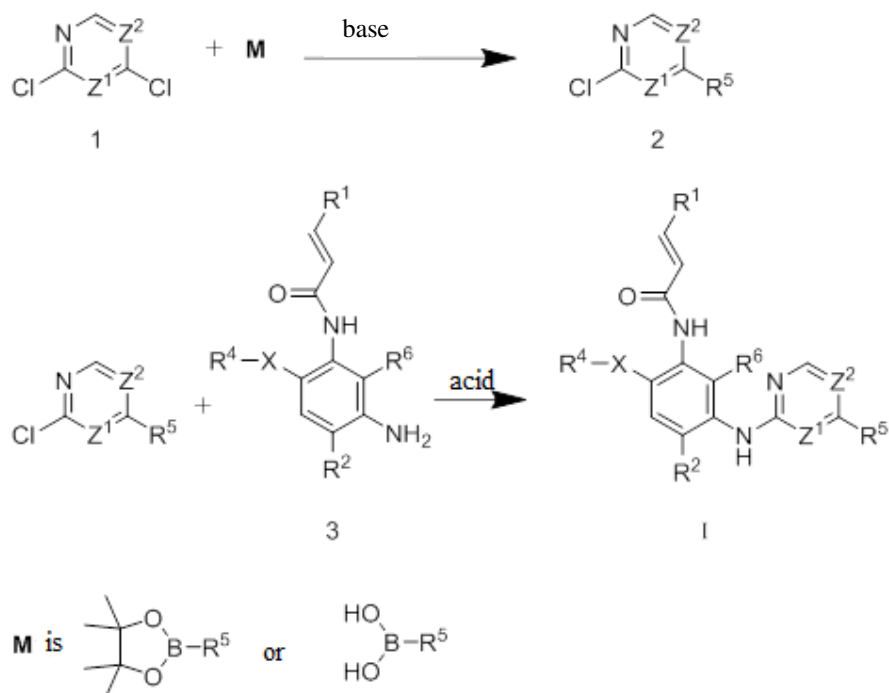
		
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4311. A method for preparing the compound according to any one of claims 1 to 4210, comprising the following steps: reacting compound 1 with compound M to form compound 2 in the presence of base, after that reacting the compound 2 with compound 3 to give the compound shown in Formula I in the presence of acid;



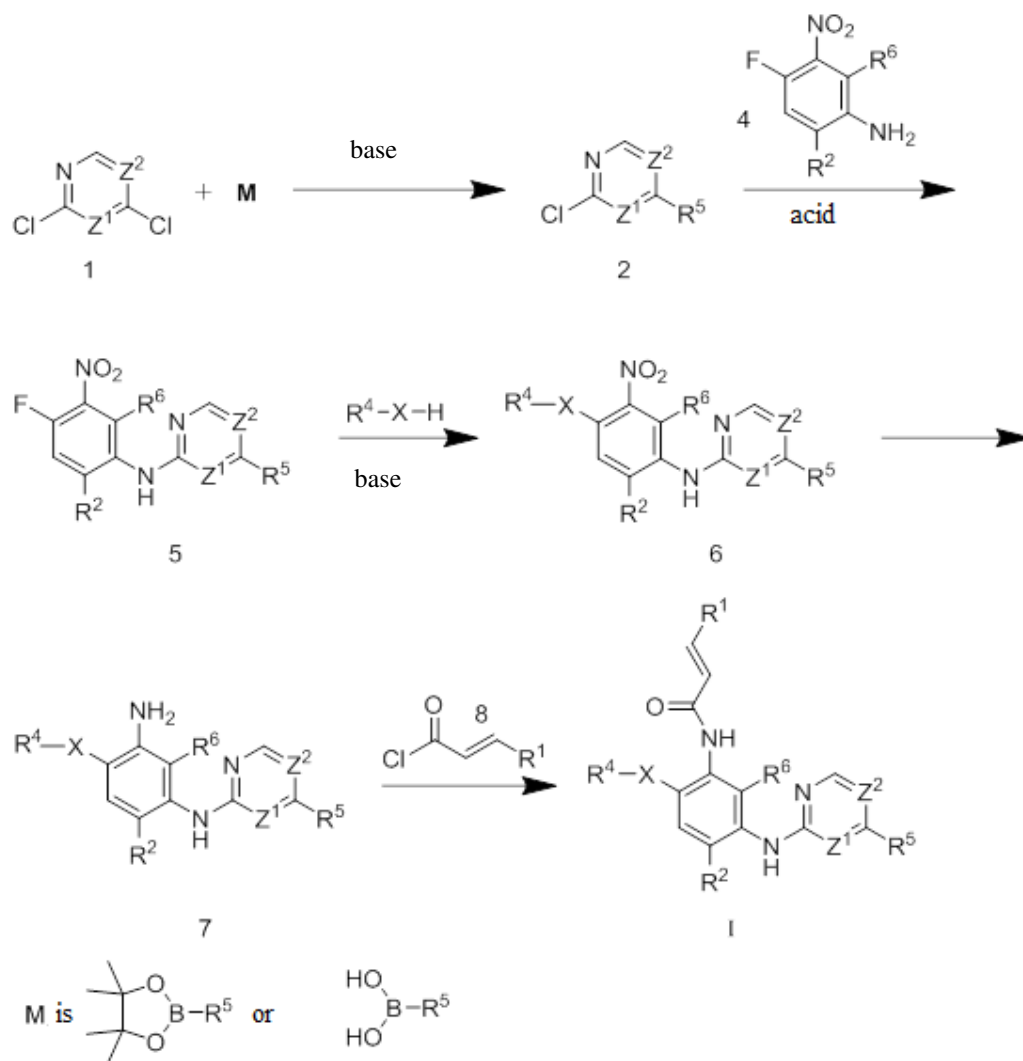
wherein R^1 , R^2 , R^4 , R^5 , R^6 , X , Z^1 and Z^2 are as defined in any one of claims 1 to [4210](#).

[4412.](#) ~~the~~The method according to claim [4312](#), wherein the base is selected from sodium carbonate and sodium bicarbonate.

[4513.](#) ~~the~~The method according to claim [4312](#), wherein the acid is selected from methanesulfonic acid and p-toluenesulfonic acid;

[4614.](#) ~~the~~The method according to claim [4312](#), wherein the method for preparing the compound shown in Formula I comprising the following steps:

- (1) reacting compound 1 with compound M to supply compound 2 in the presence of base;
- (2) reacting the compound 2 with compound 4 to form compound 5 in the presence of acid;
- (3) reacting the compound 5 with $R^4\text{-X-H}$ to give compound 6 in the presence of base;
- (4) reducing the compound 6 to provide compound 7;
- (5) reacting the compound 7 with compound 8 to form the compound shown in Formula I;



wherein R^1 , R^2 , R^4 , R^5 , R^6 , X , Z^1 and Z^2 are as defined in any one of claims 1 to [4210](#);

in step (1), the base is selected from sodium carbonate and sodium bicarbonate;

in step (2), the acid is selected from methanesulfonic acid and p-toluene sulfonic acid;

in step (3), the base is selected from diisopropylethylamine, sodium carbonate and triethylamine.

[4715](#). A pharmaceutical composition comprising the compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to [4210](#) and pharmaceutically acceptable carriers or excipients; the pharmaceutical composition is tablet, capsule, pill, granule, powder, suppository, injection, solution, suspension, plaster, patch, lotion, drop, liniment and spray.

~~48~~16. Use of the compound or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof according to any one of claims 1 to ~~42~~10 and/or the pharmaceutical composition according to claim ~~47~~15 in the preparation of a medicament for treating a tumor wherein the tumor is antitumor drugs; the antitumor drugs are applied for the following conditions: head and neck cancer, melanoma, bladder cancer, esophageal cancer, anaplastic large cell lymphoma, renal cell cancer, breast cancer, colorectal cancer, ovarian cancer, cervical cancer, pancreatic cancer, glioma, glioblastoma, prostate cancer, leukemia, lymphoma, non-Hodgkin's lymphoma, stomach cancer, lung cancer, hepatocellular cancer, gastrointestinal stromal tumors, thyroid cancer, cholangiocarcinoma, uterus endometrial cancer, multiple myeloma or mesothelioma.