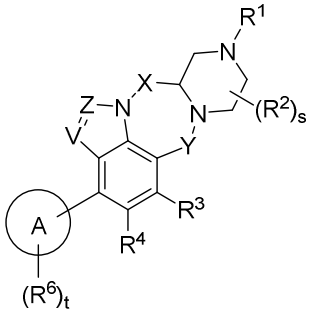
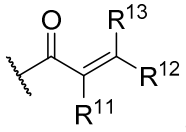
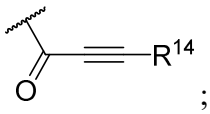
CLAIMS

1. A compound represented by general formula (IM) or a pharmaceutically acceptable salt thereof:



(IM)

wherein:
X is $C(R^aR^b)$ or $C(R^aR^b)$-$C(R^cR^d)$;
Y is C(O) or CH_2;
Z is CR^{5a} or N;
V is CR^5 or N;
ring A is aryl or heteroaryl;
R^a, R^b, R^c, and R^d are identical or different at each occurrence and are each independently selected from the group consisting of a hydrogen atom, halogen, alkyl, haloalkyl, hydroxyalkyl, alkoxy, haloalkoxy, alkenyl, alkynyl, hydroxy, and cyano;
R^1 is selected from the group consisting of cyano, , and ;
each R^2 is identical or different and is independently selected from the group consisting of a hydrogen atom, halogen, cyano, alkyl, alkoxy, hydroxy, and amino, wherein the alkyl and alkoxy are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, cyano, amino, and hydroxy;
R^3, R^4, R^5, and R^{5a} are identical or different and are each independently selected from the group consisting of a hydrogen atom, halogen, cyano, alkyl, alkenyl, alkynyl, $-NR^{7a}R^{7b}$, $-C(O)R^8$, $-OR^8$, $-S(O)_pR^8$, cycloalkyl, heterocyclyl, aryl and heteroaryl, wherein the alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, alkyl, haloalkyl, cyano, $-NR^{7c}R^{7d}$, $-OR^{8a}$, cycloalkyl, heterocyclyl, aryl, and heteroaryl;
each R^6 is identical or different and is independently selected from the group consisting of a hydrogen atom, halogen, cyano, alkyl, alkenyl, alkynyl, $-NR^{9a}R^{9b}$, $-C(O)NR^{9a}R^{9b}$, $-C(O)R^{10}$, $-C(O)OR^{10}$, $-OC(O)R^{10}$, $-OR^{10}$, $-S(O)_pR^{10}$, $-S(O)_pNR^{9a}R^{9b}$, cycloalkyl, heterocyclyl, aryl, and heteroaryl, wherein the alkyl, cycloalkyl, heterocyclyl, aryl, and

heteroaryl are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, alkyl, haloalkyl, cyano, -$NR^{9c}R^{9d}$, -OR^{10a}, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

R^{11}, R^{12}, R^{13}, and R^{14} are identical or different and are each independently selected from the group consisting of a hydrogen atom, halogen, alkyl, -$NR^{15a}R^{15b}$, -OR^{16}, cyano, cycloalkyl, heterocyclyl, aryl, and heteroaryl, wherein the alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, haloalkyl, alkoxy, haloalkoxy, cyano, -$NR^{15c}R^{15d}$, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

R^{8}, R^{8a}, R^{10}, R^{10a}, and R^{16} are identical or different at each occurrence and are each independently selected from the group consisting of a hydrogen atom, alkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl, wherein the alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, alkyl, alkenyl, alkynyl, oxo, alkoxy, haloalkyl, haloalkoxy, cyano, -$NR^{17a}R^{17b}$, hydroxy, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

R^{7a}, R^{7b}, R^{7c}, R^{7d}, R^{9a}, R^{9b}, R^{9c}, R^{9d}, R^{15a}, R^{15b}, R^{15c}, R^{15d}, R^{17a}, and R^{17b} are identical or different at each occurrence and are each independently selected from the group consisting of a hydrogen atom, alkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl, wherein the alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl are each independently optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, hydroxy, cyano, alkyl, alkoxy, haloalkyl, and haloalkoxy;

or R^{7a} and R^{7b}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

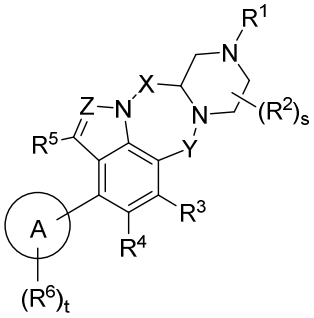
or R^{7c} and R^{7d}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

or R^{9a} and R^{9b}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;

or R^{9c} and R^{9d}, together with the nitrogen atom to which they are attached, form

heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;
or R^{15a} and R^{15b}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;
or R^{15c} and R^{15d}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;
or R^{17a} and R^{17b}, together with the nitrogen atom to which they are attached, form heterocyclyl, wherein the heterocyclyl is optionally substituted with one or more substituents selected from the group consisting of halogen, oxo, alkyl, alkoxy, haloalkyl, haloalkoxy, cyano, amino, nitro, hydroxy, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl;
s is 0, 1, 2, 3, 4, 5, or 6;
t is 0, 1, 2, 3, 4, or 5; and
p is 0, 1, or 2.

2. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to claim 1, being a compound represented by general formula (I) or a pharmaceutically acceptable salt thereof:



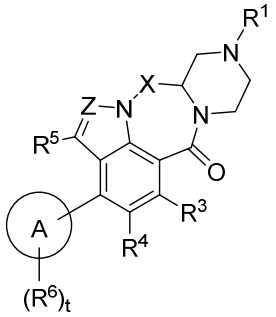
(I)

wherein:
ring A, X, Y, Z, R^1, R^2, R^3, R^4, R^5, R^6, s, and t are as defined in claim 1.

3. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to claim 1 or 2, wherein Y is C(O).

4. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 3, wherein s is 0 or 1.

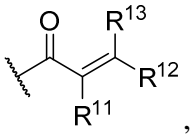
5. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 4, being a compound represented by general formula (II) or a pharmaceutically acceptable salt thereof:



(II)

wherein:
ring A, X, Z, R^1, R^3, R^4, R^5, R^6, and t are as defined in claim 1.

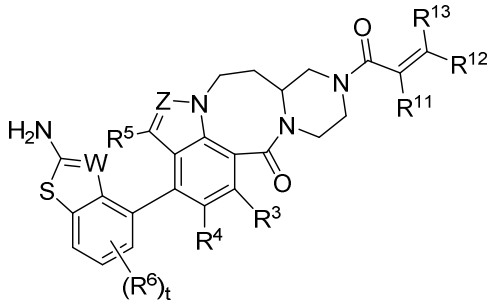
6. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 5, wherein ring A is 8- to 10-membered bicyclic heteroaryl containing in the ring 1, 2, or 3 heteroatoms selected from the group consisting of nitrogen, oxygen, and sulfur.

7. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 6, wherein R^1 is 

, wherein R^{11}, R^{12}, and R^{13} are as defined in claim 1.

8. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 7, wherein X is CH_2 or CH_2-CH_2; preferably, X is CH_2-CH_2.

9. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 8, being a compound represented by general formula (III) or a pharmaceutically acceptable salt thereof:



(III)

wherein:
W is C(CN) or N;
t is 0, 1, 2, or 3;
Z, R^3, R^4, R^5, R^6, R^{11}, R^{12}, and R^{13} are as defined in claim 1.

10. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 9, wherein R^3, R^4, R^5, and R^{5a} are identical or different and are each independently selected from the group consisting of a hydrogen atom, halogen, C_{1-6} alkyl, and C_{1-6} haloalkyl.

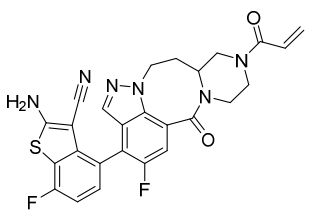
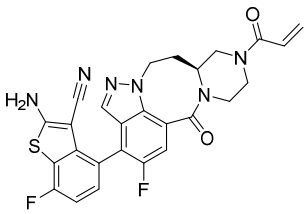
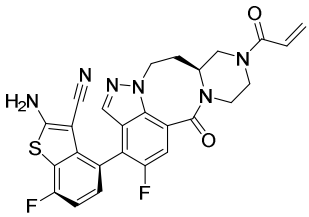
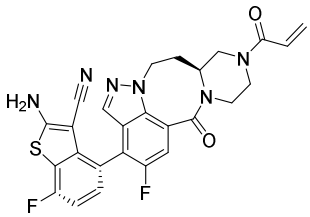
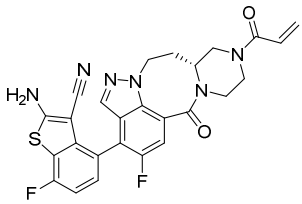
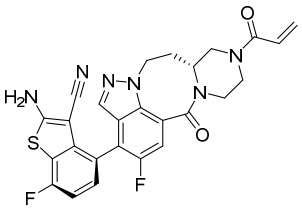
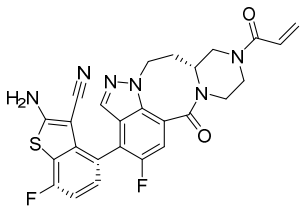
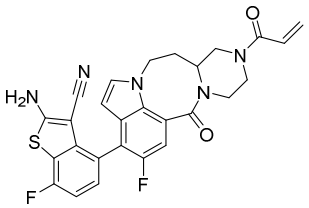
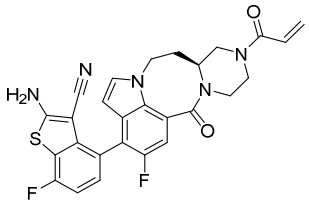
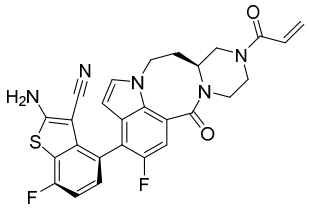
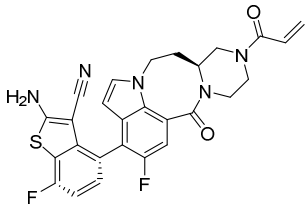
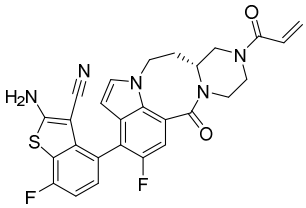
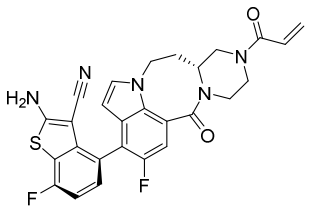
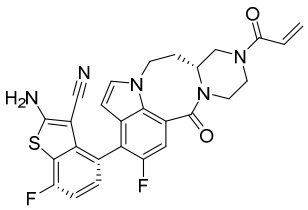
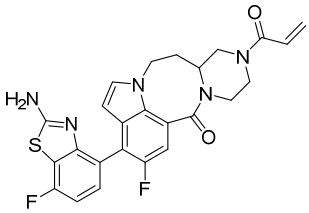
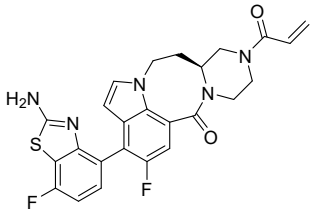
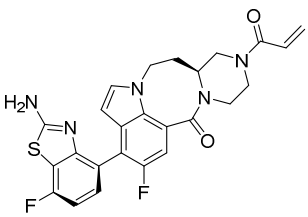
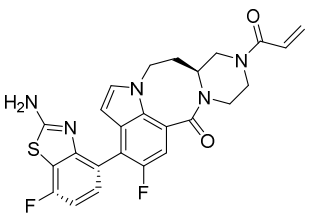
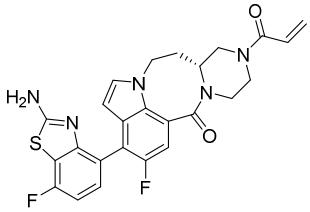
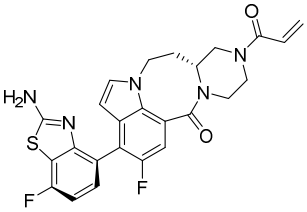
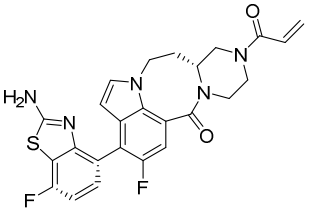
11. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 10, wherein each R^6 is identical or different and is independently selected from the group consisting of halogen, cyano, $-NH_2$, C_{1-6} alkyl, and C_{1-6} haloalkyl, and t is 0, 1, 2, or 3.

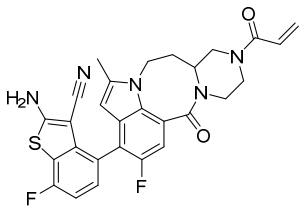
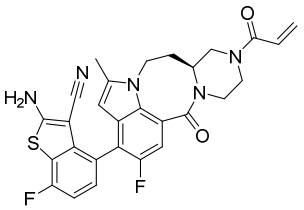
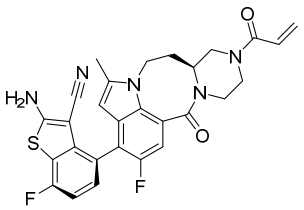
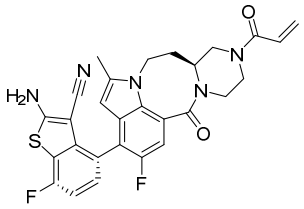
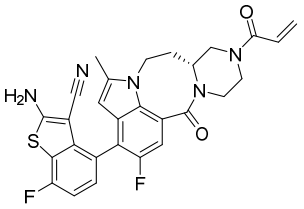
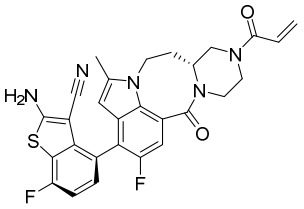
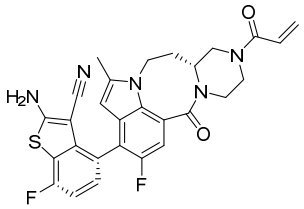
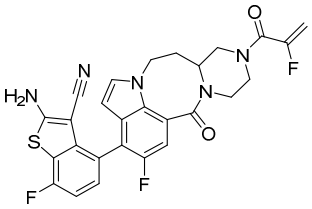
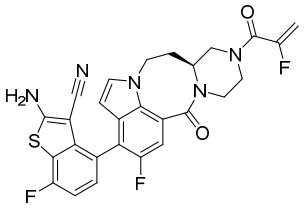
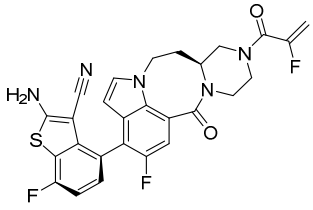
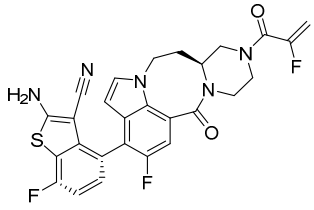
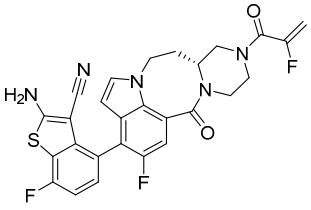
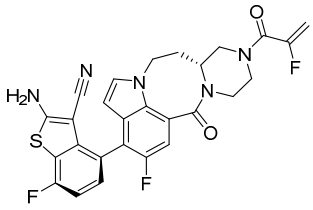
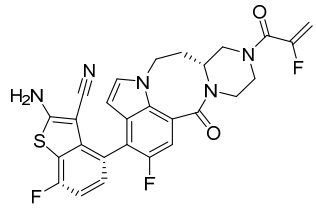
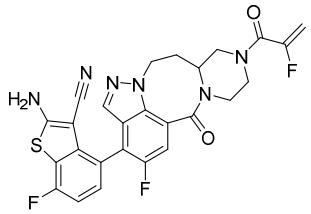
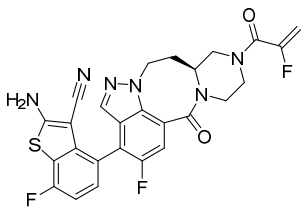
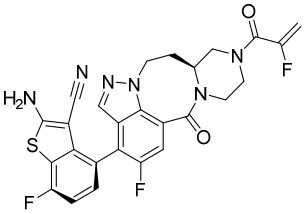
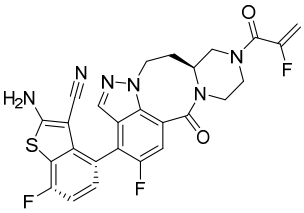
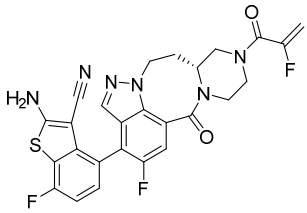
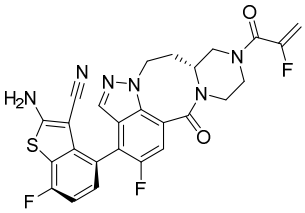
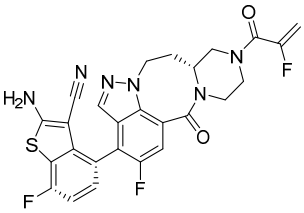
12. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 11, wherein R^{11} is a hydrogen atom or halogen.

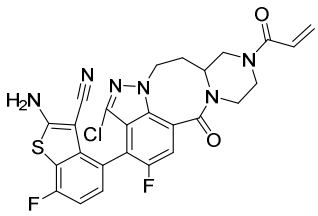
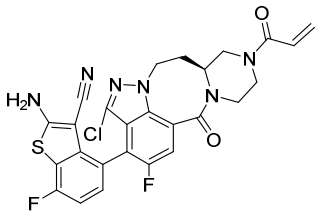
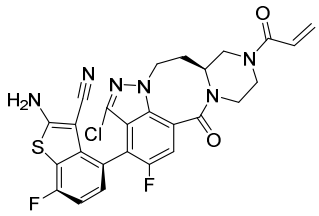
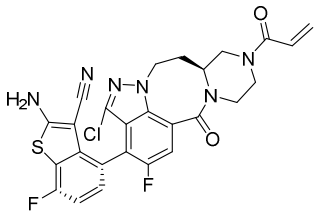
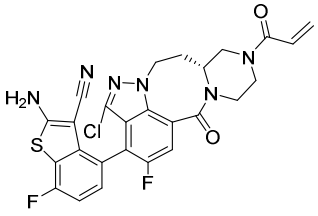
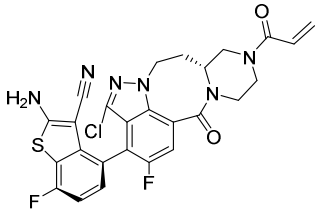
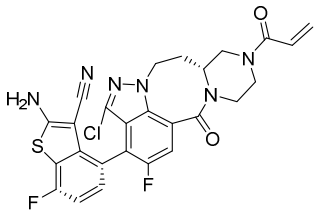
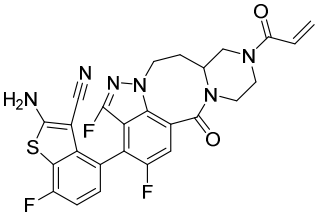
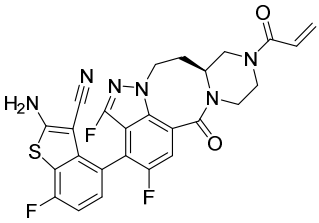
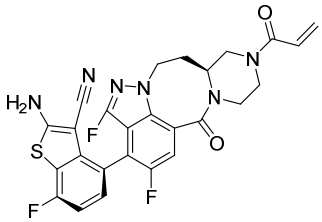
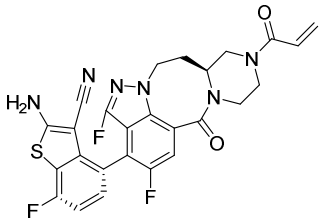
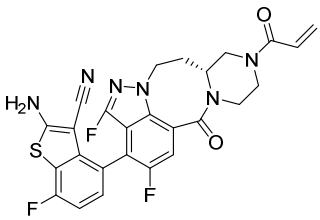
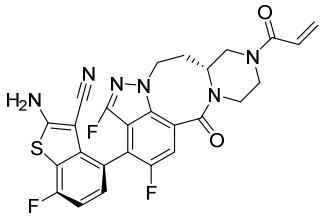
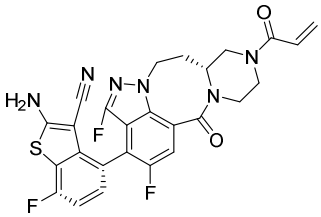
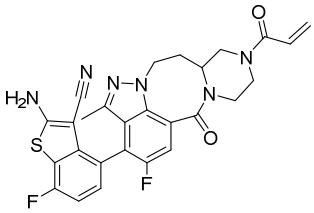
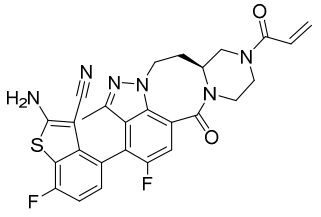
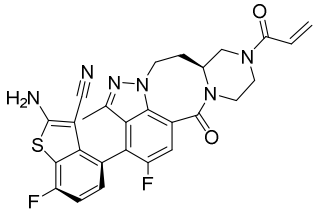
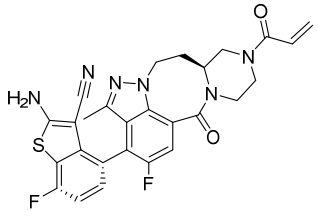
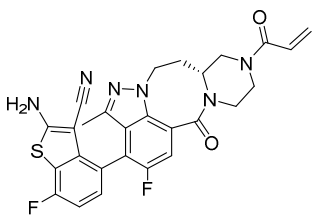
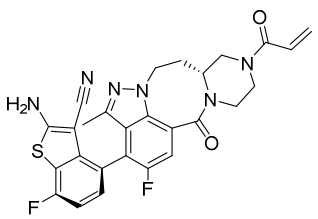
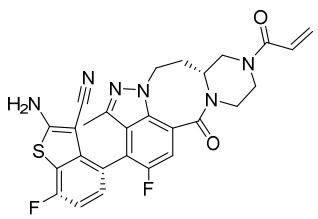
13. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 12, wherein R^{12} is a hydrogen atom.

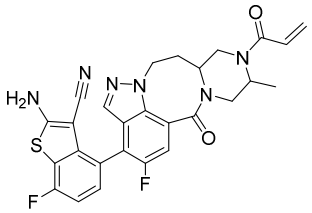
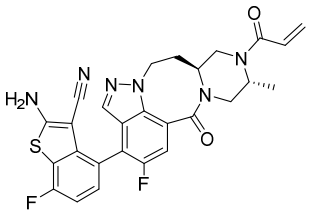
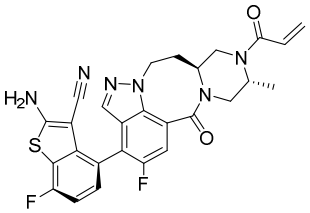
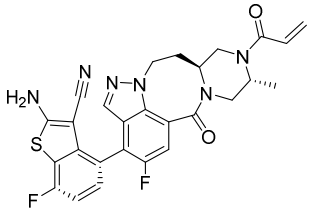
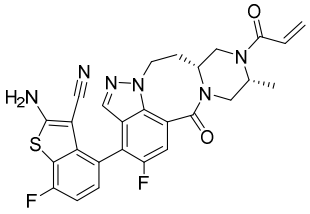
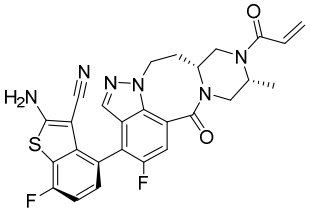
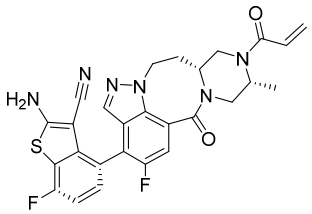
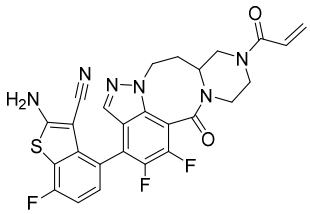
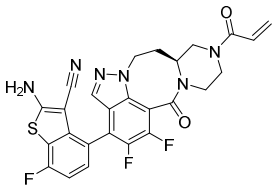
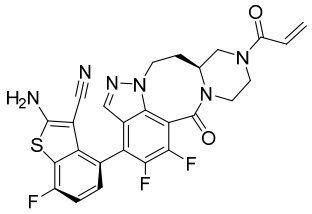
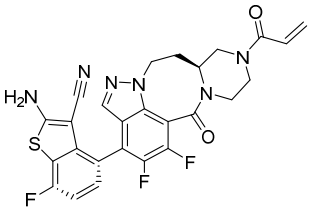
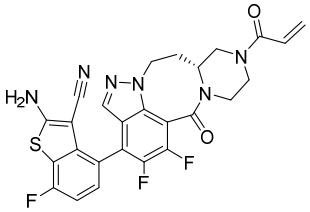
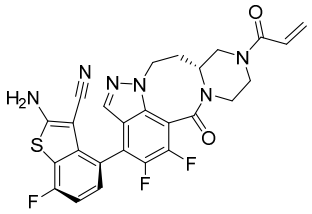
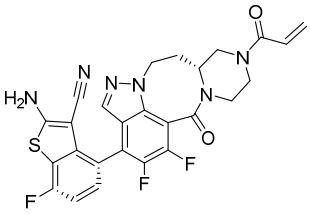
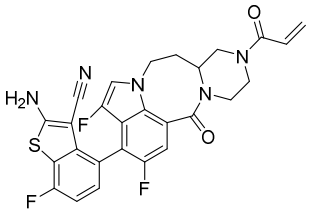
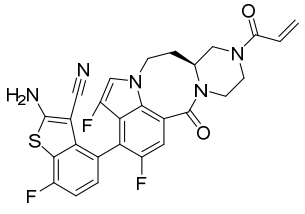
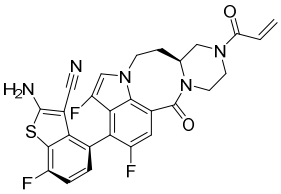
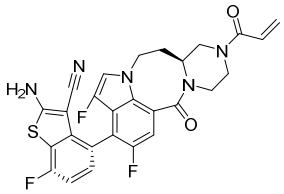
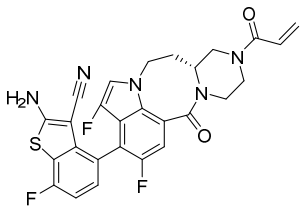
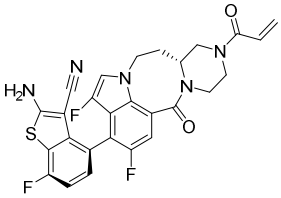
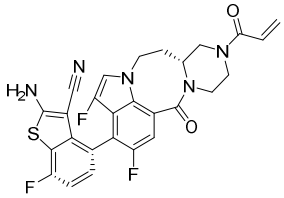
14. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 13, wherein R^{13} is a hydrogen atom.

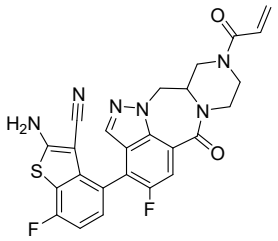
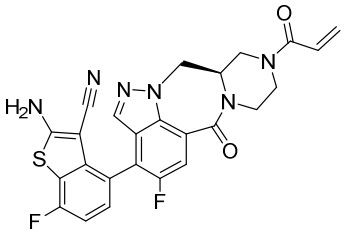
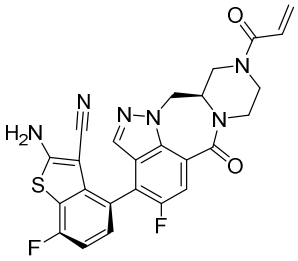
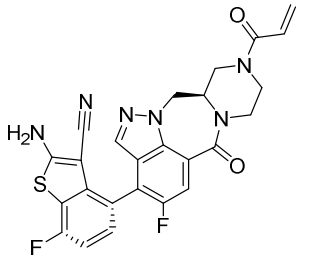
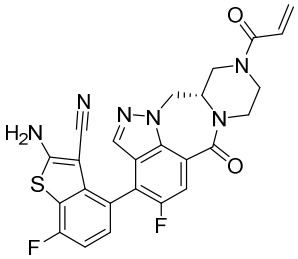
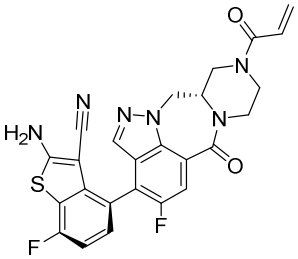
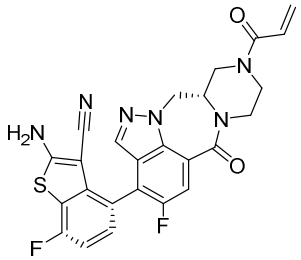
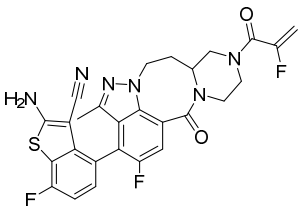
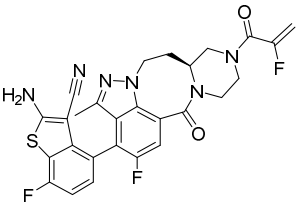
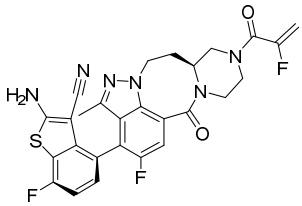
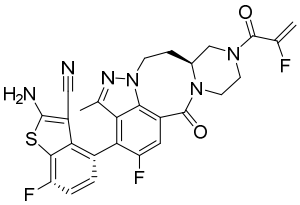
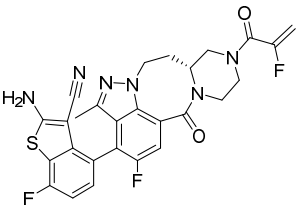
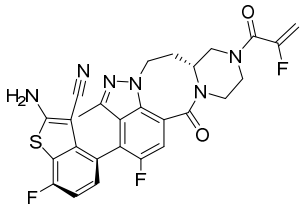
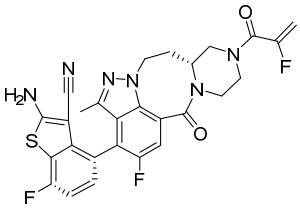
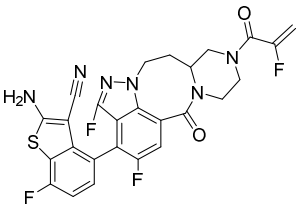
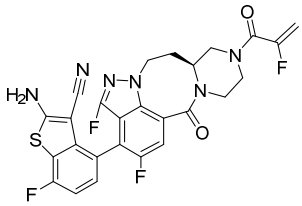
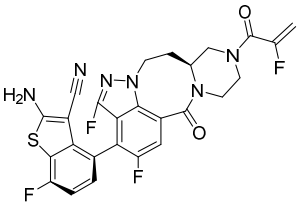
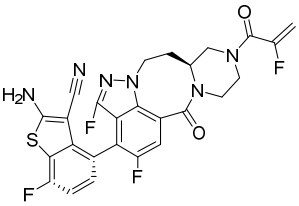
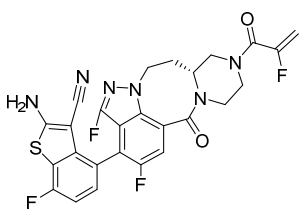
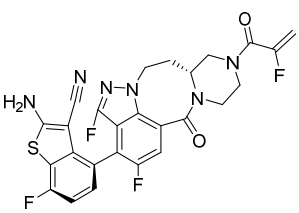
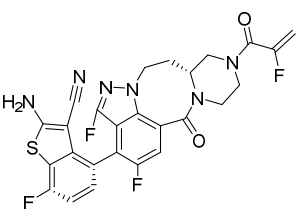
15. The compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 14, being selected from the group consisting of the following compounds:

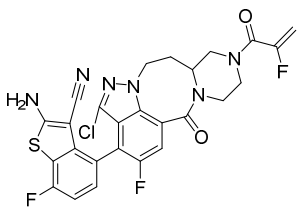
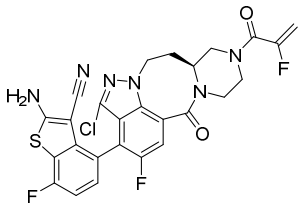
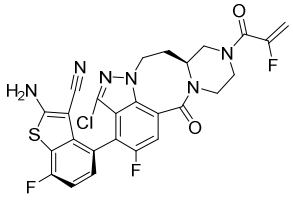
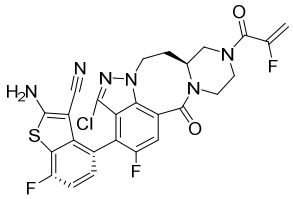
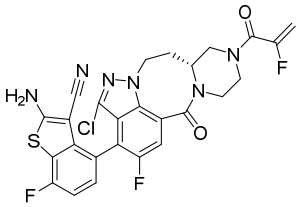
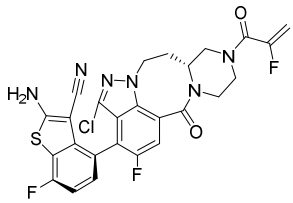
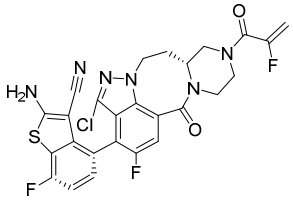
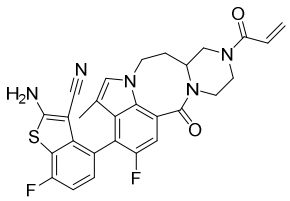
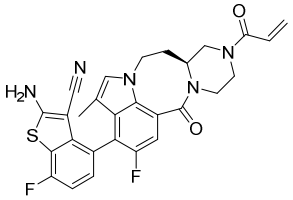
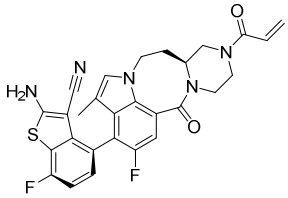
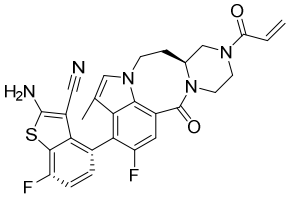
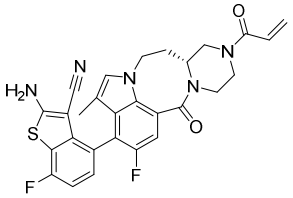
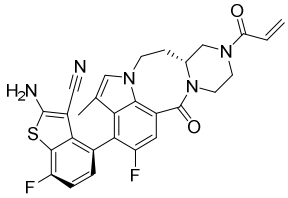
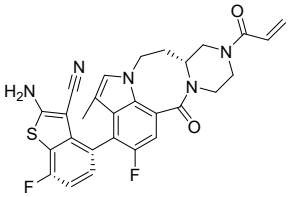
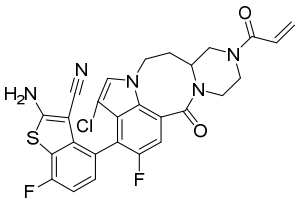
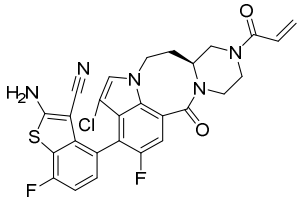
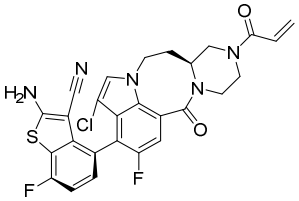
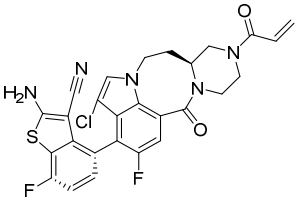
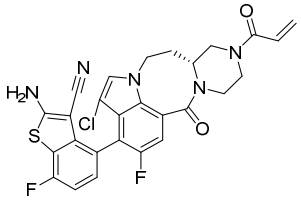
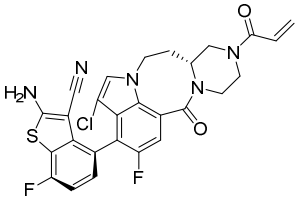
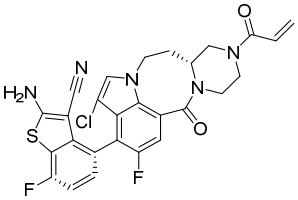

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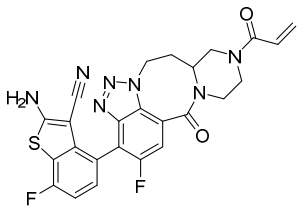
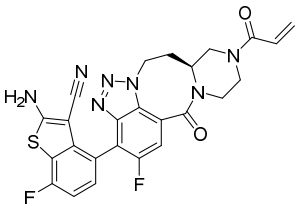
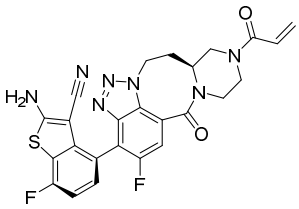
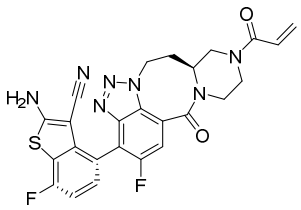
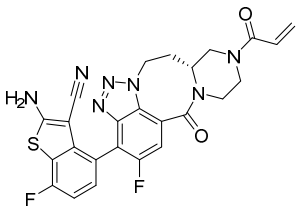
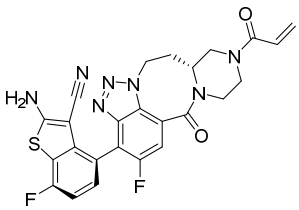
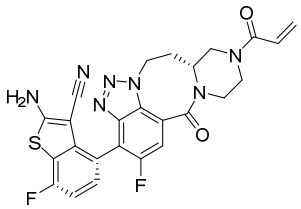
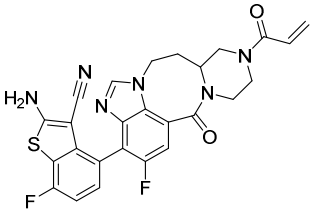
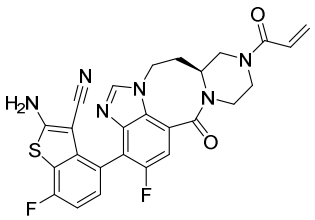
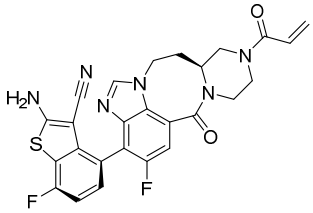
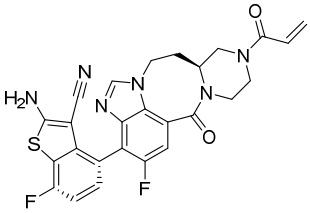
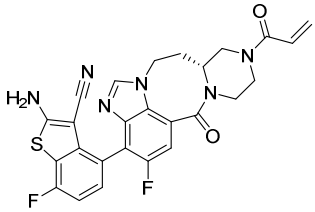
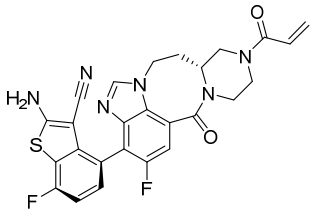
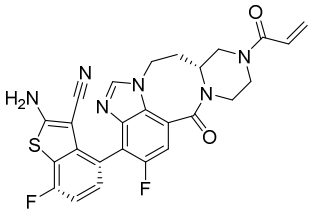

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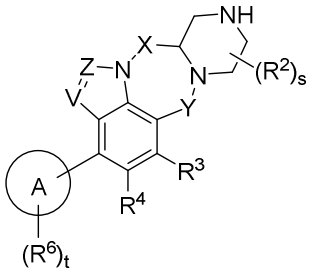

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16. A compound represented by general formula (IMa) or a salt thereof:

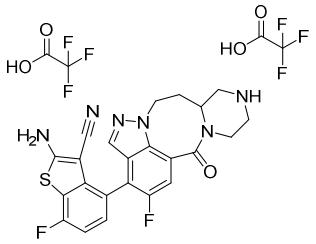
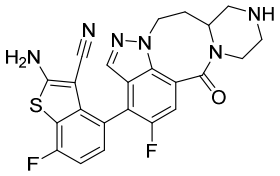
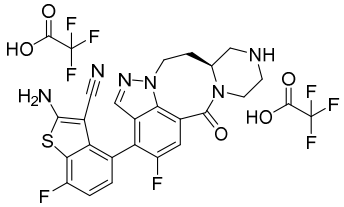
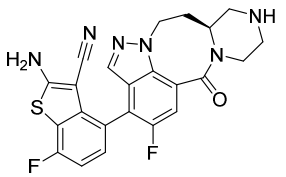
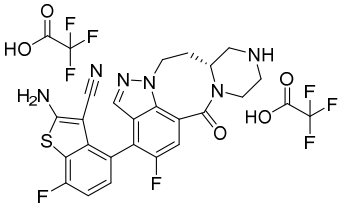
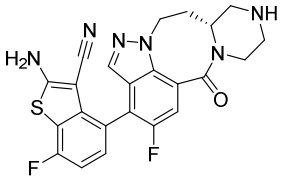
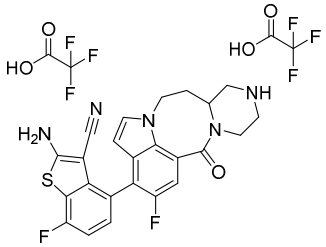
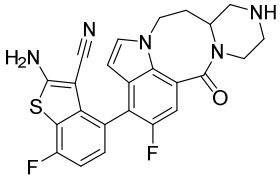
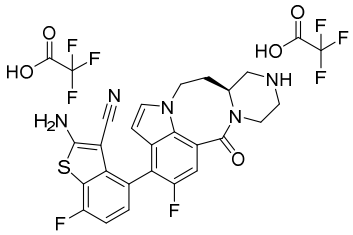
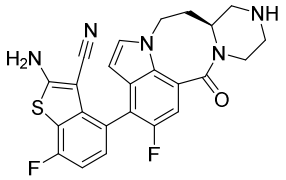
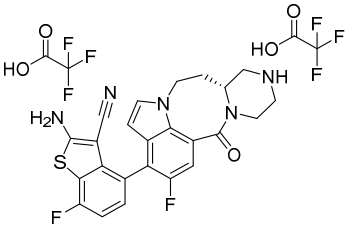
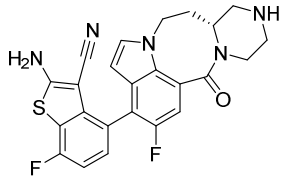
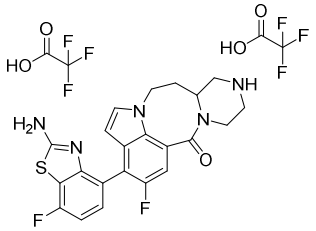
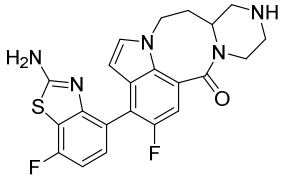
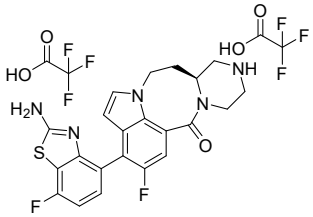
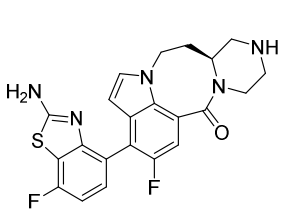
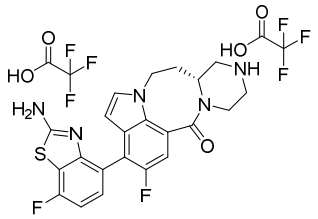
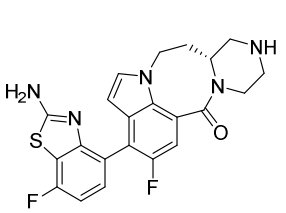


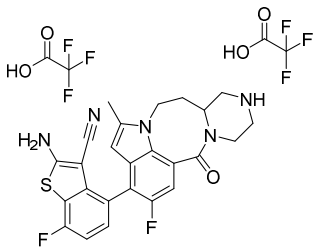
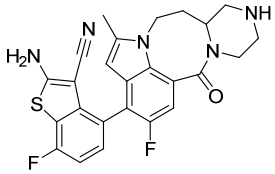
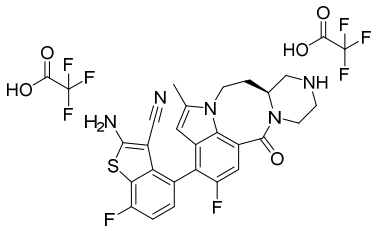
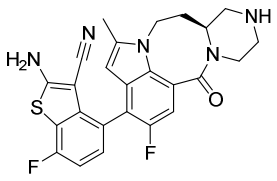
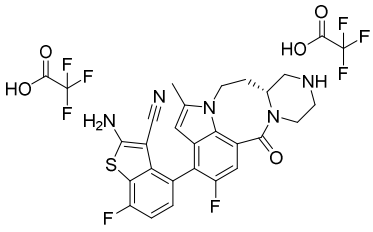
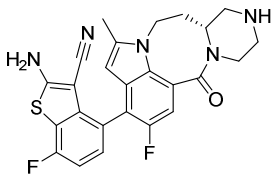
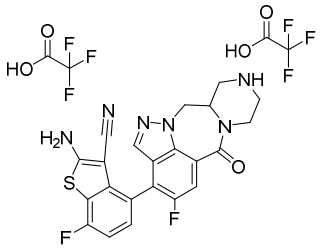
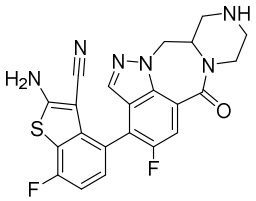
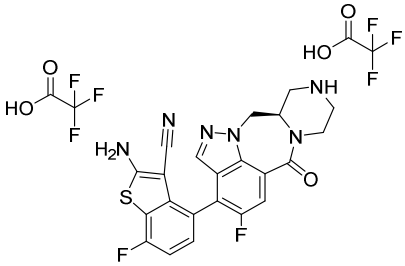
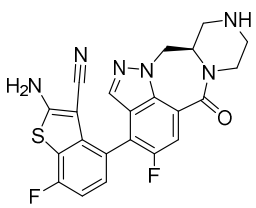
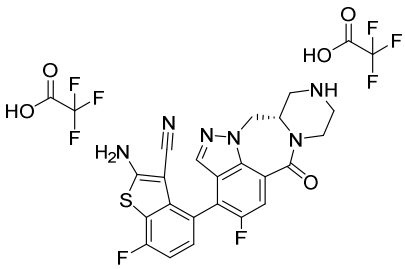
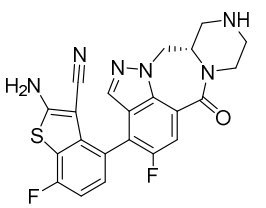
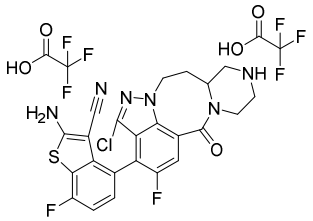
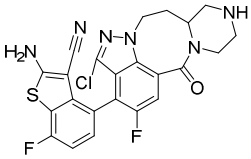
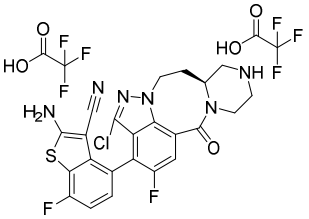
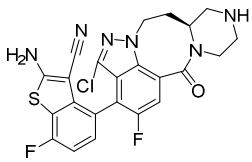
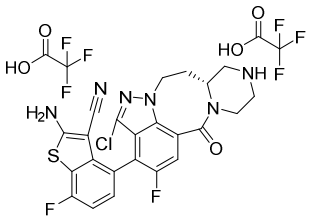
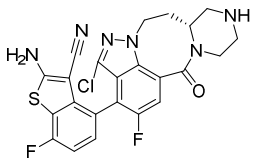
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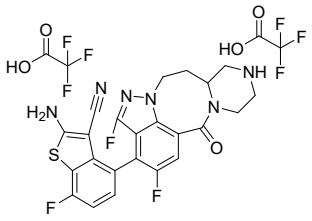
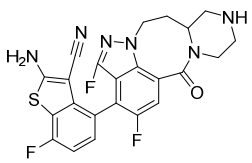
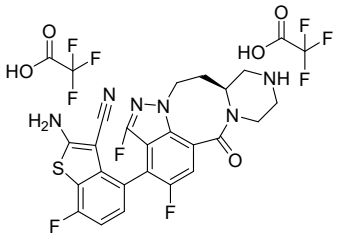
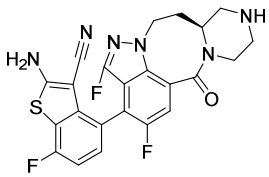
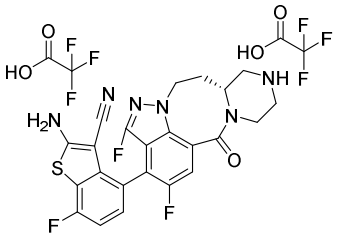
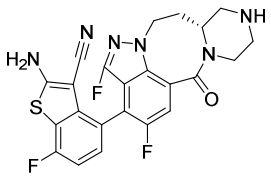
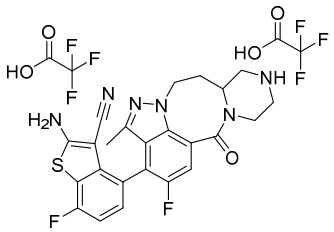
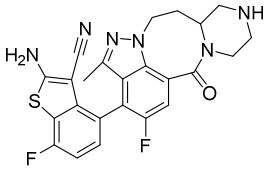
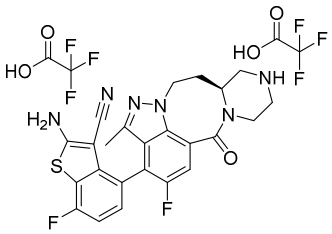
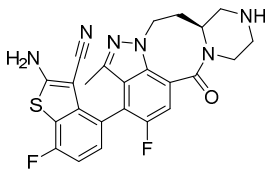
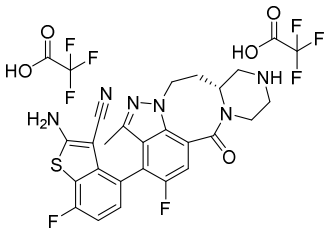
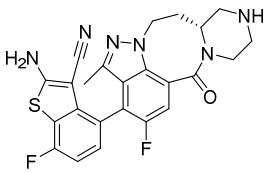
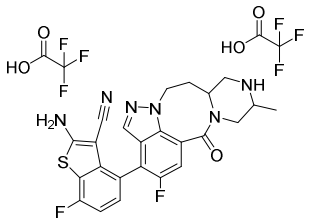
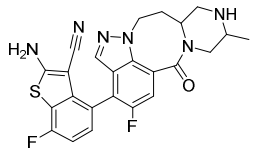
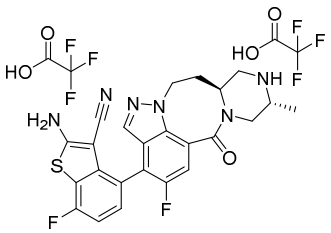
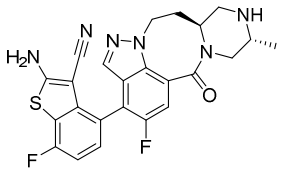
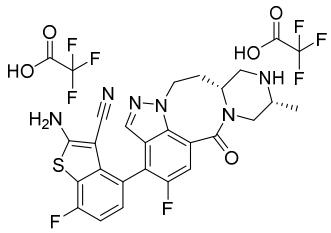
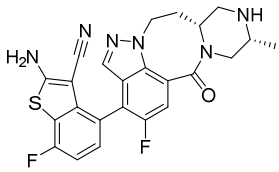
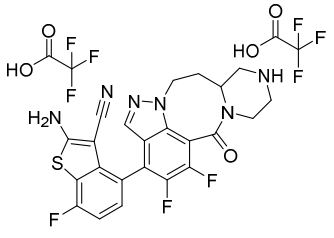
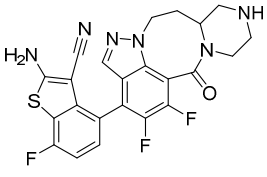
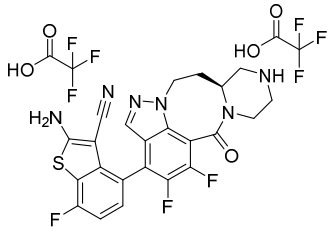
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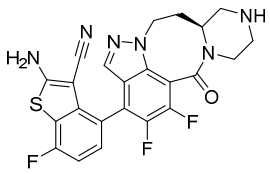
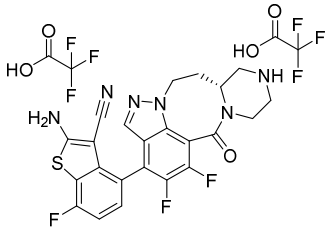
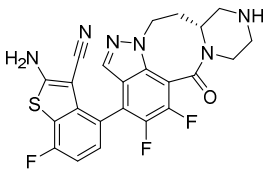
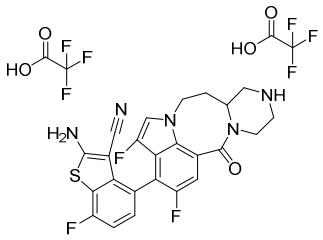
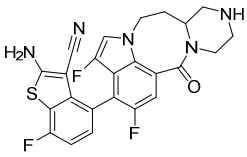
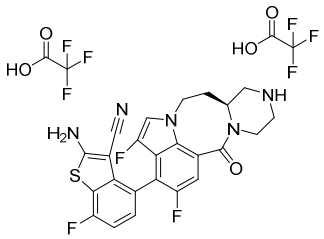
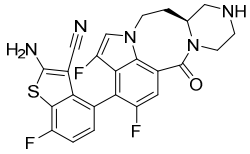
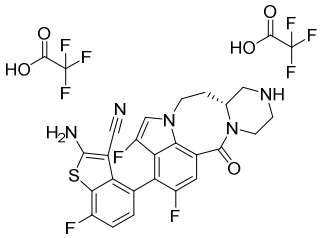
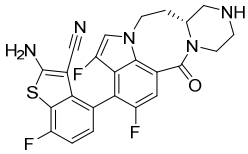
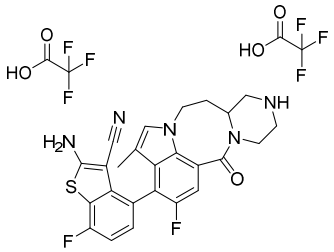
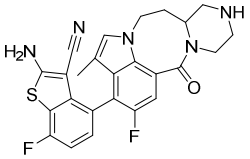
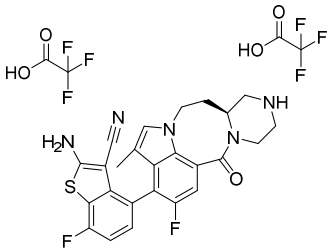
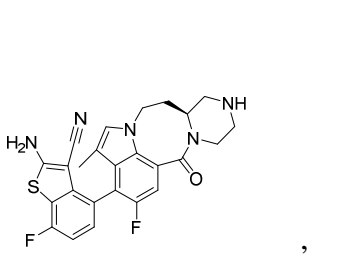
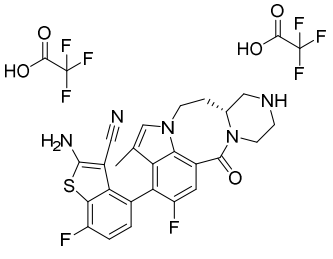
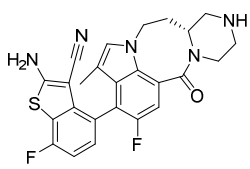
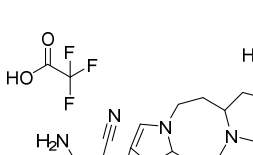
ring A, V, X, Y, Z, R^2, R^3, R^4, R^6, s, and t are as defined in claim 1.

17. A compound or a salt thereof, being selected from the group consisting of the following compounds:


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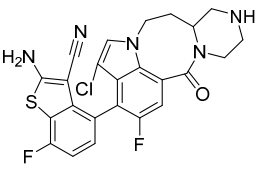
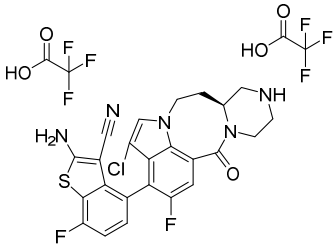
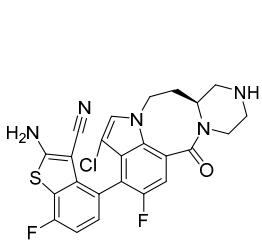
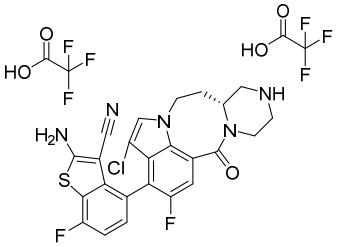
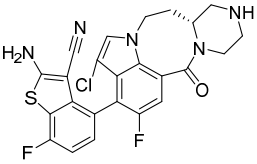

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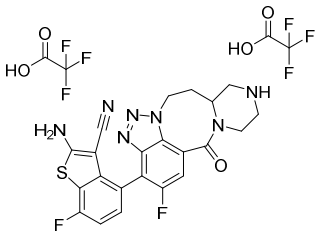
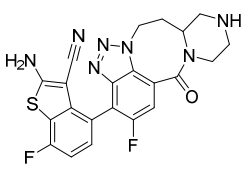
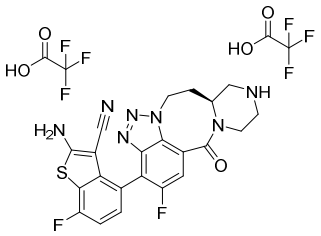
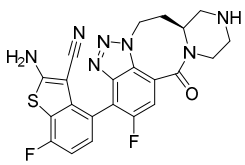
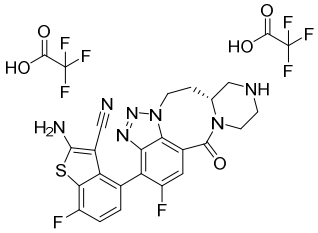
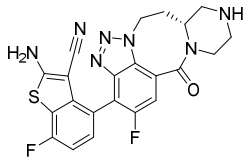
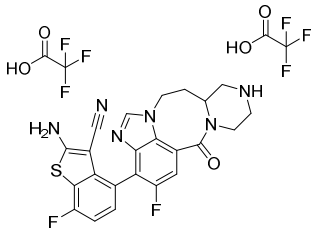
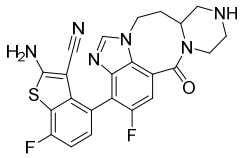
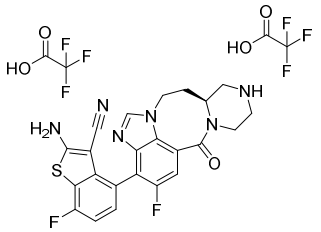
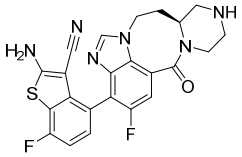
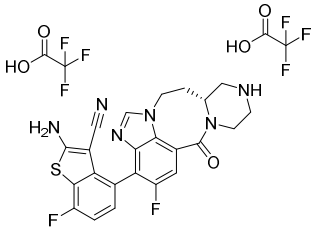
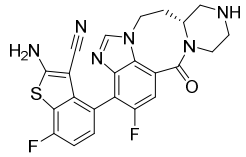
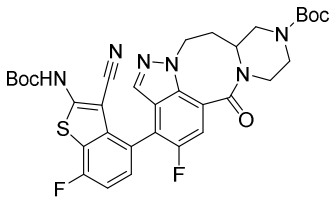
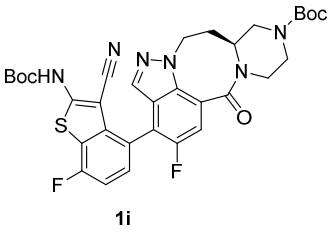
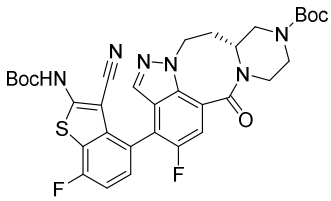
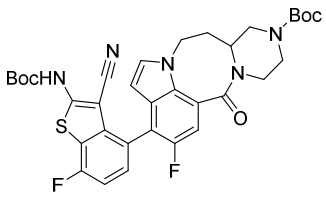
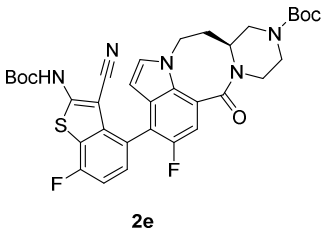
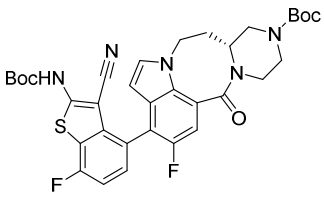
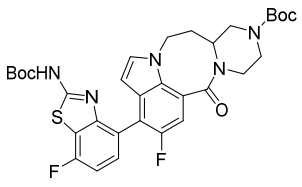
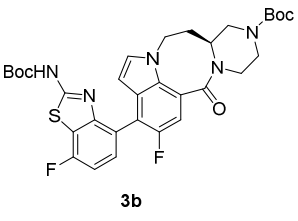
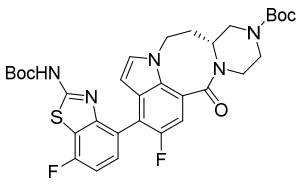
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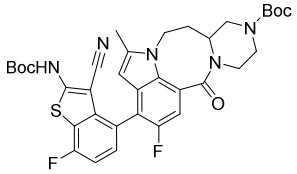
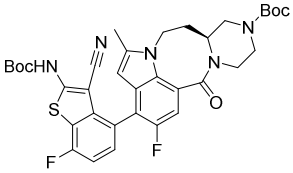
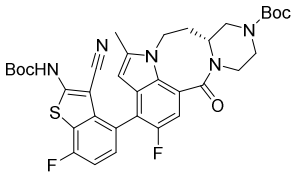
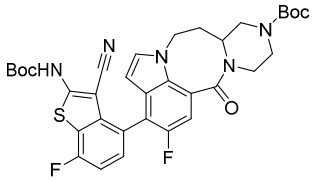
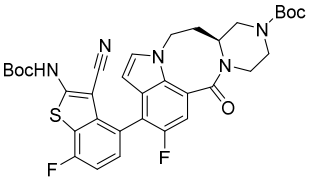
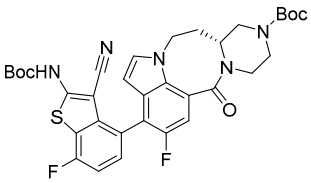
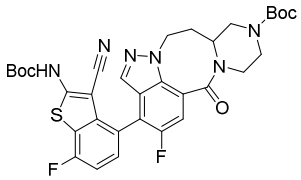
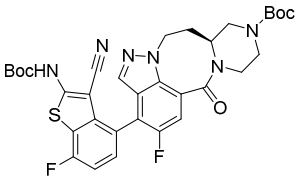
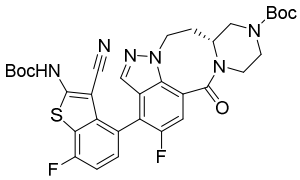
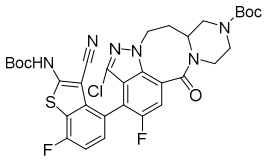
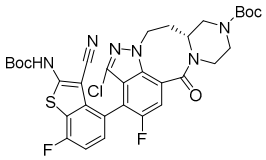
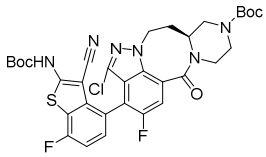
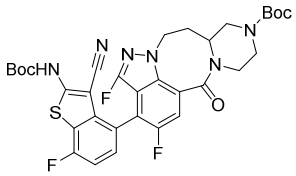
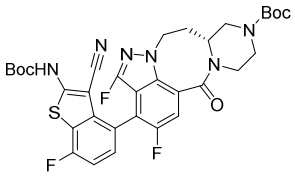
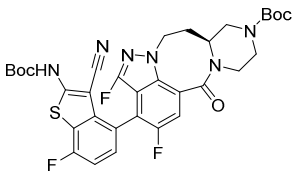
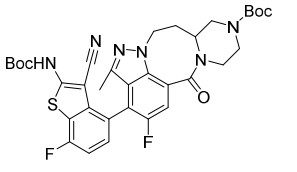
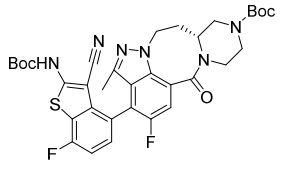
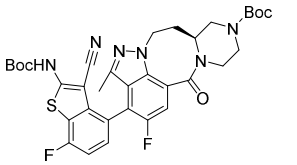
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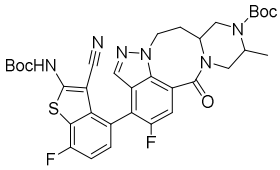
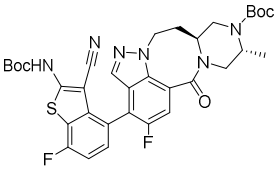
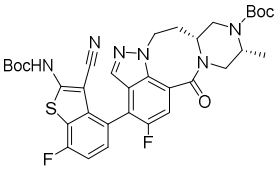
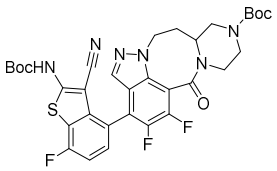
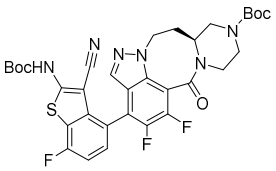
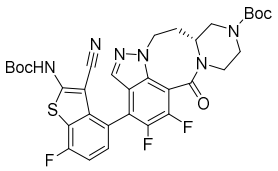
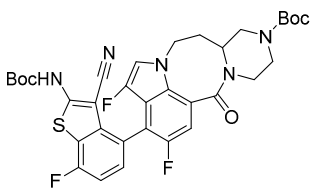
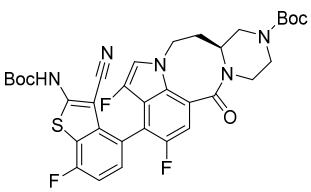
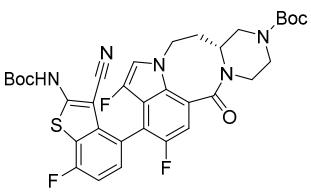
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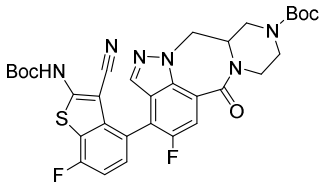
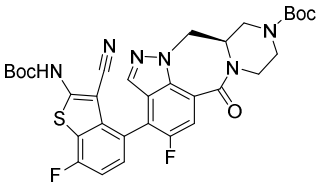
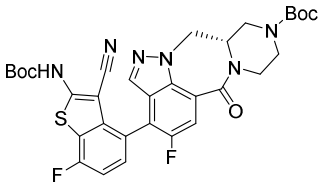
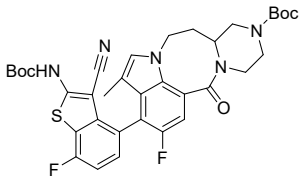
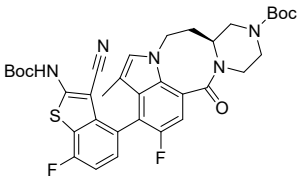
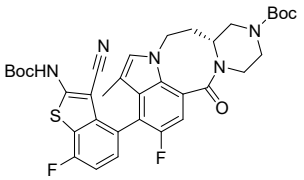
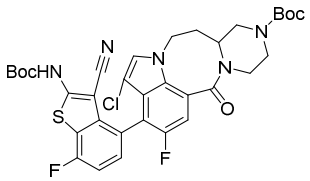
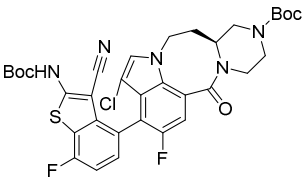
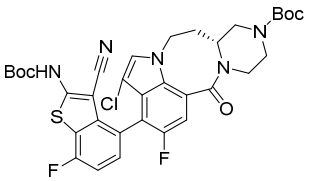
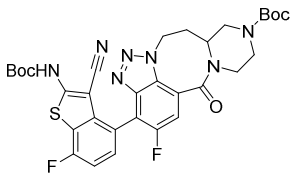
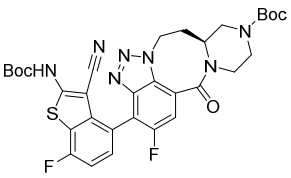
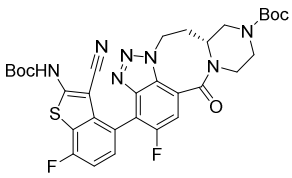
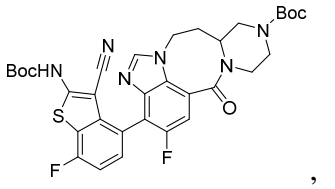
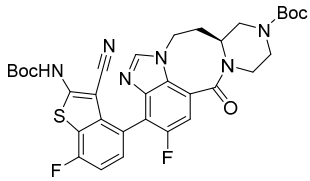
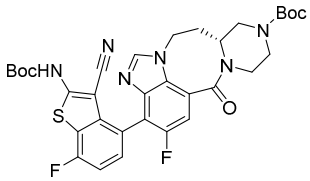

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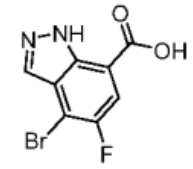
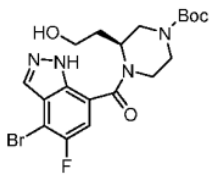
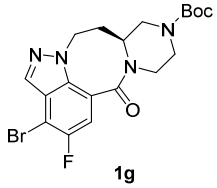
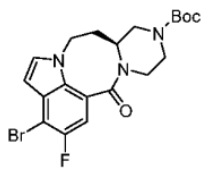
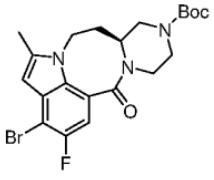
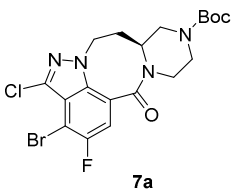
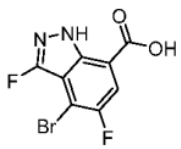
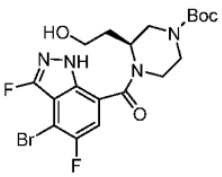
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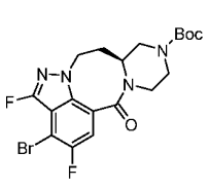
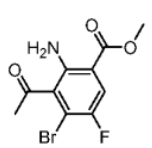
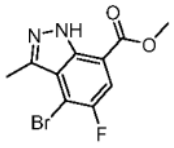
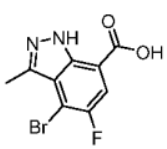
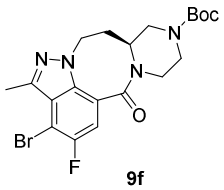
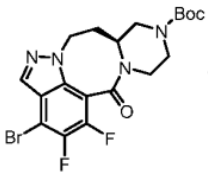
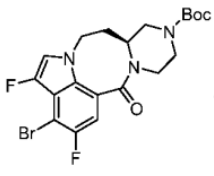
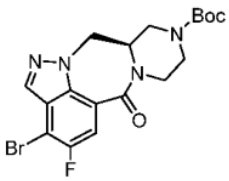
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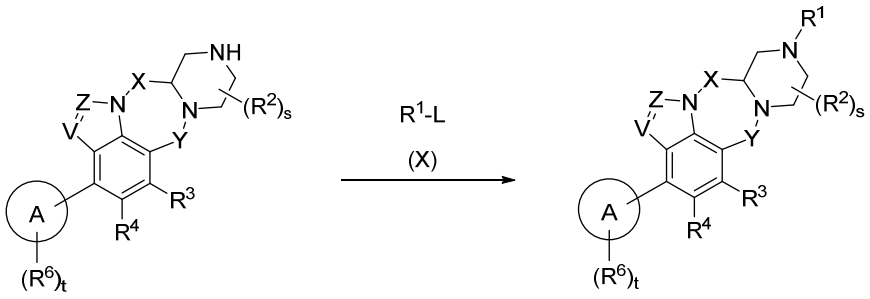
















18. A compound or a salt thereof, being selected from the group consisting of the following compounds:

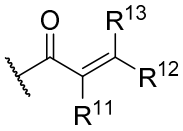
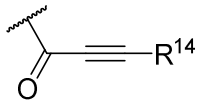

1c

1f

1g

2d

4d

7a

8a

8b


8c ,

9b ,

9c ,

9d ,

9f ,

11a ,

13a and

14c .

19. A method for preparing a compound represented by general formula (IM) or a pharmaceutically acceptable salt thereof, comprising:



(IMa) (IM)

conducting a reaction of a compound represented by general formula (IMa) or a salt thereof with a compound of general formula (X) or a salt thereof to give the compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof;
wherein:
L is halogen; preferably, L is Cl;
R^1 is  or  ;
ring A, V, X, Y, Z, R^2, R^3, R^4, R^6, R^{11}, R^{12}, R^{13}, R^{14}, s, and t are as defined in claim 1.

20. A pharmaceutical composition, wherein the pharmaceutical composition comprises the compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 15, and one or more pharmaceutically acceptable carriers, diluents, or excipients.

21. Use of the compound represented by general formula (IM) or the pharmaceutically acceptable salt thereof according to any of claims 1 to 15 or the pharmaceutical composition according to claim 19 in the preparation of a medicament for treating and/or preventing a tumor.

22. The use according to claim 21, wherein the tumor is a cancer; preferably, the cancer is selected from the group consisting of lung cancer, pancreatic cancer, cervical cancer, esophageal cancer, endometrial cancer, ovarian cancer, cholangiocarcinoma, colorectal cancer, liver cancer, breast cancer, prostate cancer, thyroid cancer, stomach cancer, urothelial cancer, testicular cancer, leukemia, skin cancer, squamous cell cancer, basal cell cancer, bladder cancer, head and neck cancer, kidney cancer, nasopharyngeal cancer, bone cancer, lymphoma, melanoma, sarcoma, peripheral neuroepithelioma, glioma, brain tumor, and myeloma; more preferably, the cancer is selected from the group consisting of lung cancer, pancreatic cancer, cervical cancer, esophageal cancer, endometrial cancer, ovarian cancer, cholangiocarcinoma, and colorectal cancer.