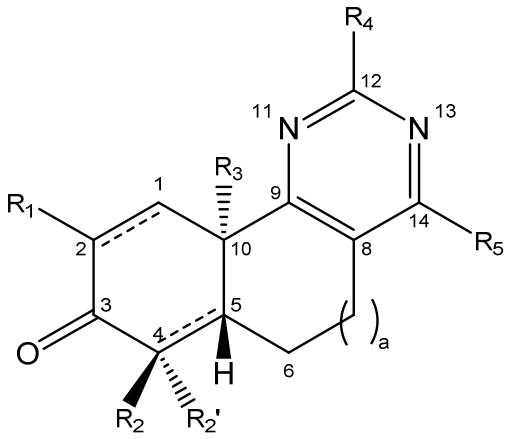
WHAT IS CLAIMED IS:

1. A compound of the formula:



(I)

wherein:

the bond between carbon atoms 1 and 2 is a single bond, an epoxidized double bond, or a double bond;

the bond between carbon atoms 4 and 5 is a single bond or a double bond;

a is 0, 1, or 2;

R_1 is cyano, heteroaryl$_{(C\leq 8)}$, substituted heteroaryl$_{(C\leq 8)}$, $-CF_3$, or $-C(O)R_a$; wherein:

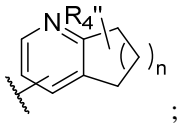
R_a is hydroxy, amino, or alkoxy$_{(C\leq 8)}$, alkylamino$_{(C\leq 8)}$, dialkylamino$_{(C\leq 8)}$, alkylsulfonylamino$_{(C\leq 8)}$, or a substituted version of any of these groups;

R_2 is hydrogen or alkyl$_{(C\leq 12)}$, cycloalkyl$_{(C\leq 12)}$, alkenyl$_{(C\leq 12)}$, alkynyl$_{(C\leq 12)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, acyl$_{(C\leq 12)}$, or a substituted version of any of these groups, or −alkanediyl$_{(C\leq 8)}$−cycloalkyl$_{(C\leq 12)}$ or a substituted version of this group;

R_2' is absent, hydrogen, or alkyl$_{(C\leq 12)}$, cycloalkyl$_{(C\leq 12)}$, alkenyl$_{(C\leq 12)}$, alkynyl$_{(C\leq 12)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, heteroaralkyl$_{(C\leq 12)}$, acyl$_{(C\leq 12)}$, or a substituted version of these groups; provided that when the bond between carbon atoms 4 and 5 is a double bond then R_2' is absent;

R_3 is alkyl$_{(C\leq 12)}$, alkenyl$_{(C\leq 12)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, or a substituted version of any of these groups;

R_4 is cycloalkyl$_{(C\leq 18)}$, substituted cycloalkyl$_{(C\leq 18)}$, aryl$_{(C\leq 18)}$, substituted aryl$_{(C\leq 18)}$, heteroaryl$_{(C\leq 18)}$, substituted heteroaryl$_{(C\leq 18)}$, heterocycloalkyl$_{(C\leq 18)}$, substituted heterocycloalkyl$_{(C\leq 18)}$, or



;

wherein:

n is 0, 1, 2, 3, or 4; and

R_4'' is –H, –OH, –F, –Cl, –Br, –I, $–NH_2$, $–NO_2$, –CN, –SH, $–S(O)_2OH$, or $–S(O)_2NH_2$, or $alkyl_{(C\leq 8)}$, $cycloalkyl_{(C\leq 8)}$, $aryl_{(C\leq 8)}$, $heteroaryl_{(C\leq 8)}$, $heterocycloalkyl_{(C\leq 8)}$, $acyl_{(C\leq 8)}$, $amido_{(C\leq 8)}$, $alkoxy_{(C\leq 8)}$, $acyloxy_{(C\leq 8)}$, $alkylamino_{(C\leq 8)}$, $dialkylamino_{(C\leq 8)}$, $–C(O)–alkoxy_{(C\leq 8)}$, $–C(O)–alkylamino_{(C\leq 8)}$, $–C(O)–dialkyl\text{-}amino_{(C\leq 8)}$, $alkylsulfonyl_{(C\leq 8)}$, $arylsulfonyl_{(C\leq 8)}$, $alkoxysulfonyl_{(C\leq 8)}$, or a substituted version of any of these groups; or

$$–X_2–(CH_2)_p–R_4'''$$;

wherein:

X_2 is $arenediyl_{(C\leq 12)}$, substituted $arenediyl_{(C\leq 12)}$, $heterocycloalkanediyl_{(C\leq 12)}$, substituted $heterocycloalkanediyl_{(C\leq 12)}$, $heteroarenediyl_{(C\leq 12)}$, or substituted $heteroarenediyl_{(C\leq 12)}$;

p is 0, 1, 2, 3, or 4; and

R_4''' is $alkyl_{(C\leq 8)}$, $cycloalkyl_{(C\leq 8)}$, $aryl_{(C\leq 8)}$, $heteroaryl_{(C\leq 8)}$, $heterocycloalkyl_{(C\leq 8)}$, $acyl_{(C\leq 8)}$, $amido_{(C\leq 8)}$, $alkoxy_{(C\leq 8)}$, $acyloxy_{(C\leq 8)}$, $–C(O)–alkoxy_{(C\leq 8)}$, $–C(O)–alkylamino_{(C\leq 8)}$, $–C(O)–dialkyl\text{-}amino_{(C\leq 8)}$, $alkylsulfonyl_{(C\leq 8)}$, $arylsulfonyl_{(C\leq 8)}$, $alkoxysulfonyl_{(C\leq 8)}$, or a substituted version of any of these groups; and

R_5 is amino, hydroxy, $–OS(O)_2C_6H_4CH_3$, $alkyl_{(C\leq 12)}$, $cycloalkyl_{(C\leq 12)}$, $cycloalkoxy_{(C\leq 12)}$, $aryl_{(C\leq 12)}$, $aralkyl_{(C\leq 12)}$, $heteroaryl_{(C\leq 12)}$, $heteroaralkyl_{(C\leq 12)}$, $heterocycloalkyl_{(C\leq 12)}$, $acyl_{(C\leq 12)}$, $acyloxy_{(C\leq 12)}$, $alkylamino_{(C\leq 12)}$, $dialkylamino_{(C\leq 12)}$, $alkylsulfonylamino_{(C\leq 12)}$, or a substituted version of any of the last thirteen groups, or

$$–OY_1–A_1$$;

wherein:

Y_1 is $alkanediyl_{(C\leq 8)}$ or substituted $alkanediyl_{(C\leq 8)}$; and

A_1 is $cycloalkyl_{(C\leq 8)}$ or substituted $cycloalkyl_{(C\leq 8)}$; or

$$–Y_2–C(O)NR_c–A_2$$;

wherein:

Y_2 is $arenediyl_{(C\leq 8)}$ or substituted $arenediyl_{(C\leq 8)}$;

R_c is hydrogen, $alkyl_{(C\leq 6)}$, or substituted $alkyl_{(C\leq 6)}$; and

A_2 is $aralkyl_{(C\leq 12)}$ or substituted $aralkyl_{(C\leq 12)}$; or

$-A_3R_d$;

wherein:

A_3 is $-O-$ or $-NR_e-$, wherein

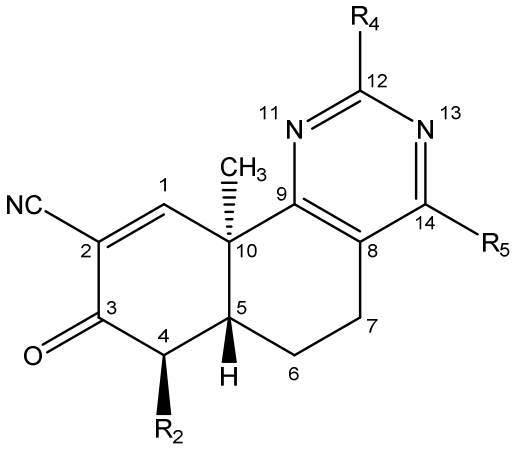
R_e is hydrogen, $alkyl_{(C\leq6)}$, or substituted $alkyl_{(C\leq6)}$; and

R_d is $acyl_{(C\leq12)}$, or substituted $acyl_{(C\leq12)}$;

provided that when carbon atoms 4 and 5 are joined by a double bond, then R_2' and the hydrogen atom at carbon atom 5 are absent;

or a pharmaceutically acceptable salt thereof.

2. The compound of claim 1 further defined as:



(VII)

wherein:

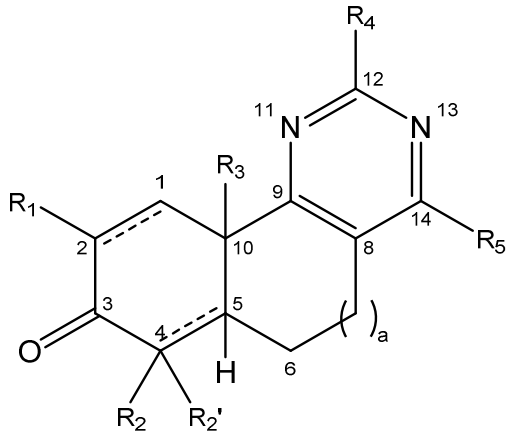
R_2 is hydrogen, $alkyl_{(C\leq12)}$, or substituted $alkyl_{(C\leq12)}$;

R_4 is $heteroaryl_{(C\leq18)}$ or substituted $heteroaryl_{(C\leq18)}$; and

R_5 is $aryl_{(C\leq12)}$ or substituted $aryl_{(C\leq12)}$;

or a pharmaceutically acceptable salt thereof.

3. A compound of the formula:



(X)

wherein:

the bond between carbon atoms 1 and 2 is a single bond, an epoxidized double bond, or a double bond;

the bond between carbon atoms 4 and 5 is a single bond or a double bond;

a is 0, 1, or 2;

R_1 is cyano, heteroaryl$_{(C\leq 8)}$, substituted heteroaryl$_{(C\leq 8)}$, $-CF_3$, or $-C(O)R_a$; wherein:

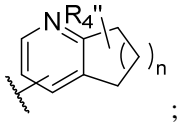
R_a is hydroxy, amino, or alkoxy$_{(C\leq 8)}$, alkylamino$_{(C\leq 8)}$, dialkylamino$_{(C\leq 8)}$, alkylsulfonylamino$_{(C\leq 8)}$, or a substituted version of any of these groups;

R_2 is hydrogen, alkyl$_{(C\leq 12)}$, cycloalkyl$_{(C\leq 12)}$, alkenyl$_{(C\leq 12)}$, alkynyl$_{(C\leq 12)}$, or a substituted version of the last four groups, or −alkanediyl$_{(C\leq 8)}$−cycloalkyl$_{(C\leq 12)}$ or a substituted version of this group;

R_2' is absent, hydrogen, alkyl$_{(C\leq 12)}$, cycloalkyl$_{(C\leq 12)}$, alkenyl$_{(C\leq 12)}$, alkynyl$_{(C\leq 12)}$, or a substituted version of the last four groups, provided that when the bond between carbon atoms 4 and 5 is a double bond then R_2' is absent;

R_3 is alkyl$_{(C\leq 12)}$, aryl$_{(C\leq 12)}$, aralkyl$_{(C\leq 12)}$, or a substituted version of any of these groups;

R_4 is cycloalkyl$_{(C\leq 18)}$, substituted cycloalkyl$_{(C\leq 18)}$, heteroaryl$_{(C\leq 18)}$, substituted heteroaryl$_{(C\leq 18)}$, heterocycloalkyl$_{(C\leq 18)}$, substituted heterocycloalkyl$_{(C\leq 18)}$, or



;

wherein:

n is 0, 1, 2, 3, or 4; and

R_4'' is −H, −OH, −F, −Cl, −Br, −I, $-NH_2$, $-NO_2$, −CN, −SH, $-S(O)_2OH$, or $-S(O)_2NH_2$, or alkyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 8)}$, heteroaryl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, acyl$_{(C\leq 8)}$, amido$_{(C\leq 8)}$, alkoxy$_{(C\leq 8)}$, acyloxy$_{(C\leq 8)}$, alkylamino$_{(C\leq 8)}$, dialkylamino$_{(C\leq 8)}$, −C(O)−alkoxy$_{(C\leq 8)}$, −C(O)−alkylamino$_{(C\leq 8)}$, −C(O)−dialkyl-amino$_{(C\leq 8)}$, alkylsulfonyl$_{(C\leq 8)}$, arylsulfonyl$_{(C\leq 8)}$, alkoxysulfonyl$_{(C\leq 8)}$, or a substituted version of any of these groups; or

$$-X_2-(CH_2)_p-R_4'''$$;

wherein:

X_2 is arenediyl$_{(C\leq 12)}$, substituted arenediyl$_{(C\leq 12)}$, heterocycloalkyldiyl$_{(C\leq 12)}$, substituted heterocycloalkyldiyl$_{(C\leq 12)}$, heteroarenediyl$_{(C\leq 12)}$, or substituted heteroarenediyl$_{(C\leq 12)}$;

p is 0, 1, 2, 3, or 4; and

R_4''' is alkyl$_{(C\leq 8)}$, cycloalkyl$_{(C\leq 8)}$, aryl$_{(C\leq 8)}$, heteroaryl$_{(C\leq 8)}$, heterocycloalkyl$_{(C\leq 8)}$, acyl$_{(C\leq 8)}$, alkoxy$_{(C\leq 8)}$, acyloxy$_{(C\leq 8)}$, −C(O)−alkoxy$_{(C\leq 8)}$,

−C(O)−alkylamino$_{(C\leq 8)}$, −C(O)−dialkyl-amino$_{(C\leq 8)}$, alkylsulfonyl$_{(C\leq 8)}$, arylsulfonyl$_{(C\leq 8)}$, alkoxysulfonyl$_{(C\leq 8)}$, or a substituted version of any of these groups; and

R_5 is cycloalkoxy$_{(C\leq 12)}$, aryl$_{(C\leq 12)}$, heteroaryl$_{(C\leq 12)}$, or a substituted version of any of the last three groups, or

$$-OY_1-A_1;$$

wherein:

Y_1 is alkanediyl$_{(C\leq 8)}$ or substituted alkanediyl$_{(C\leq 8)}$; and

A_1 is cycloalkyl$_{(C\leq 8)}$ or substituted cycloalkyl$_{(C\leq 8)}$; or

provided that when carbon atoms 4 and 5 are joined by a double bond, then R_2' and the hydrogen atom at carbon atom 5 are absent;

or a pharmaceutically acceptable salt thereof.

4. The compound according to any one of claims 1-3, wherein R_1 is cyano.

5. The compound according to any one of claims 1-4, wherein R_2 is alkyl$_{(C\leq 12)}$ or substituted alkyl$_{(C\leq 12)}$.

6. The compound according to any one of claims 1-5, wherein R_2' is hydrogen, alkyl$_{(C\leq 12)}$, or substituted alkyl$_{(C\leq 12)}$, or R_3 is alkyl$_{(C\leq 12)}$ or substituted alkyl$_{(C\leq 12)}$.

7. The compound according to any one of claims 1-6, wherein R_4 is heteroaryl$_{(C\leq 18)}$ or substituted heteroaryl$_{(C\leq 18)}$.

8. The compound of claim 7, wherein R_4 is a heteroaryl$_{(C\leq 12)}$ or a substituted heteroaryl$_{(C\leq 12)}$ group wherein at least one of the heteroatoms in the aromatic ring is a nitrogen atom.

9. The compound of claim 7, wherein R_4 is heteroaryl$_{(C\leq 18)}$.

10. The compound of claim 9, wherein R_4 is 3-pyridinyl, 4-pyridinyl, 4-(2-cycylopropyl)-pyridinyl, 5-(2-cycylopropyl)-pyridinyl, 4-(2-morpholino)-pyridinyl, 4-(2-phenyl)-pyridinyl, 3-(5-methyl)-pyridinyl, 3-(6-methyl)-pyridinyl, 4-(2-methyl)-pyridinyl, 4-(3-methyl)-pyridinyl, 3-pyrazolo[1,5-*a*]pyridinyl, 3-(*N*-methyl)-pyrrolo[2,3-*b*]pyridinyl, 5-isoquinlinyl, 2-isoquinlinyl, 1-isoquinolinyl, 4-(2-phenyl)-pyridinyl, 5-(2-phenyl)-pyridinyl, 3-(5-methyl)-pyridinyl, 4-(3-methyl)-pyridinyl, 4-(3,5-dimethyl)-isoxazolyl, 4-(2-methyl)-pyridinyl, 4-(3-methyl)-pyridinyl, 3-(4-methyl)-pyridinyl, 4-(6-methyl)-pyrimidinyl, 6-(4-methyl)-pyrimidinyl, 4-pyridazinyl, 2-quinazolinyl, 4-quinazolinyl, 2-quinolinyl, 3-quinolinyl, 4-quinolinyl, 5-quinolinyl, 6-quinolinyl, 8-quinolinyl, 4-isoquinolinyl, 3-(8-methyl)-quinolinyl, 3-(1-methyl)-quinolinyl, 4-(2-methyl)-quinolinyl, 4-(2-isopropyl)-quinolinyl, 4-(6-methyl)-quinolinyl, 4-(7-methyl)-quinolinyl, 4-(8-methyl)-quinolinyl, 2-(*N*-methyl)-indolyl, 5-(2,4-dimethyl)-thiazolyl, or 5-(3-methyl)-oxadizolyl.

11. The compound of claim 7, wherein R_4 is substituted heteroaryl$_{(C\leq18)}$.

12. The compound of claim 11, wherein R_4 is 4-(2-trifluoromethyl)-pyridinyl, 4-(3-fluoro)-pyridinyl, 4-(2-methoxy)-pyridinyl, 4-(2-hydroxymethyl)-pyridinyl, 4-(2-acetylamino)-pyridinyl, 4-(2-fluoromethyl)-pyridinyl, 4-(2-acetamidylethyl)-pyridinyl, 4-(2-fluoromethyl)-quinolinyl, 4-(2-acetoxymethyl)-quinolinyl, 4-(2-formyl)-quinolinyl, 4-(6-fluoro)-quinolinyl, 4-(7-fluoro)-quinolinyl, 4-(8-fluoro)-quinolinyl, 4-(6,8-difluoro)-quinolinyl, 4-(6-fluoro-2-methyl)-quinolinyl, or 4-(8-fluoro-2-methyl)-quinolinyl.

13. The compound according to any one of claims 1-6, wherein R_4 is aryl$_{(C\leq12)}$ or substituted aryl$_{(C\leq12)}$.

14. The compound according to any one of claims 1-13, wherein R_5 is aryl$_{(C\leq12)}$ or substituted aryl$_{(C\leq12)}$.

15. The compound of claim 14, wherein R_5 is aryl$_{(C\leq12)}$.

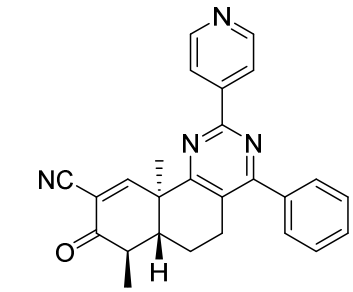
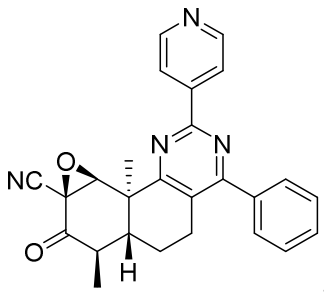
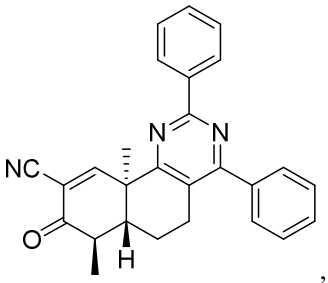
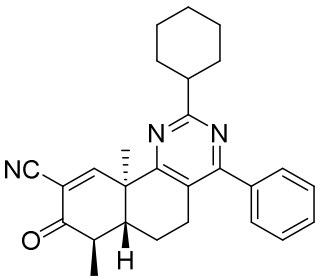
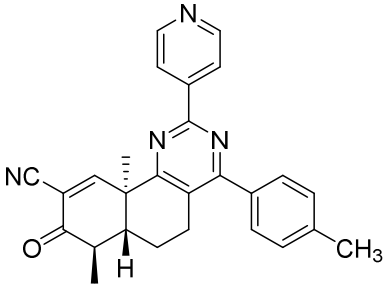
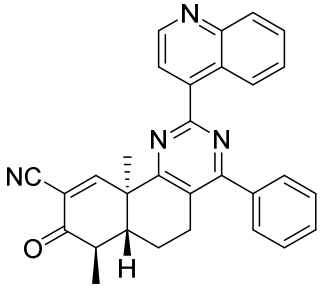
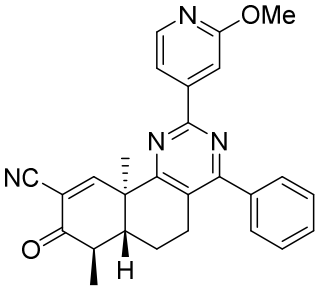
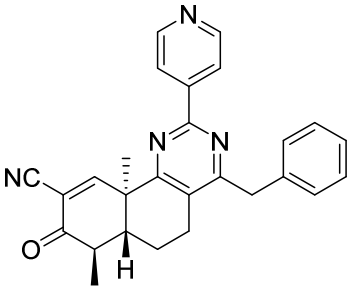
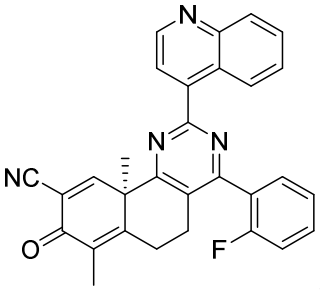
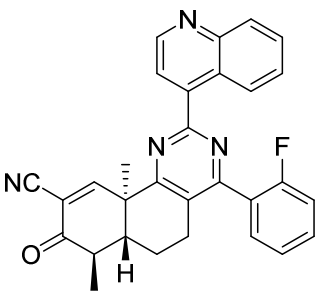
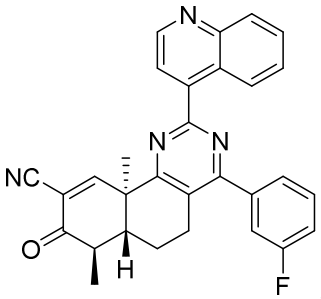
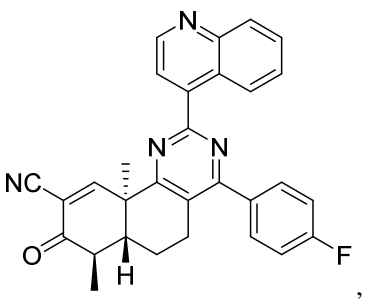
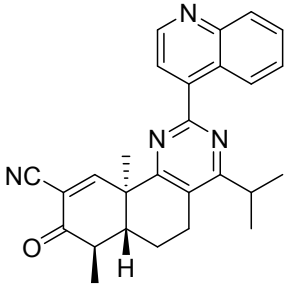
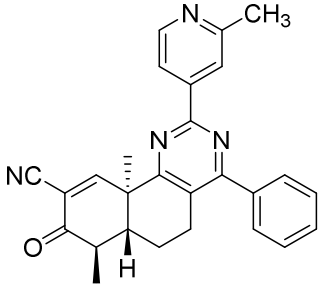
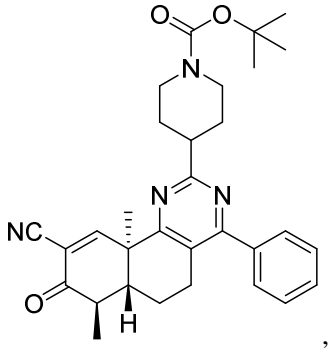
16. The compound of claim 15, wherein R_5 is phenyl, 4-methylphenyl, 3-isopropylphenyl, 4-isopropylphenyl, 1,3-biphenyl, or 1,4-biphenyl.

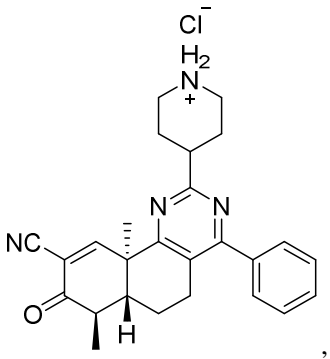
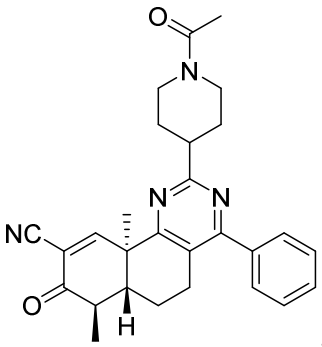
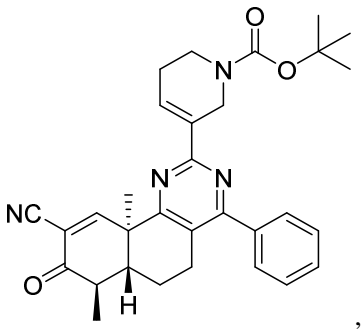
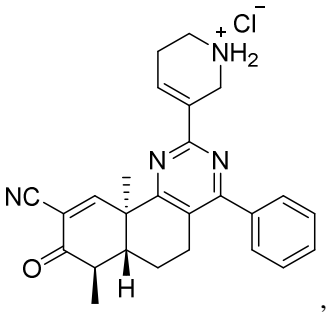
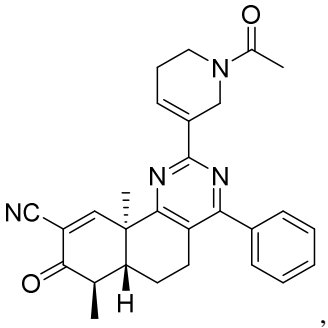
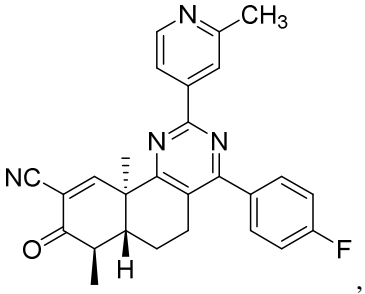
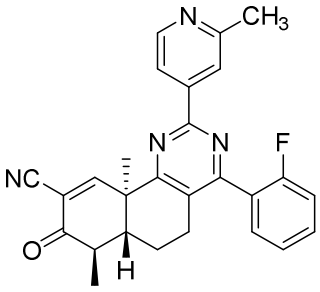
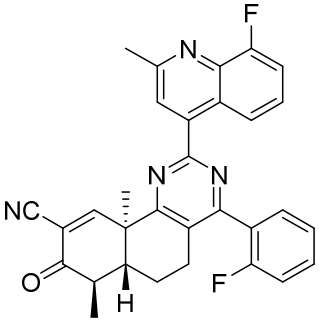
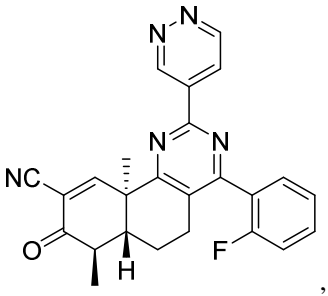
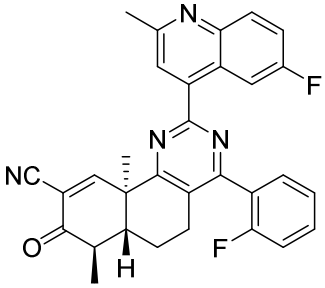
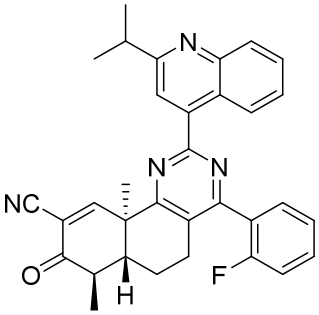
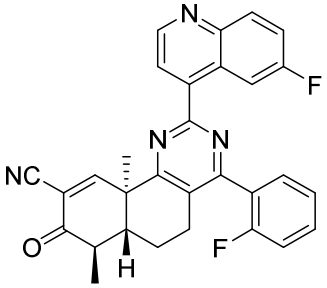
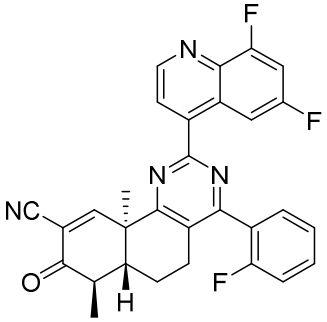
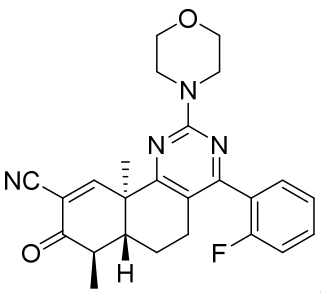
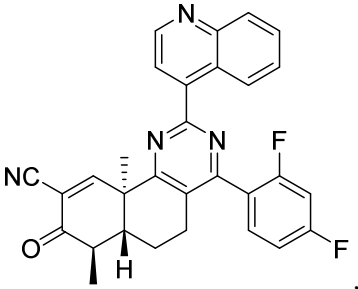
17. The compound of claim 14, wherein R_5 is a substituted aryl$_{(C\leq12)}$ wherein one or more hydrogen atoms of the aryl$_{(C\leq12)}$ has been independently replaced by –F.

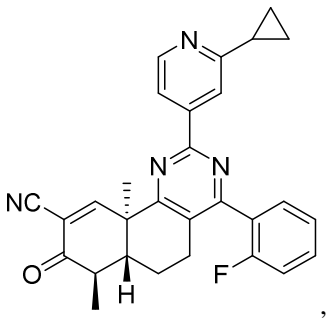
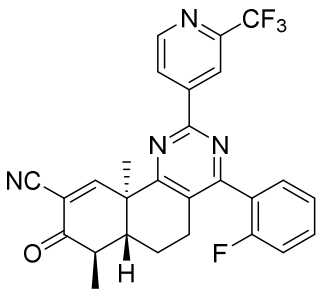
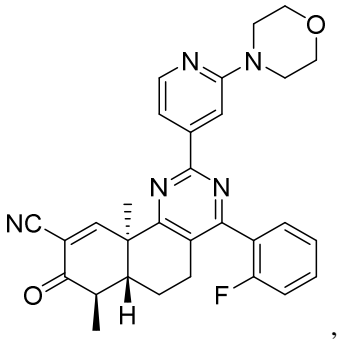
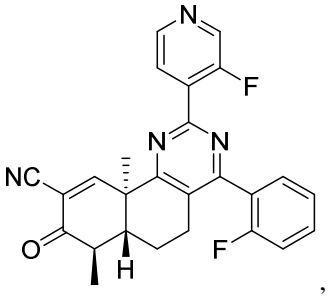
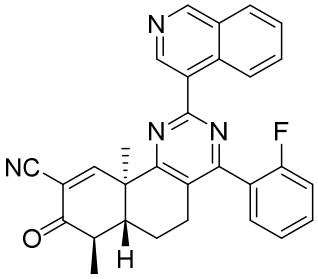
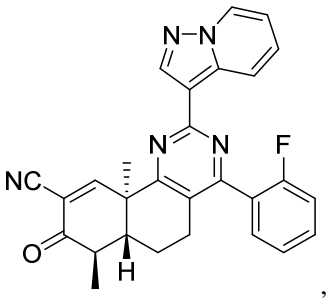
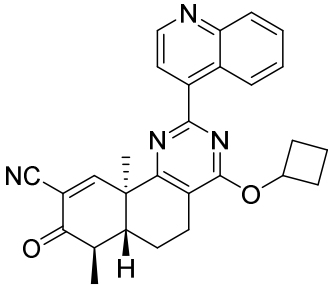
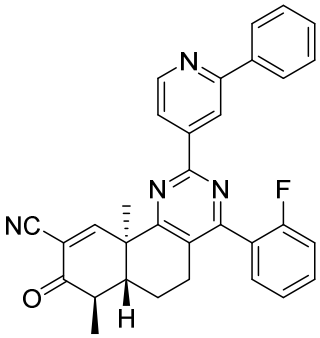
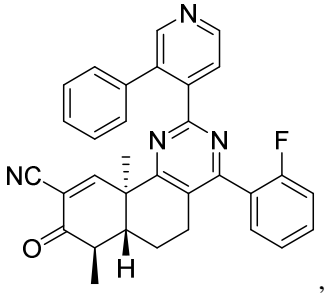
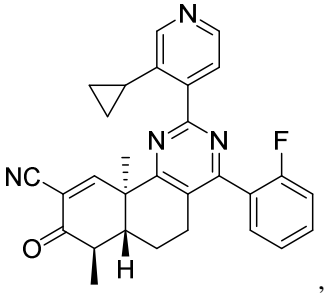
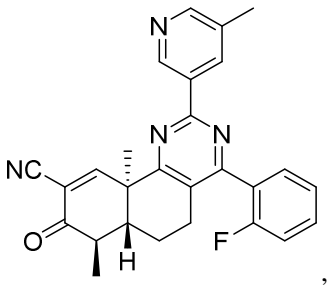
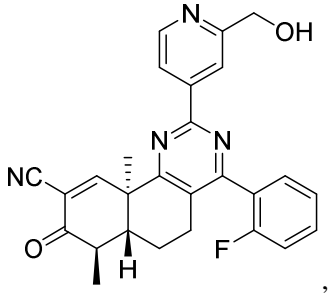
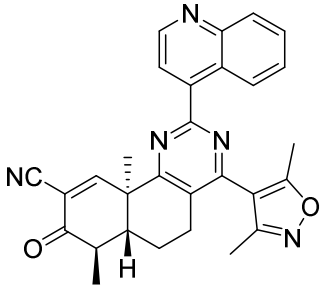
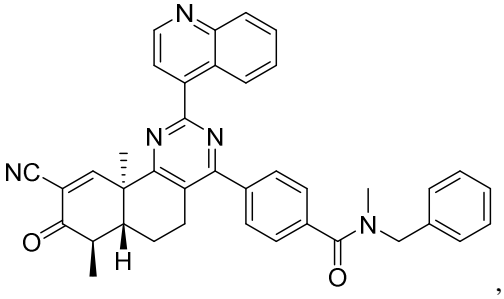
18. The compound of either claim 14 or claim 17, wherein R_5 is substituted aryl$_{(C\leq12)}$.

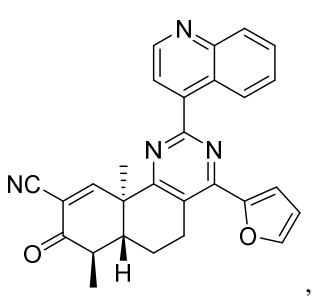
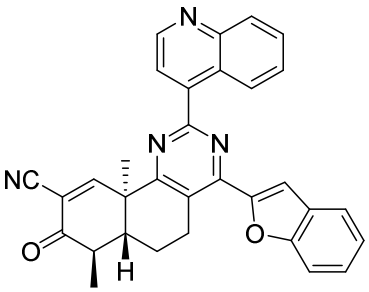
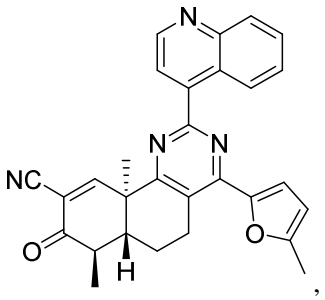
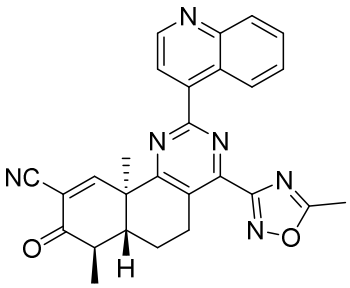
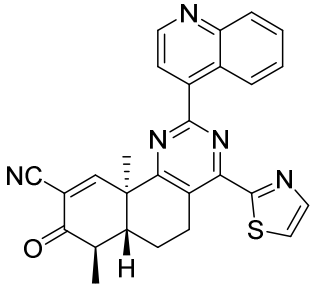
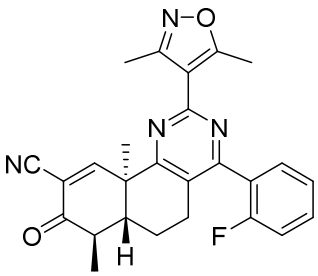
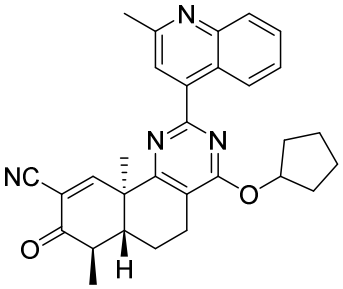
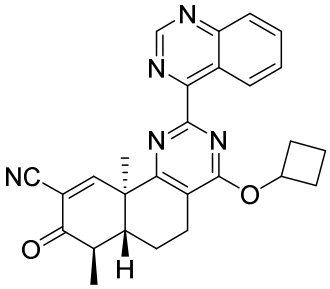
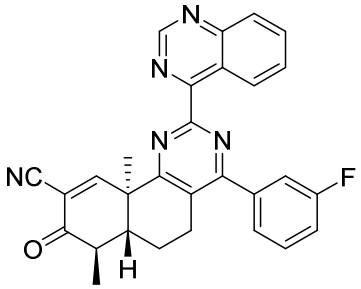
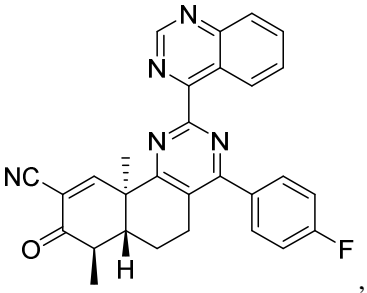
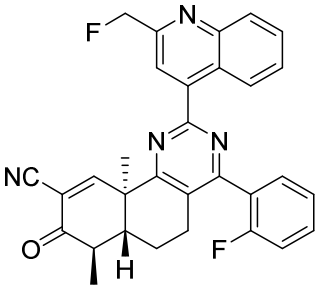
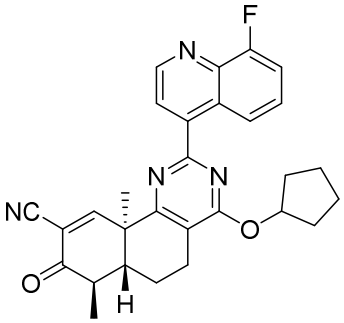
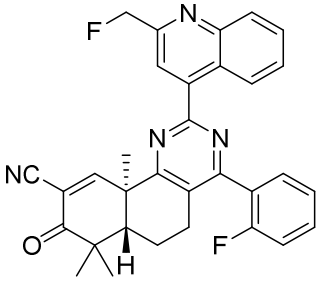
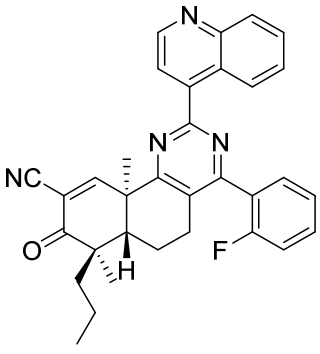
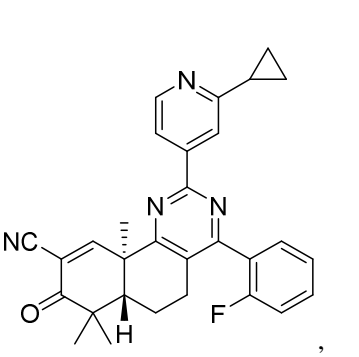
19. The compound of claim 18, wherein R_5 is 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2,4-difluorophenyl, 4-hydroxymethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 4-methoxyphenyl, 4-chlorophenyl, or 3,4-dichlorophenyl.

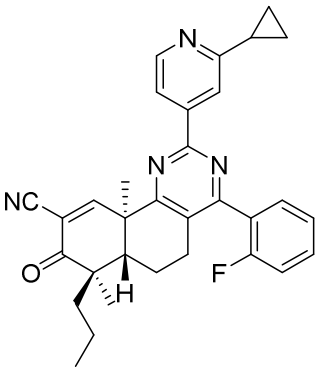
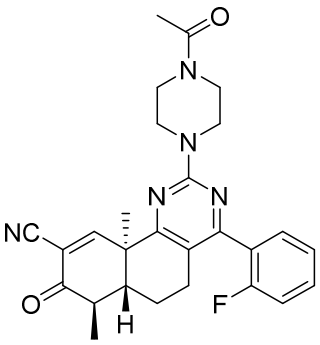
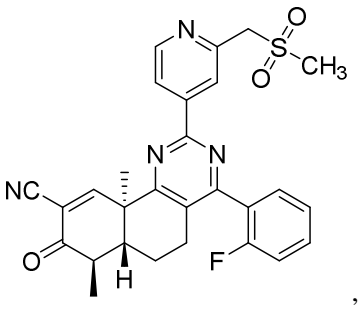
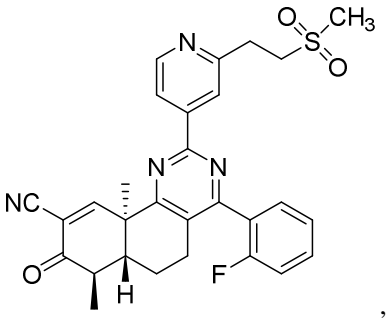
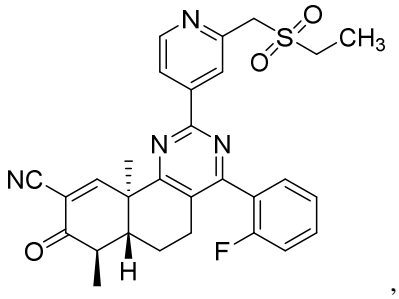
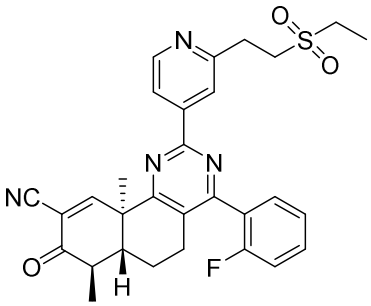
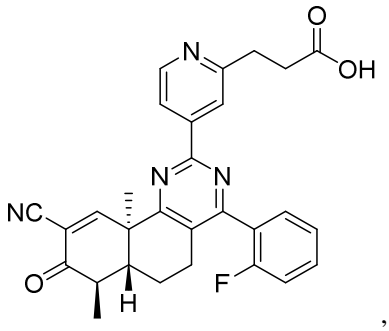
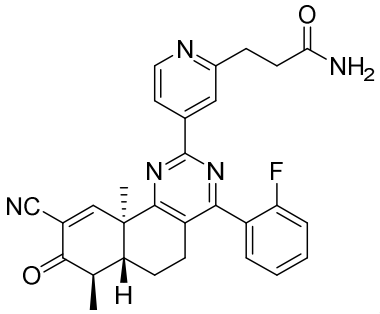
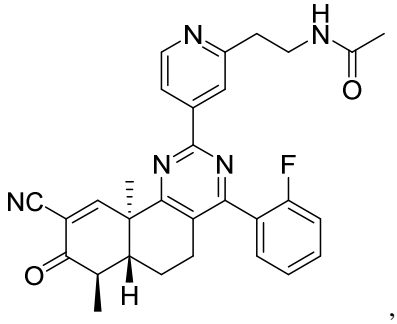
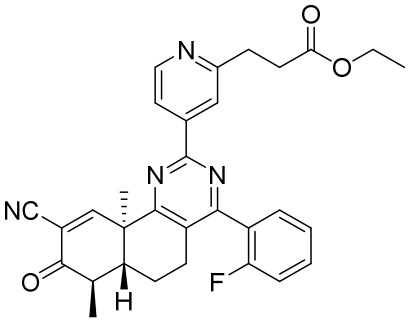
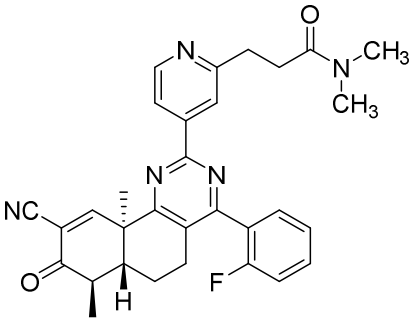
20. The compound according to any one of claims 1-3, wherein the compound is further defined as:


,

,

,

,

,

,

,

,

,

,

,

,

,

,

,


,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

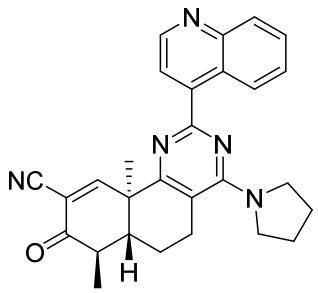
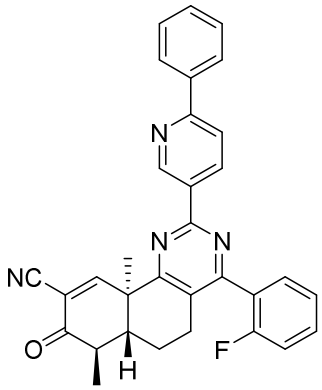
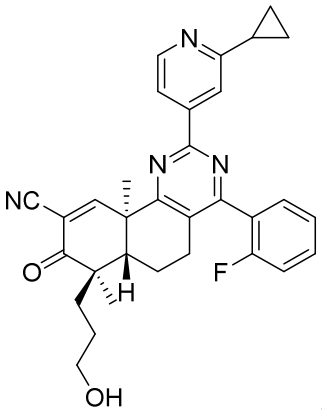
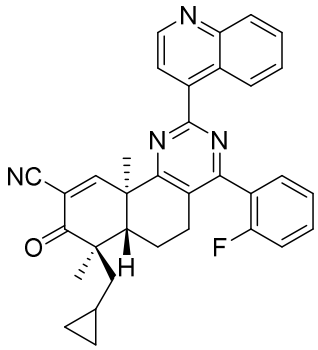
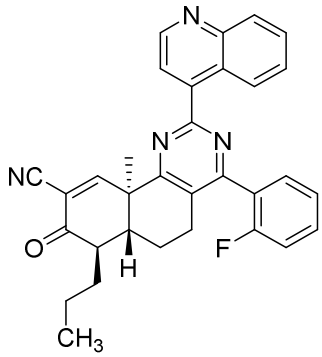
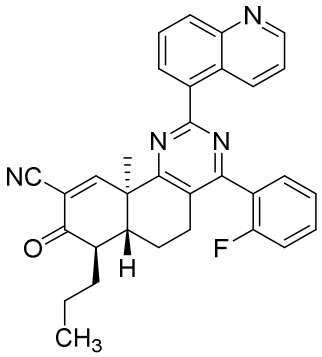
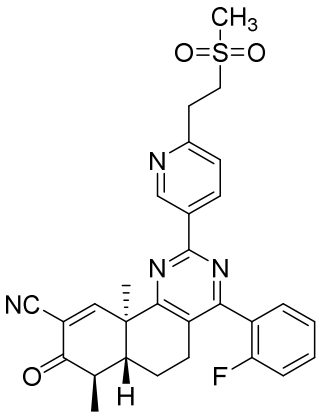
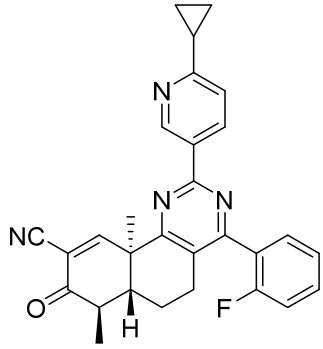
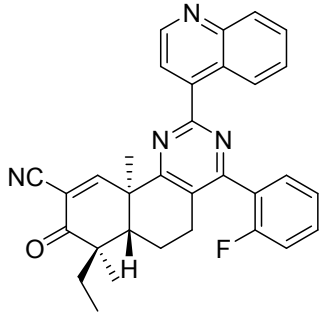
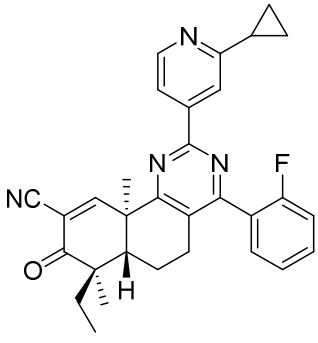
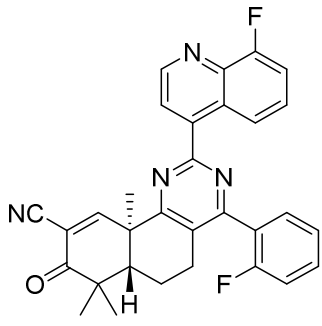
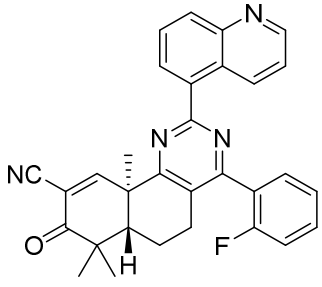

,

,

,

,

,

,

,

,

,

,

,

,

,

,

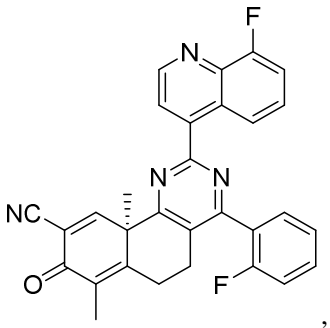
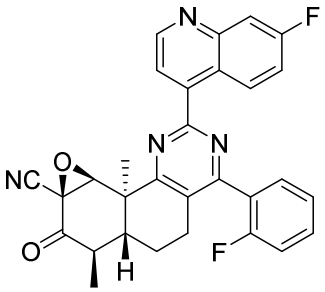
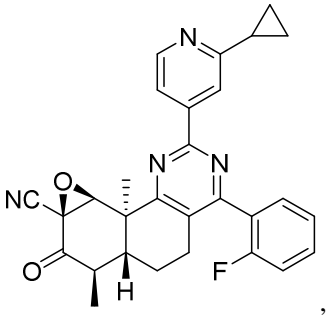
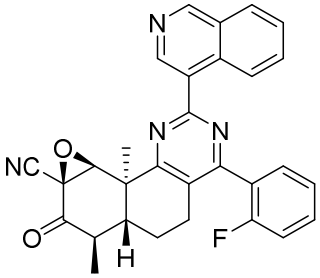
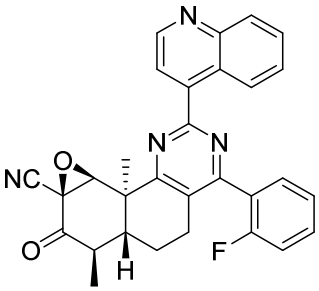
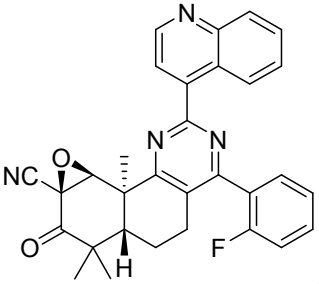
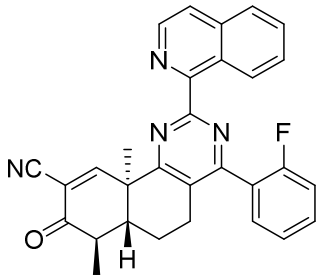
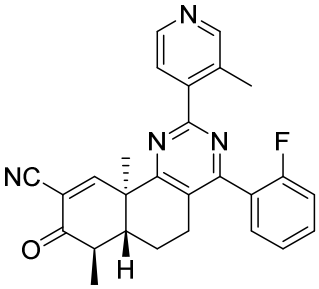
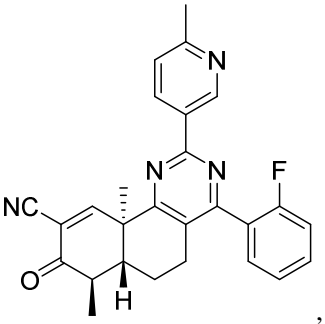
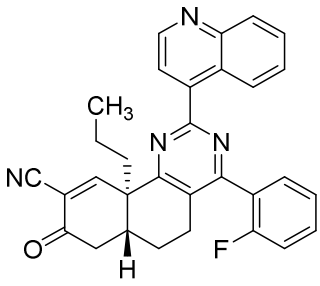
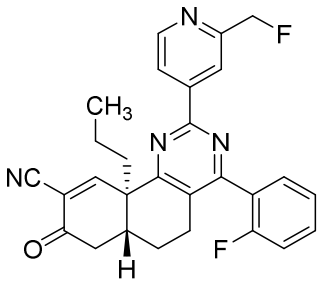
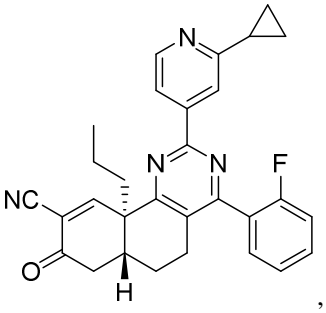
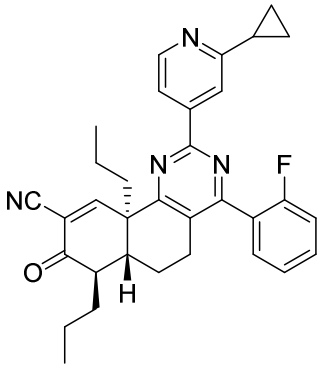
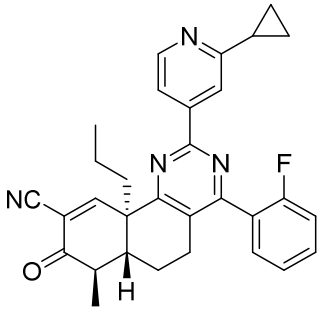
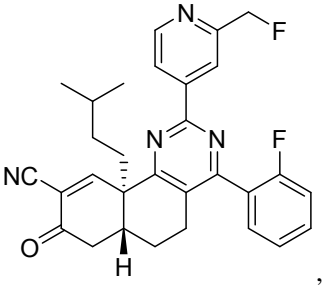

,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

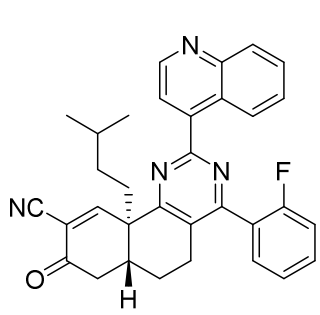
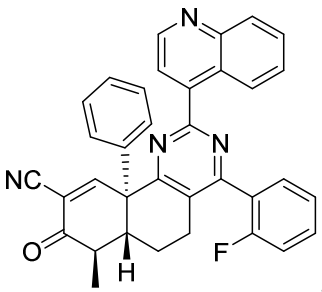
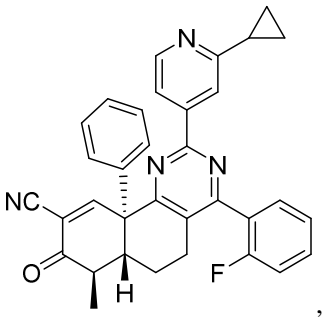
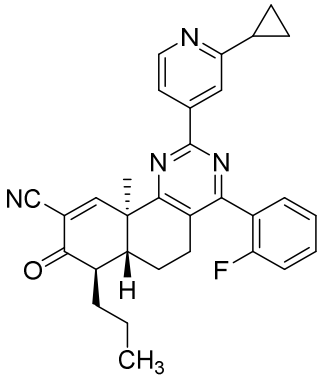
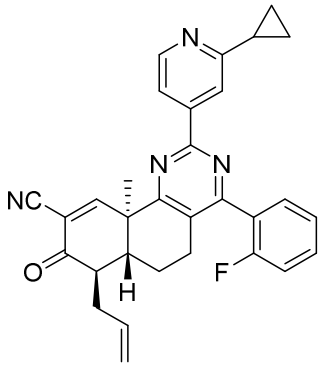
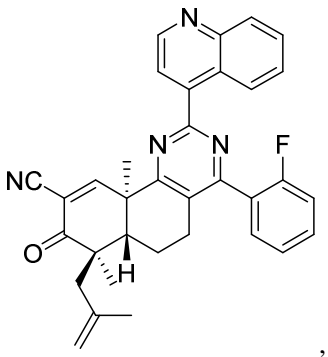
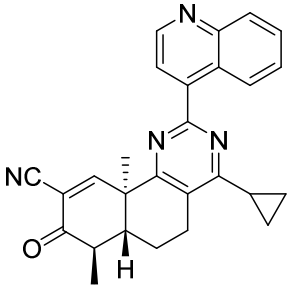
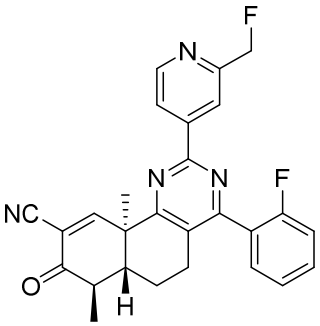
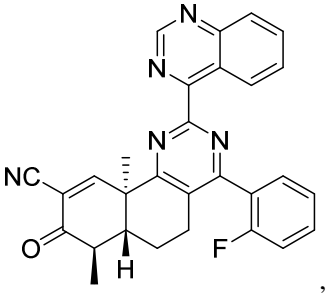
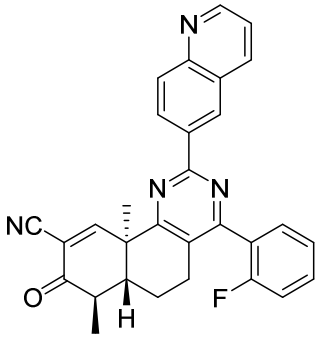
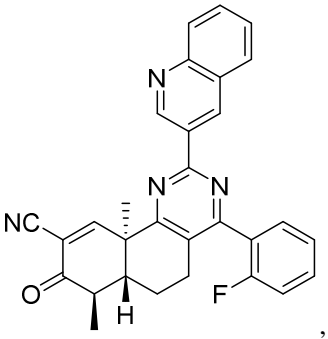
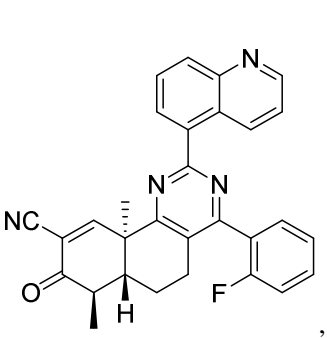

,

,

,

,

,

,

,

,

,

,

,

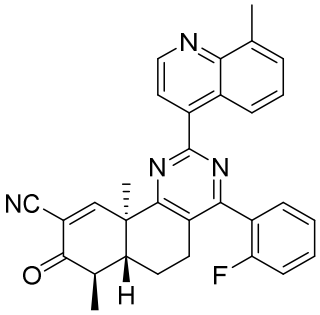
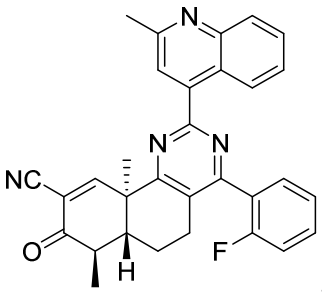
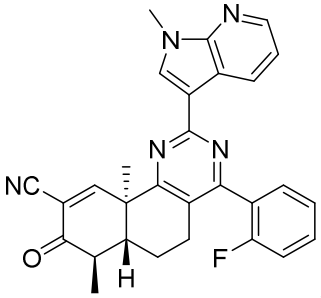
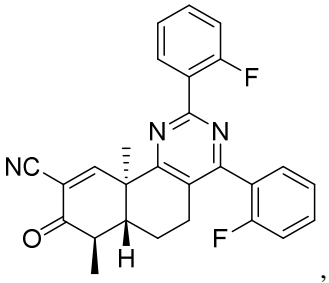
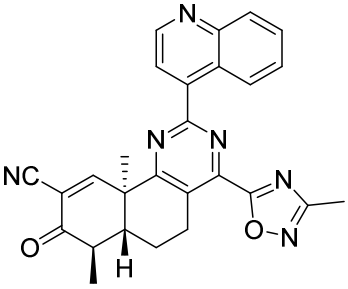
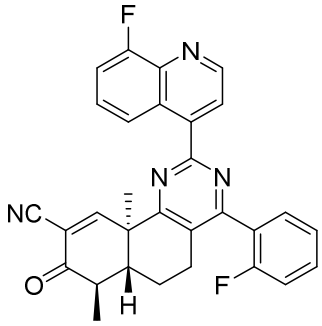
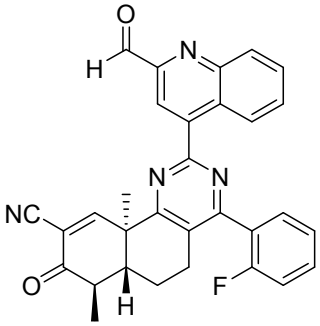
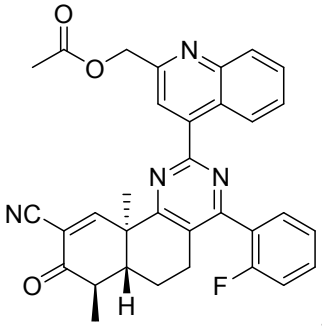
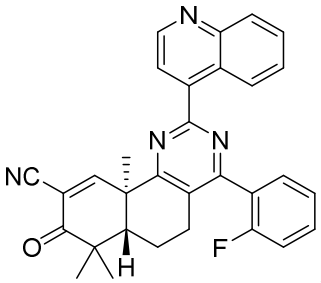
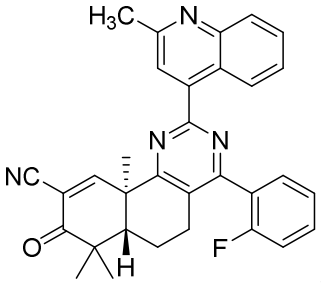
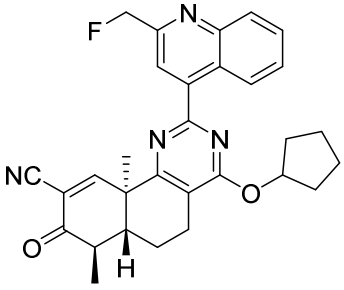
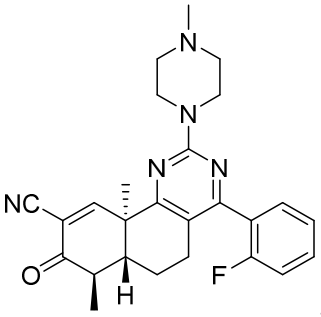
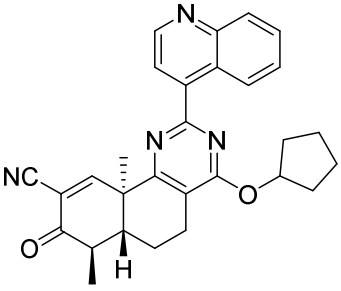
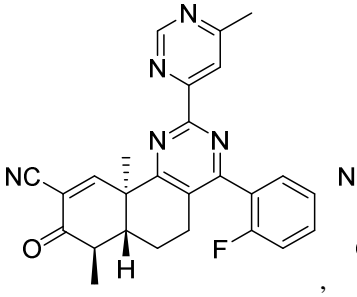
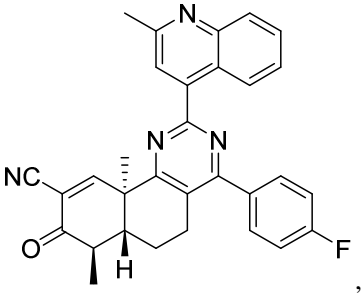
,

,


,

,

,

,

,

,

,

,

,

,

,

,


,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

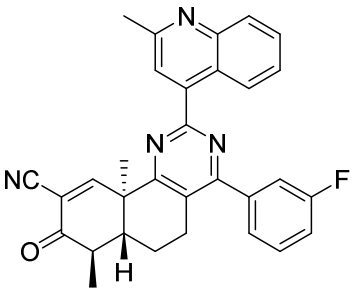
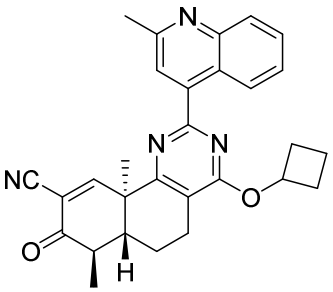
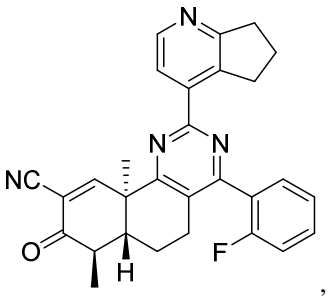
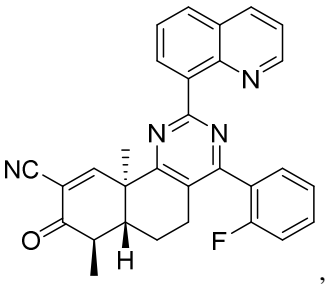
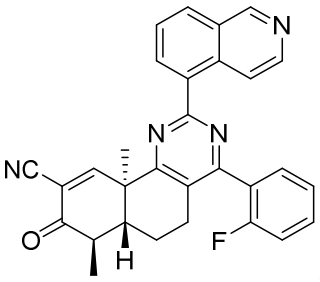
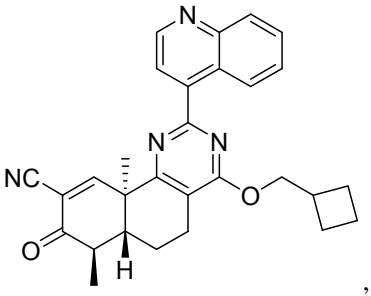
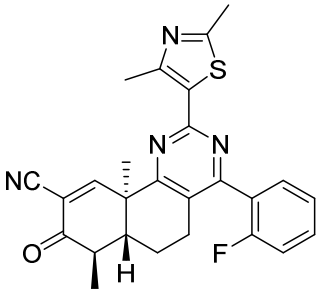
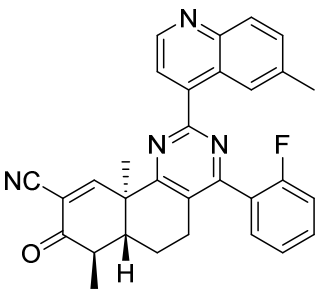
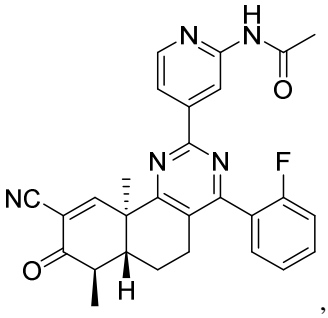
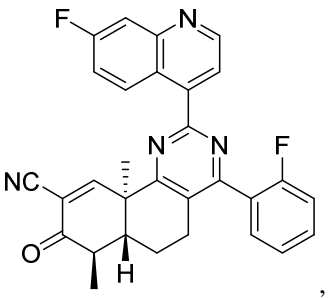
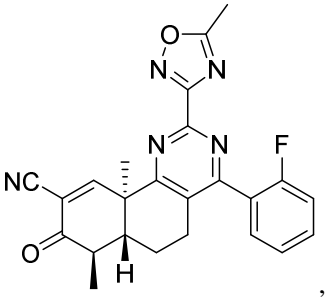
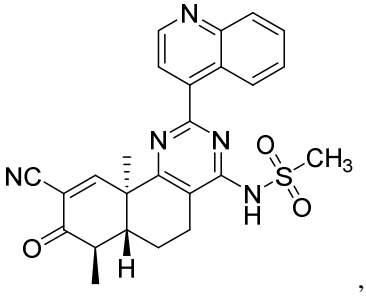
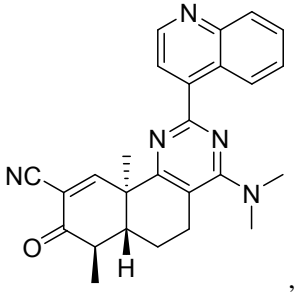
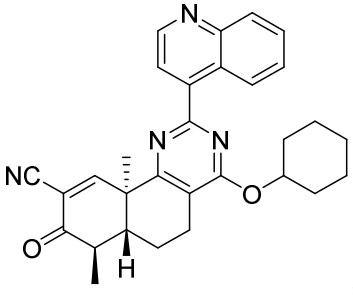
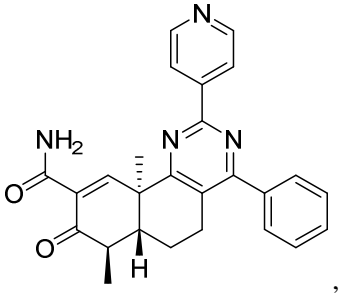

,

,

,

,

,

,

,

,

,

,

,

,

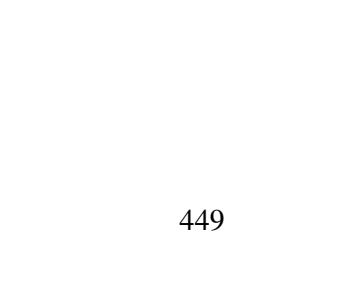

,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

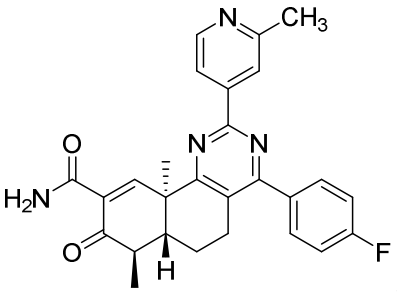
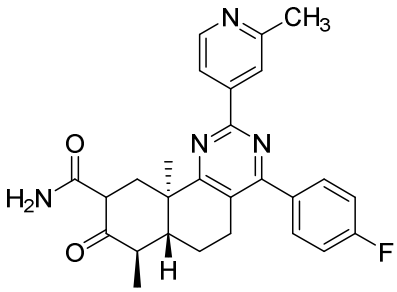
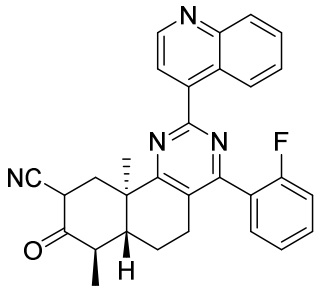
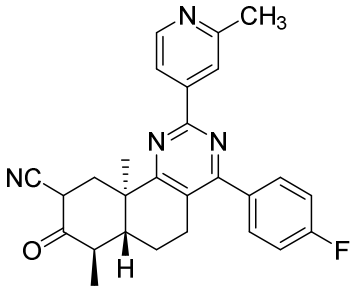
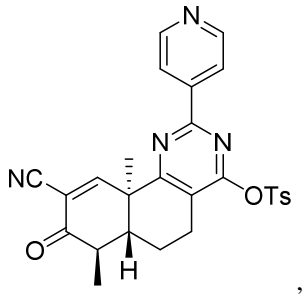
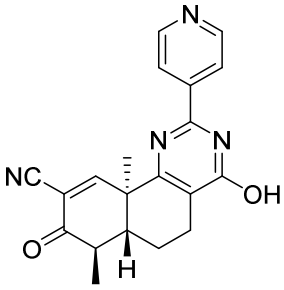
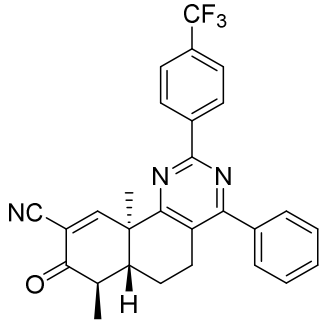
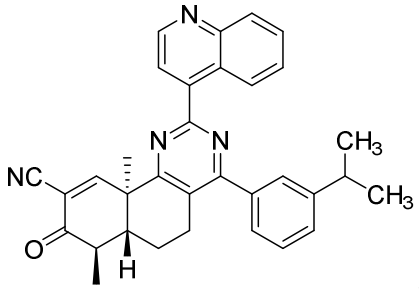
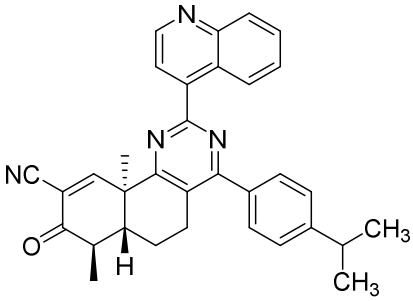
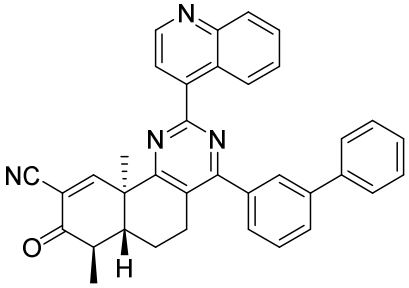
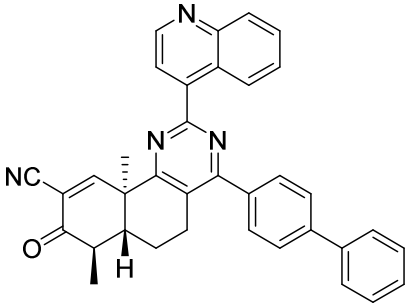
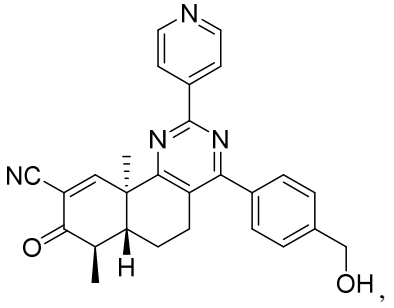
,

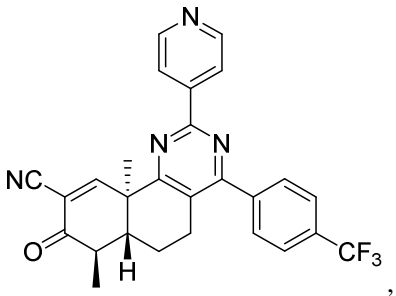
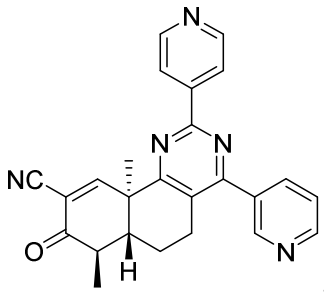
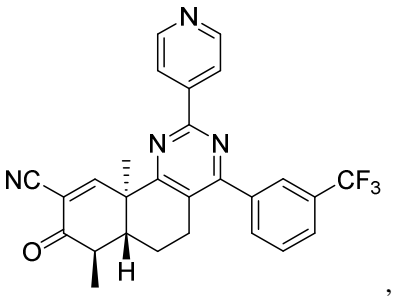
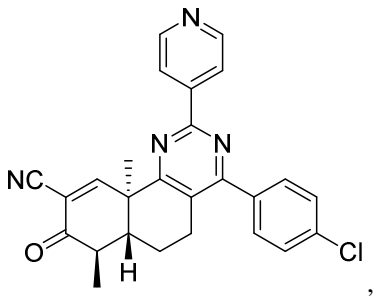
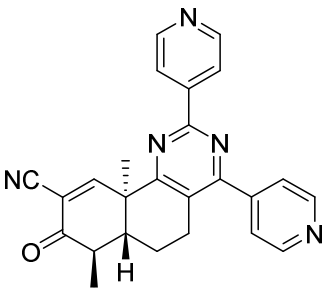
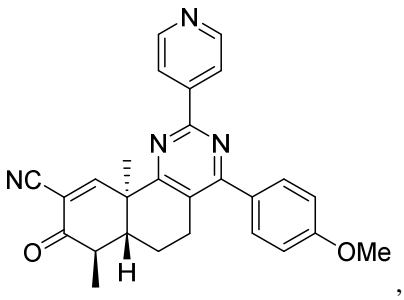
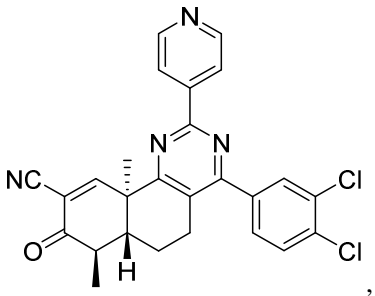
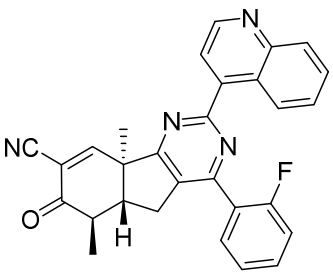
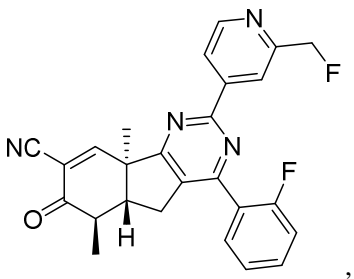
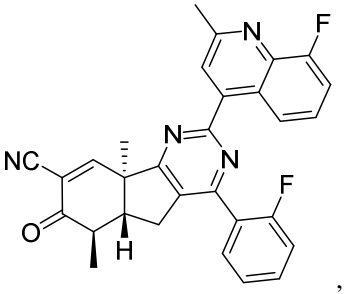
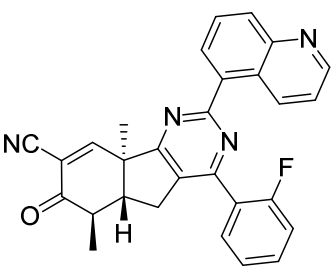
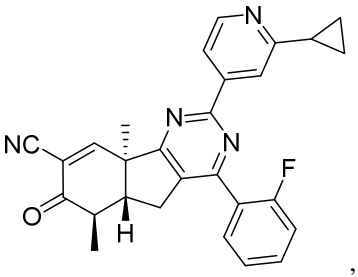
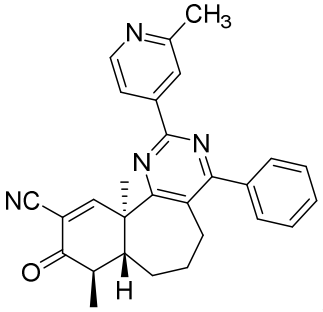
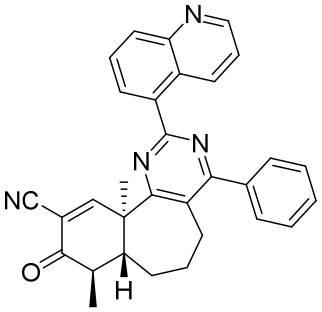
,


,

,

,

,

,

,

,

,

,

,

,

,

,

,

,

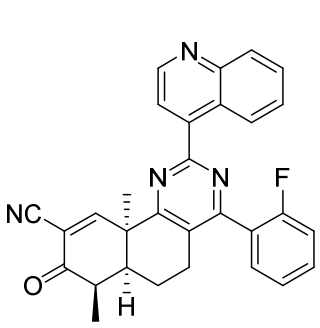
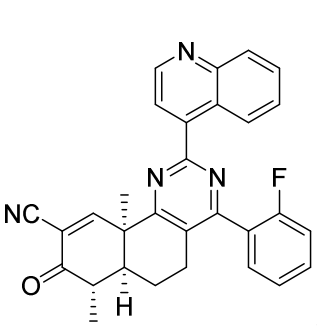
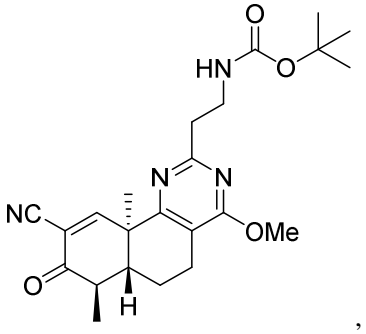
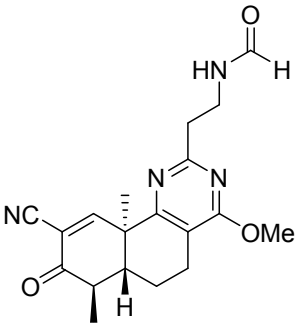
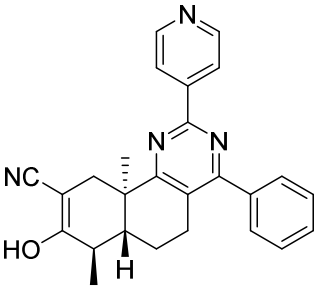
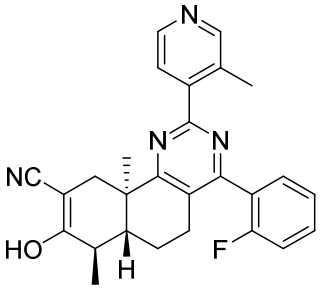
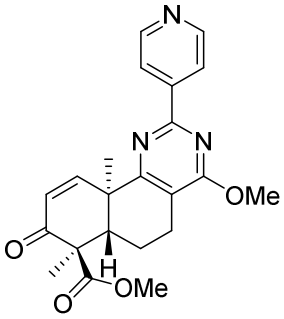
,

,

,


,

,

,

,

,

,

,

,

,

,

,



,

,

,

,

,

,

,

,

,

,

,

,

,

,
or a pharmaceutically acceptable salt thereof.

21. A compound of the formula:


,

,

,

,

,

, or

;

or a pharmaceutically acceptable salt thereof.

22. A pharmaceutical composition comprising:

(A) a compound according to any one of claims 1-21; and

(B) an excipient;

optionally the pharmaceutical composition is formulated for oral administration, administration via injection such as intraarterial administration, intramuscular administration, intraperitoneal administration, or intravenous administration, or topical administration such as topical administration to the skin or to the eye.

23. Use of a compound or composition according to any one of claims 1-22 in the manufacture of a medicament for treating or preventing a disease or disorder such as a disease or disorder associated with increased production of cytokine IL-17 or associated with inflammation in a patient in need thereof.