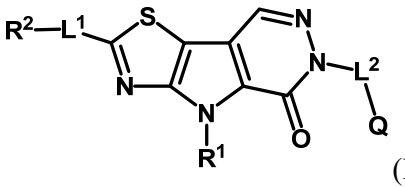
or a compound of Formulas (I'), (II'), (III'), (IV'), (V'), (collectively referred to herein as Formulas (I')-(V')" or a pharmaceutically acceptable salt thereof, that regulate PKM2, wild type and/or mutant enzymes (such as those described herein).

In an aspect, there is provided the use of a compound of Formula (I):



(I)

or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for modulating treating a disease associated with the aberrant activity of pyruvate kinase M2 (PKM2) in a subject in need thereof, wherein

Q is hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl;

R^1 is hydrogen, optionally substituted alkyl, optionally substituted haloalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, $–OR^{o1}$, $–C(=O)R^{c1}$, or a nitrogen protecting group;

L^1 is a bond, optionally substituted alkylene, –O–, –S–, $–S–CH_2–$, $–S(=O)CH_2–$, $–S(=O)_2CH_2–$, $–NR^3–$, $–NR^3C(=O)–$, $–C(=O)NR^3–$, –C(=O)–, –OC(=O)–, –C(=O)O–, $–NR^3C(=O)O–$, $–OC(=O)NR^3–$, $–NR^3C(=O)NR^3–$, $–OC(R^4)_2–$, $–C(R^4)_2O–$, $–NR^3C(R^4)_2–$, $–C(R^4)_2NR^3–$, $–S(=O)_2–$, –S(=O)–, $–S(=O)_2O–$, $–OS(=O)_2–$, –S(=O)O–, –OS(=O)–, $–S(=O)_2NR^3–$, $–NR^3S(=O)_2–$, $–S(=O)NR^3–$, $–NR^3S(=O)–$, $–NR^3S(=O)_2O–$, $–OS(=O)_2NR^3–$, $–NR^3S(=O)O–$, $–OS(=O)NR^3–$, or $–S(=O)(=NR^3)–$, wherein the point of the attachment to R^2 is on the left-hand side;

L^2 is a bond, optionally substituted alkylene, –C(=O)–, $–S(=O)_2–$, or –S(=O)–, wherein the point of the attachment to Q is on the right-hand side;

R^2 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkoxy, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl, or a nitrogen protecting group when L^1 is $–NR^3–$, $–NR^3C(=O)–$, $–NR^3C(=O)O–$, $–NR^3C(R^4)_2–$, $–NR^3S(=O)_2–$, $–NR^3S(=O)–$, $–NR^3C(=O)NR^3–$, $–NR^3S(=O)_2O–$, or $–NR^3S(=O)O–$, an oxygen protecting group when

L^1 is –O–, –OC(=O)–, –OC(=O)NR^3–, –OC(R^4)$_2$–, –OS(=O)$_2$–, –OS(=O)$_2NR^3$–, –OS(=O)NR^3–, or –OS(=O)–, or a sulfur protecting group when L^1 is –S–;

each instance of R^3 is independently hydrogen, –OR^{o2}, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, optionally substituted heteroaryl, or a nitrogen protecting group;

each instance of R^{o1}, and R^{o2} is independently hydrogen, optionally substituted alkyl, or an oxygen protecting group;

each instance of R^{c1} is independently optionally substituted alkyl or –N(R^{cn})$_2$, wherein each instance of R^{cn} is independently hydrogen, −C_{1-6} alkyl, or a nitrogen protecting group; and

each instance of R^4 is independently hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl

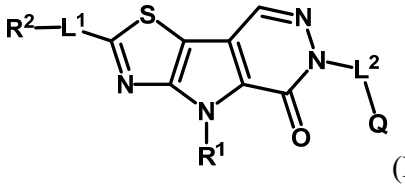
In another aspect, there is provided the use of a compound of Formula (I) as defined above or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating hyperglycemia in a subject in need thereof.

In another aspect, there is provided the use of a compound of Formula (I) as defined above or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating a diabetic disease in a subject in need thereof

In one example, the disclosure provides a method of modulating pyruvate kinase M2 (PKM2) activity in a subject, comprising administering an effective amount of a compound of Formula (I) or a pharmaceutically acceptable salt thereof:

CLAIMS

1. Use of a compound of Formula (I):



(I)

or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating a disease associated with the aberrant activity of pyruvate kinase M2 (PKM2) in a subject in need thereof, wherein

Q is hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl;

R^1 is hydrogen, optionally substituted alkyl, optionally substituted haloalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, $–OR^{o1}$, $–C(=O)R^{c1}$, or a nitrogen protecting group;

L^1 is a bond, optionally substituted alkylene, –O–, –S–, $–S–CH_2–$, $–S(=O)CH_2–$, $–S(=O)_2CH_2–$, $–NR^3–$, $–NR^3C(=O)–$, $–C(=O)NR^3–$, —C(=O)–, $–OC(=O)–$, $–C(=O)O–$, $–NR^3C(=O)O–$, $–OC(=O)NR^3–$, $–NR^3C(=O)NR^3–$, $–OC(R^4)_2–$, $–C(R^4)_2O–$, $–NR^3C(R^4)_2–$, $–C(R^4)_2NR^3–$, $–S(=O)_2–$, –S(=O)–, $–S(=O)_2O–$, $–OS(=O)_2–$, –S(=O)O–, –OS(=O)–, $–S(=O)_2NR^3–$, $–NR^3S(=O)_2–$, $–S(=O)NR^3–$, $–NR^3S(=O)–$, $– NR^3S(=O)_2O–$, $–OS(=O)_2NR^3–$, $– NR^3S(=O)O–$, $–OS(=O)NR^3–$, or $–S(=O)(=NR^3)–$, wherein the point of the attachment to R^2 is on the left-hand side;

L^2 is a bond, optionally substituted alkylene, $–C(=O)–$, $–S(=O)_2–$, or –S(=O)–, wherein the point of the attachment to Q is on the right-hand side;

R^2 is hydrogen, halogen, optionally substituted alkyl, optionally substituted alkoxy, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl, or a nitrogen protecting group when L^1 is $–NR^3–$, $–NR^3C(=O)–$, $–NR^3C(=O)O–$, $–NR^3C(R^4)_2–$, $–NR^3S(=O)_2–$,$–NR^3S(=O)–$, $–NR^3C(=O)NR^3–$, $– NR^3S(=O)_2O–$, or $–NR^3S(=O)O–$, an oxygen protecting group when L^1 is –O–, $–OC(=O)–$, $–OC(=O)NR^3–$, $–OC(R^4)_2–$, $–OS(=O)_2–$, $–OS(=O)_2NR^3–$, $–OS(=O)NR^3–$, or –OS(=O)–, or a sulfur protecting group when L^1 is –S–;

each instance of R^3 is independently hydrogen, $–OR^{o2}$, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, optionally substituted heteroaryl, or a nitrogen protecting group;

each instance of R^{o1}, and R^{o2} is independently hydrogen, optionally substituted alkyl, or an oxygen protecting group;

each instance of R^{c1} is independently optionally substituted alkyl or $–N(R^{cn})_2$, wherein each instance of R^{cn} is independently hydrogen, $-C_{1-6}$ alkyl, or a nitrogen protecting group; and

each instance of R^4 is independently hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted heterocyclyl, optionally substituted aryl, or optionally substituted heteroaryl.

2. The use of claim 1, wherein the disease is a proliferative disease.

3. The use of claim 2, wherein the disease is cancer, obesity, a diabetic disease (e.g. diabetic nephropathy (DN)), atherosclerosis, restenosis, coronary artery disease (CAD), Bloom Syndrome (BS), benign prostatic hyperplasia (BPH), or an autoimmune disease.

4. Use of a compound of Formula (I) as defined in claim 1 or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating hyperglycemia in a subject in need thereof.

5. Use of a compound of Formula (I) as defined in claim 1 or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating a diabetic disease in a subject in need thereof

6. The use of any one of the preceding claims, wherein:

Q is hydrogen, optionally substituted $-C_1$-C_6 alkyl, optionally substituted C_3-C_{12} cycloalkyl, optionally substituted 3- to 14-membered heterocyclyl, optionally substituted 6- to 14-membered aryl, or optionally substituted 5- to 14-membered heteroaryl;

R^1 is hydrogen, optionally substituted $-C_1$-C_6 alkyl, optionally substituted $-C_1$-C_6 haloalkyl, optionally substituted $-C_2$-C_6 alkenyl, optionally substituted

−C_2-C_6 alkynyl, optionally substituted C_3-C_{12} cycloalkyl, optionally substituted 3- to 14-membered heterocyclyl, optionally substituted 6- to 12-membered aryl, –OR^{o1}, –$C(=O)R^{c1}$, or a nitrogen protecting group;

L^1 is a bond, optionally substituted C_{1-6} alkylene, –O–, –S–, –S−CH_2–, –S(=O)CH_2–, –$S(=O)_2CH_2$–, –NR^3–, –$NR^3C(=O)$– , –$C(=O)NR^3$–, —C(=O)–, –OC(=O)– , –C(=O)O–, –$NR^3C(=O)O$–, –$OC(=O)NR^3$–, –$NR^3C(=O)NR^3$–, –$OC(R^4)_2$–, –$C(R^4)_2O$–, –$NR^3C(R^4)_2$–, –$C(R^4)_2NR^3$–, –$S(=O)_2$–, –S(=O)–, –$S(=O)_2O$–, –$OS(=O)_2$–, –S(=O)O–, –OS(=O)–, –$S(=O)_2NR^3$–, –$NR^3S(=O)_2$–, –$S(=O)NR^3$–, –$NR^3S(=O)$–, – $NR^3S(=O)_2O$–, –$OS(=O)_2NR^3$–, –$NR^3S(=O)O$–, –$OS(=O)NR^3$–, or –$S(=O)(=NR^3)$–, wherein the point of the attachment to R^2 is on the left-hand side;

L^2 is a bond, optionally substituted C_1-C_6 alkylene, –C(=O)–, –$S(=O)_2$–, or –S(=O)–, wherein the point of the attachment to Q is on the right-hand side;

R^2 is hydrogen, halogen, optionally substituted −C_1-C_6 alkyl, optionally substituted −C_1-C_6 alkoxy, optionally substituted −C_3-C_{12} cycloalkyl, optionally substituted 3- to 14-membered heterocyclyl, optionally substituted −C_6-C_{12} aryl, or optionally substituted 3- to 14-membered heteroaryl, or a nitrogen protecting group when L^1 is –NR^3–, –$NR^3C(=O)$–, –$NR^3C(=O)O$–, –$NR^3C(R^4)_2$–, –$NR^3S(=O)_2$–, –$NR^3S(=O)$–, –$NR^3C(=O)NR^3$–, –$NR^3S(=O)_2O$–, or –$NR^3S(=O)O$–, an oxygen protecting group when L^1 is –O–, –OC(=O)–, –$OC(=O)NR^3$–, –$OC(R^4)_2$–, –OS(=O)–, –$OS(=O)_2$–, –$OS(=O)_2NR^3$–, –$OS(=O)NR^3$–, or –OS(=O)–, or a sulfur protecting group when L^1 is –S–;

each instance of R^3 is independently hydrogen, –OR^{o2}, optionally substituted −C_1-C_6 alkyl, optionally substituted −C_2-C_6 alkenyl, optionally substituted −C_2-C_6 alkynyl, optionally substituted C_3-C_{12} cycloalkyl, optionally substituted C_3-C_{12} heterocyclyl, optionally substituted C_6-C_{12} aryl, optionally substituted C_5-C_{12} heteroaryl, or a nitrogen protecting group;

each instance of R^{o1} and R^{o2} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c1} is independently optionally substituted −C_1-C_6 alkyl or –$N(R^{cn})_2$, wherein each instance of R^{cn} is independently hydrogen, −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^4 is independently hydrogen, optionally substituted −C_1-C_6 alkyl, optionally substituted −C_2-C_6 alkenyl, optionally substituted −C_2-C_6 alkynyl, optionally substituted C_3-C_{12} cycloalkyl, optionally substituted 3- to 14-membered

heterocyclyl, optionally substituted C_6-C_{12} aryl, or optionally substituted 5- to 14-membered heteroaryl.

7. The use of any one of the preceding claims, wherein:

Q is C_6-C_{12} aryl, 5- to 6-membered monocyclic heteroaryl, or 8- to 12-membered bicyclic heteroaryl, each of which is substituted with 0-3 occurrences of R^c;

R^1 is selected from hydrogen, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, C_3-C_7 monocyclic cycloalkyl and 3- to 14-membered heterocyclyl, –OR^{o1}, –$C(=O)R^{c1}$, or a nitrogen protecting group; wherein each alkyl, cycloalkyl or heterocyclyl is substituted with 0-3 occurrences of R^d;

R^2 is selected from hydrogen, halogen, −C_1-C_6 alkyl, −C_1-C_6 alkoxy, C_3-C_7 monocyclic cycloalkyl, C_6-C_{12} bicyclic cycloalkyl, 3- to 14-membered heterocyclyl, C_6-C_{12} aryl, 5- to 6-membered monocyclic heteroaryl, 8- to 12-membered bicyclic heteroaryl, wherein each alkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl is substituted with 0-3 occurrences of R^e, or a nitrogen protecting group when L^1 is –NR^3–, –$NR^3C(=O)$–, –$NR^3C(=O)O$–, –$NR^3C(R^4)_2$–, –$NR^3S(=O)_2$–,–$NR^3S(=O)$–, –$NR^3C(=O)NR^3$–, –$NR^3S(=O)_2O$–, or –$NR^3S(=O)O$–, an oxygen protecting group when L^1 is –O–, –OC(=O)–, –$OC(=O)NR^3$–, –$OC(R^4)_2$–, –$OS(=O)$–, –$OS(=O)_2$–, –$OS(=O)_2NR^3$–, –$OS(=O)NR^3$–, or –OS(=O)–, or a sulfur protecting group when L^1 is –S–;

R^3 is selected from hydrogen, –OR^{o2}, −C_1-C_6 alkyl, C_3-C_7 monocyclic cycloalkyl, C_6-C_{12} bicyclic cycloalkyl, 3- to 14-membered heterocyclyl, C_6-C_{12} aryl, 5- to 6-membered monocyclic heteroaryl, and 8- to 12-membered bicyclic heteroaryl, wherein each alkyl, cycloalkyl, heterocycloalkyl, aryl and heteroaryl is substituted with 0-3 occurrences of R^f;

R^4 is selected from hydrogen, −C_1-C_6 alkyl, C_3-C_7 monocyclic cycloalkyl, and 3- to 14-membered heterocyclyl, wherein each alkyl, cycloalkyl or heterocyclyl is substituted with 0-1 occurrences of R^g;

L^1 is a bond, an alkylene substituted with 0-3 occurences of R^h, –O–, –S–, –S–CH_2–, –S(=O)CH_2–, –$S(=O)_2CH_2$–, –NR^3–, –$NR^3C(=O)$– , –$C(=O)NR^3$–, –C(=O)–, –OC(=O)– , –C(=O)O–, –$NR^3C(=O)O$–, –$OC(=O)NR^3$–, –$NR^3C(=O)NR^3$–, –$OC(R^4)_2$–, –$C(R^4)_2O$–, –$NR^3C(R^4)_2$–, –$C(R^4)_2NR^3$–, –$S(=O)_2$–, –S(=O)–, –$S(=O)_2O$–, –$OS(=O)_2$–, –S(=O)O–, –OS(=O)–, –$S(=O)_2NR^3$–, –$NR^3S(=O)_2$–, –$S(=O)NR^3$–, –$NR^3S(=O)$–,

– $NR^3S(=O)_2O$–, –$OS(=O)_2NR^3$–, –$NR^3S(=O)O$–, –$OS(=O)NR^3$–, or –$S(=O)(=NR^3)$–, wherein the point of the attachment to R^2 is on the left-hand side;

L^2 is a bond, an alkylene substituted with 0-3 occurences of R^h, –C(=O)–, –$S(=O)_2$–, or –S(=O)–, wherein the point of the attachment to Q is on the right-hand side;

each R^c is independently selected from halo, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, −C_1-C_6 hydroxyalkyl, −OH, −OC_1-C_6 alkyl, −C_1-C_6 aminoalkyl, −NH(C_1-C_6 alkyl), −N(C_1-C_6 alkyl)$_2$, −C(=O)OC_1-C_6 alkyl, −C(=O)OH, −C(=O)C_1-C_6 alkyl, −C(=O)NH_2, −C(=O)NH(C_1-C_6 alkyl), −C(=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)NH_2, −NHC(=O)NH(C_1-C_6 alkyl), –NH(C=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)(C_1-C_6 alkyl), −N(C_1-C_6 alkyl)C(=O)(C_1-C_6 alkyl), –S(=O)$_2NH_2$, –S(=O)$_2$NH(C_1-C_6 alkyl), –S(=O)$_2$N(C_1-C_6 alkyl)$_2$, −NHS(=O)$_2$(C_1-C_6 alkyl), −NH_2, −CN, and −NO_2; or two instances of R^c attached to the same or adjacent carbon atoms, are taken together with the carbon atoms to which they are attached form a cycloalkyl or a heterocyclylC(=O)OH;

each R^d is independently selected from halo, −C_1-C_6 alkyl, −OH, −OC_1-C_6 alkyl, −NH_2 and −CN;

each R^e is independently selected from halo, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, −C_1-C_6 hydroxyalkyl, −OH, −OC_1-C_6 alkyl, −C_1-C_6 aminoalkyl, −NH(C_1-C_6 alkyl), −N(C_1-C_6 alkyl)$_2$, −C(=O)OC_1-C_6 alkyl, −C(=O)OH, −C(=O)C_1-C_6 alkyl, −C(=O)NH_2, −C(=O)NH(C_1-C_6 alkyl), −C(=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)NH_2, −NHC(=O)NH(C_1-C_6 alkyl), –NH(C=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)(C_1-C_6 alkyl), −N(C_1-C_6 alkyl)C(=O)(C_1-C_6 alkyl), –S(=O)$_2NH_2$, –S(=O)$_2$NH(C_1-C_6 alkyl), –S(=O)$_2$N(C_1-C_6 alkyl)$_2$, −NHS(=O)$_2$(C_1-C_6 alkyl), −NH_2, −CN, and −NO_2; or two instances of R^e attached to the same or adjacent carbon atoms, are taken together with the carbon atoms to which they are attached form a cycloalkyl or a heterocyclyl;

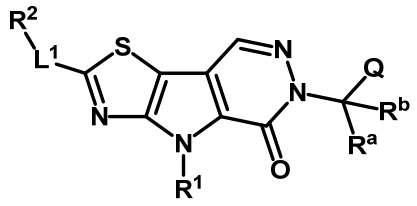
each R^f is independently selected from halo, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, −C_1-C_6 alkoxy, −OH, −NH_2, −CN and −NO_2;

each R^g is independently selected from halo, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, −C_1-C_6 alkoxy, −OH, NH_2, −CN and NO_2 and;

each R^h is independently selected from halo, −C_1-C_6 alkyl, −C_1-C_6 haloalkyl, −C_1-C_6 hydroxyalkyl, −OH, −OC_1-C_6 alkyl, −C_1-C_6 aminoalkyl, −NH(C_1-C_6 alkyl), −N(C_1-C_6 alkyl)$_2$, −C(=O)OC_1-C_6 alkyl, −C(=O)OH, −C(=O)C_1-C_6 alkyl, −C(=O)NH_2, −C(=O)NH(C_1-C_6 alkyl), −C(=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)NH_2, −NHC(=O)NH(C_1-C_6 alkyl), –NH(C=O)N(C_1-C_6 alkyl)$_2$, −NHC(=O)(C_1-C_6 alkyl), −N(C_1-C_6

alkyl)C(=O)(C_1-C_6 alkyl), –S(=O)$_2$NH$_2$, –S(=O)$_2$NH(C_1-C_6 alkyl), –S(=O)$_2$N(C_1-C_6 alkyl)$_2$, −NHS(=O)$_2$(C_1-C_6 alkyl), −NH$_2$, −CN, and −NO$_2$, S(=O)$_2$aryl, S(=O)$_2$heteroaryl and =NOH or two instances of R^h attached to the same or adjacent carbon atoms, are taken together with the carbon atoms to which they are attached form a cycloalkyl or a heterocyclyl.

8. The use of any one of the preceding claims, wherein the compound is of Formula (II):



(II)

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, −NO$_2$, −N$_3$, optionally substituted alkyl, –OR^{o3}, –N(R^{n1})$_2$, –C(=O)N(R^{n1})$_2$, or –C(=O)R^{c2}, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group; and

each instance of R^{c2} is independently optionally substituted −C_1-C_6 alkyl.

9. The use of any one of the preceding claims, wherein L^1 is C_{1-6} alkylene substituted with R^j and R^k;

wherein each instance of R^j and R^k is independently selected from H, halogen, −CN, –OR^{o7}, –N(R^{n5})$_2$, –N(R^{n5})C(=O) R^{c5}, –C(=O)N(R^{n5})$_2$, –C(=O)R^{c5}, –C(=O)OR^{o7}, –SR^{js}, –S(=O)$_2$R^{js}, or –S(=O)R^{js}, optionally substituted −C_1-C_6 alkyl; or R^j and R^k can be taken together with the carbon atom to form C=O, C=NR^{jn}, an optionally substituted C_3-C_6 monocyclic cycloalkyl ring or an optionally substituted C_3-C_6 monocyclic heterocyclyl ring;

each of R^{n5} and R^{jn} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, −OR^{o8}, or a nitrogen protecting group;

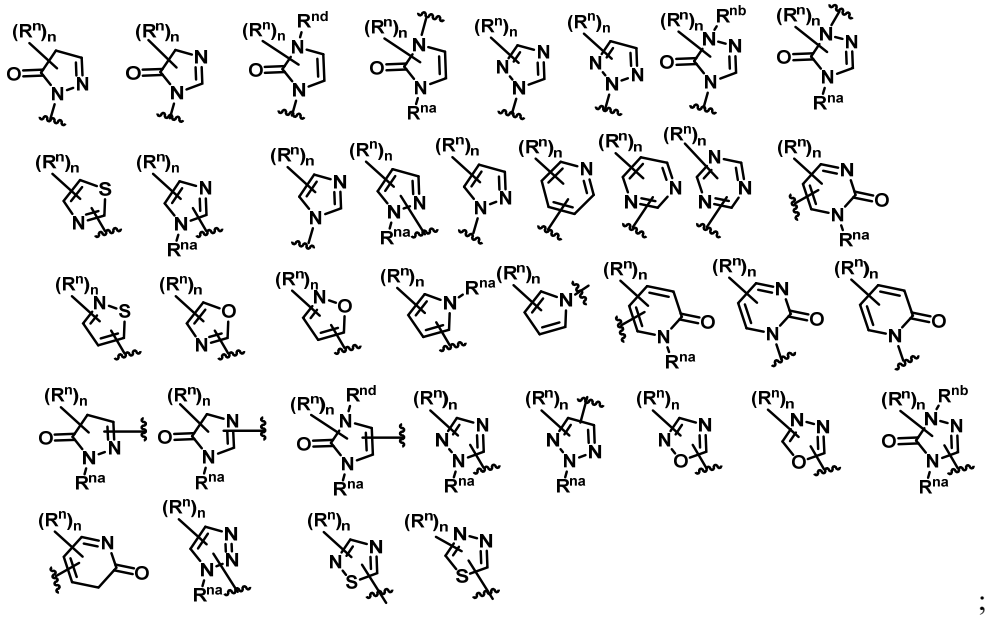
each instance of R^{o7} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{o8} is indepenently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c5} is independently optionally substituted $-C_1$-C_6 alkyl; and

each instance of R^{js} is independently optionally substituted $-C_1$-C_6 alkyl, optionally substituted C_{6-12} aryl, optionally substituted heteroaryl, or a sulfur protecting group.

10. The use of any one of the preceding claims, wherein Q is of one of the following formulae:



;

wherein:

each instance of R^n is independently hydrogen, a halogen, $-CN$, $-NO_2$, $-N_3$, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, $–OR^{o4}$, $–SR^{s1}$, $–N(R^{n2})_2$, $–C(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)R^{c3}$, $–C(=O)R^{c3}$, $–C(=O)OR^{o4}$, $–OC(=O)R^{c3}$, $–S(=O)R^{s1}$, $–S(=O)_2R^{s1}$, $–S(=O)OR^{o4}$, $–OS(=O)R^{c3}$, $–S(=O)_2OR^{o4}$, $–OS(=O)_2R^{c3}$, $–S(=O)N(R^{n2})_2$, $–S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)R^{s1}$, $–N(R^{n2})S(=O)_2R^{s1}$, $–N(R^{n2})C(=O)OR^{o4}$, $–OC(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)OR^{o4}$, $–N(R^{n2})S(=O)_2OR^{o4}$, $–OS(=O)N(R^{n2})_2$, or $–OS(=O)_2N(R^{n2})_2$; or two

instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o4} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

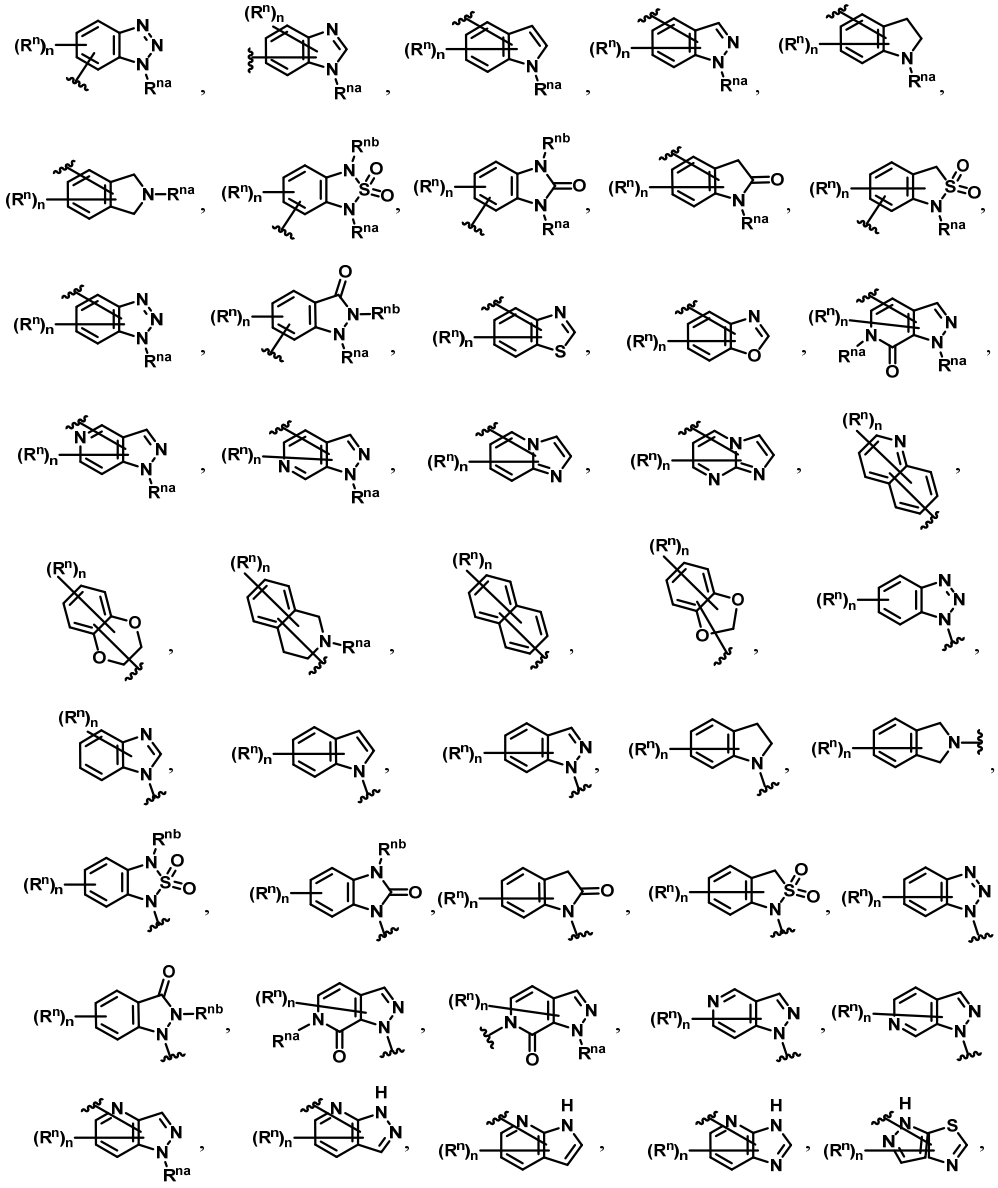
each instance of R^{c3} is independently an optionally substituted $-C_1$-C_6 alkyl;

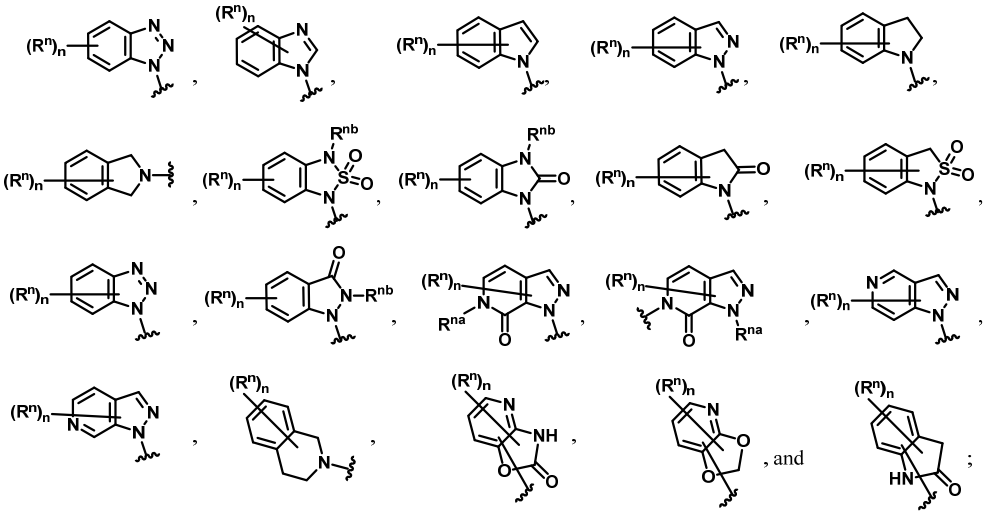
each instance of R^{s1} is independently an optionally substituted $-C_1$-C_6 alkyl or a sulfur protecting group;

n is 0, 1, 2, or 3, as valency permits; and

each of R^{na}, R^{nb}, and R^{nd} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group.

11. The use of any one of claims 1-9, wherein Q is of one of the following formulae:





wherein each instance of R^n is independently selected from hydrogen, halogen, −CN,−NO_2,−N_3, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl, optionally substituted heterocyclyl, optionally substituted heteroaryl, –OR^{o4}, –SR^{s1}, –$N(R^{n2})_2$, –$C(=O)N(R^{n2})_2$, –$N(R^{n2})C(=O)R^{c3}$, –$C(=O)R^{c3}$, –$C(=O)OR^{o4}$, –$OC(=O)R^{c3}$, –$S(=O)R^{s1}$, –$S(=O)_2R^{s1}$, –$S(=O)OR^{o4}$, –$OS(=O)R^{c3}$, –$S(=O)_2OR^{o4}$, –$OS(=O)_2R^{c3}$, –$S(=O)N(R^{n2})_2$, –$S(=O)_2N(R^{n2})_2$, –$N(R^{n2})S(=O)R^{s1}$, –$N(R^{n2})S(=O)_2R^{s1}$, –$N(R^{n2})C(=O)OR^{o4}$, –$OC(=O)N(R^{n2})_2$, –$N(R^{n2})C(=O)N(R^{n2})_2$, –$N(R^{n2})S(=O)N(R^{n2})_2$, –$N(R^{n2})S(=O)_2N(R^{n2})_2$, –$N(R^{n2})S(=O)OR^{o4}$, –$N(R^{n2})S(=O)_2OR^{o4}$, –$OS(=O)N(R^{n2})_2$, –$OS(=O)_2N(R^{n2})_2$, or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{na} and R^{nb} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{n2} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o4} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

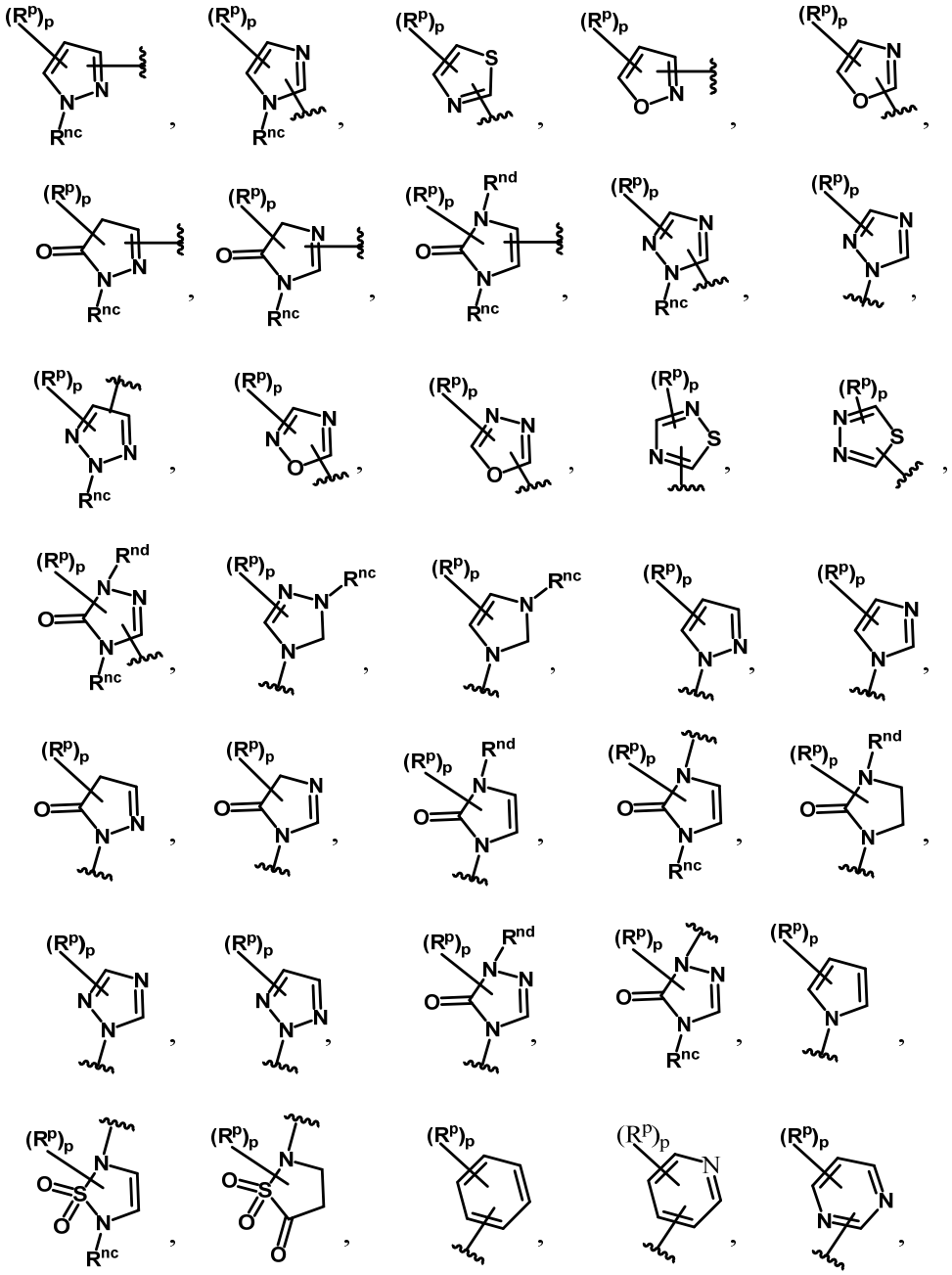
each instance of R^{c3} is independently optionally substituted −C_1-C_6 alkyl;

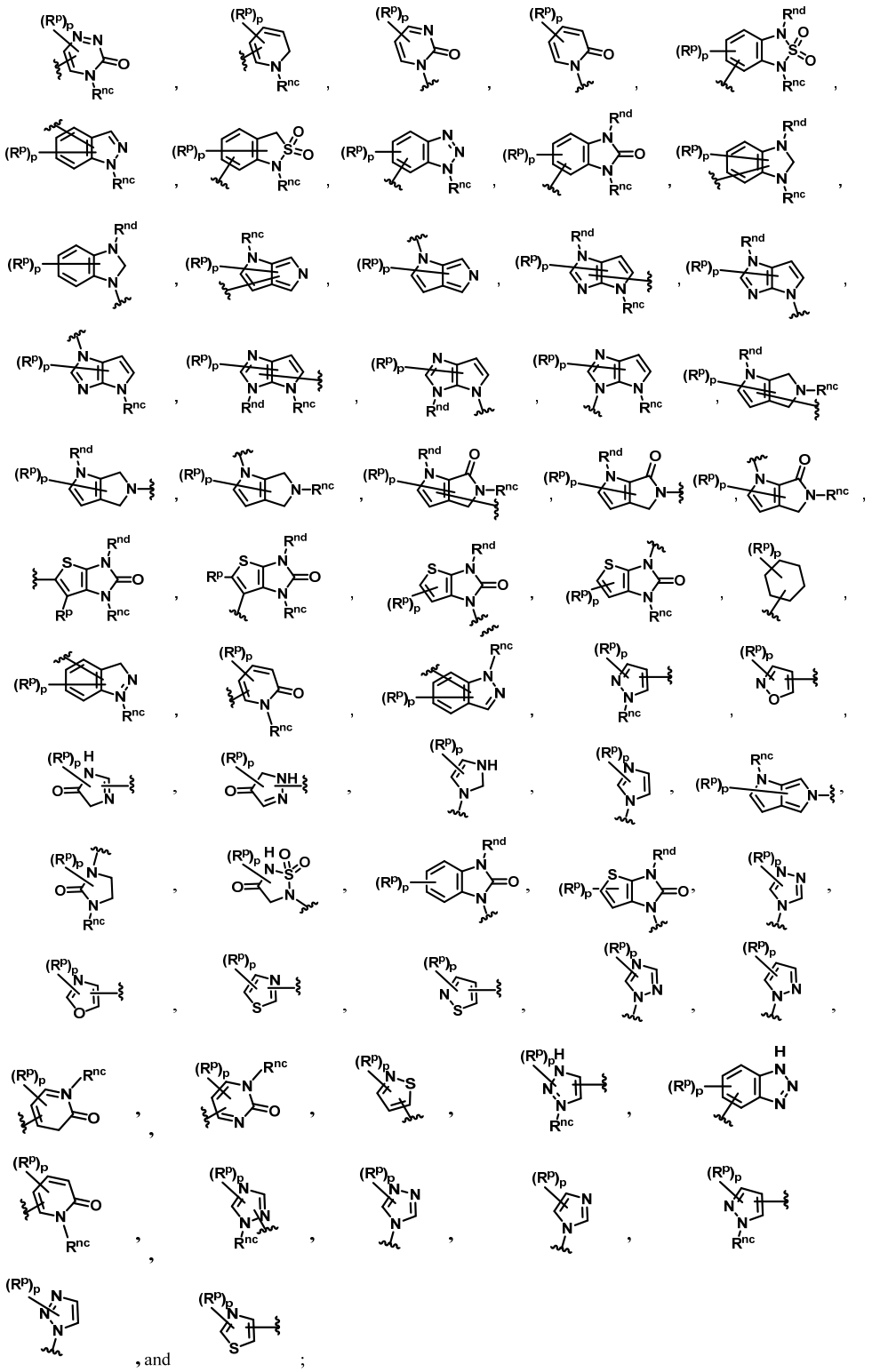
each instance of R^{s1} is independently optionally substituted −C_1-C_6 alkyl, or a sulfur protecting group; and

n is 0, 1, 2, or 3, as valency permits.

12. The use of any one of the preceding claims, wherein R^2 is selected from hydrogen, halogen, optionally substituted C_1-C_6 alkyl, optionally substituted C_2-C_6 alkenyl, C_2-C_6 alkoxyl, optionally substituted phenyl, naphthalenyl, C_{3-6} cycloalkyl, optionally substituted 5-membered heteroaryl, optionally substituted 6-membered heteroaryl, optionally substituted 8-membered bicyclic heteroaryl, and optionally substituted 9-membered bicyclic heteroaryl.

13. The use of any one of the preceding claims, wherein R^2 is of one of the following formulae:





wherein each instance of R^p is independently selected from hydrogen, halogen, $-CN$, $-NO_2$, $-N_3$, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl,

optionally substituted heterocyclyl, optionally substituted heteroaryl, $–OR^{o6}$, $–SR^{s2}$, $–N(R^{n3})_2$, $–C(=O)N(R^{n3})_2$, $–N(R^{n3})C(=O)R^{c4}$, $–C(=O)R^{c4}$, $–C(=O)OR^{o6}$, $–OC(=O)R^{c4}$, $–S(=O)R^{s2}$, $–S(=O)_2R^{s2}$, $–S(=O)OR^{o6}$, $–OS(=O)R^{c4}$, $–S(=O)_2OR^{o6}$, $–OS(=O)_2R^{c4}$, $–S(=O)N(R^{n3})_2$, $–S(=O)_2N(R^{n3})_2$, $–N(R^{n3})S(=O)R^{s2}$, $–N(R^{n3})S(=O)_2R^{s2}$, $–N(R^{n3})C(=O)OR^{o6}$, $–OC(=O)N(R^{n3})_2$, $–N(R^{n3})C(=O)N(R^{n3})_2$, $–N(R^{n3})S(=O)N(R^{n3})_2$, $– N(R^{n3})S(=O)_2N(R^{n3})_2$, $–N(R^{n3})S(=O)OR^{o6}$, $–N(R^{n3})S(=O)_2OR^{o6}$, $–OS(=O)N(R^{n3})_2$, $–OS(=O)_2N(R^{n3})_2$, or two instances of R^p attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{n3}, R^{nc}, and R^{nd} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o6} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

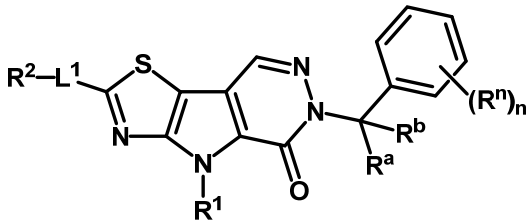
each instance of R^{c4} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s2} is independently optionally substituted $-C_1$-C_6 alkyl, or a sulfur protecting group; and

p is 0, 1, 2, or 3, as valency permits.

14. The use of claim 13, wherein each instance of R^p is independently hydrogen, halogen, optionally substituted C_{1-4} alkyl, $-CN$, $-NO_2$, $-N_3$, $–OR^{o6}$, $–N(R^{n3})_2$, $–C(=O)N(R^{n3})_2$, $–C(=O)R^{c4}$, or $–C(=O)OR^{o6}$.

15. The use of any one of claims 1-9 and 12-14, wherein the compound is of Formula (III):



(III);

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, $–CN$, $-NO_2$, $-N_3$, optionally substituted alkyl, $–OR^{o3}$, $–N(R^{n1})_2$, $–C(=O)N(R^{n1})_2$, or $–C(=O)R^{c2}$, or R^a and

R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, $-CN$, $-NO_2$, $-N_3$, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, $–OR^{o4}$, $–SR^{s1}$, $–N(R^{n2})_2$, $–C(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)R^{c3}$, $–C(=O)R^{c3}$, $–C(=O)OR^{o4}$, $–OC(=O)R^{c3}$, $–S(=O)R^{s1}$, $–S(=O)_2R^{s1}$, $–S(=O)OR^{o4}$, $–OS(=O)R^{c3}$, $–S(=O)_2OR^{o4}$, $–OS(=O)_2R^{c3}$, $–S(=O)N(R^{n2})_2$, $–S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)R^{s1}$, $–N(R^{n2})S(=O)_2R^{s1}$, $–N(R^{n2})C(=O)OR^{o4}$, $–OC(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)N(R^{n2})_2$, $– N(R^{n2})S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)OR^{o4}$, $–N(R^{n2})S(=O)_2OR^{o4}$, $–OS(=O)N(R^{n2})_2$, or $–OS(=O)_2N(R^{n2})_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

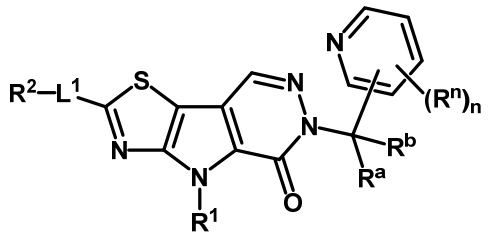
each instance of R^{o4} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c3} is independently an optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted $-C_1$-C_6 alkyl or a sulfur protecting group; and

n is 0, 1, 2, or 3, as valency permits.

16. The use of any one of claims 1-10 and 12-14, wherein the compound is of Formula (IV):



(IV);

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, $-NO_2$, $-N_3$, optionally substituted alkyl, $–OR^{o3}$, $–N(R^{n1})_2$, $–C(=O)N(R^{n1})_2$, or $–C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, $-CN$, $-NO_2$, $-N_3$, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, $–OR^{o4}$, $–SR^{s1}$, $–N(R^{n2})_2$,

$–C(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)R^{c3}$, $–C(=O)R^{c3}$, $–C(=O)OR^{o4}$, $–OC(=O)R^{c3}$, $–S(=O)R^{s1}$, $–S(=O)_2R^{s1}$, $–S(=O)OR^{o4}$, $–OS(=O)R^{c3}$, $–S(=O)_2OR^{o4}$, $–OS(=O)_2R^{c3}$, $–S(=O)N(R^{n2})_2$,

$–S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)R^{s1}$, $–N(R^{n2})S(=O)_2R^{s1}$, $–N(R^{n2})C(=O)OR^{o4}$,

$–OC(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)OR^{o4}$, $–N(R^{n2})S(=O)_2OR^{o4}$, $–OS(=O)N(R^{n2})_2$, or $–OS(=O)_2N(R^{n2})_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

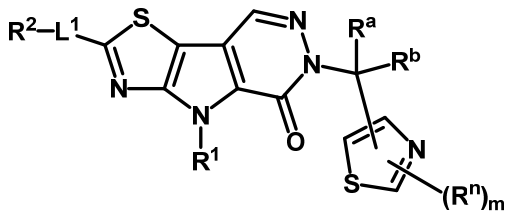
each instance of R^{o4} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c3} is independently an optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted −C_1-C_6 alkyl or a sulfur protecting group; and

n is 0, 1, 2, or 3, as valency permits.

17. The use of any one of claims 1-10 and 12-14, wherein the compound is of Formula (V-a):



(V-a),

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, −NO_2, −N_3, optionally substituted alkyl, –OR^{o3}, –$N(R^{n1})_2$, –$C(=O)N(R^{n1})_2$, or –$C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, −CN, −NO_2, −N_3, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, –OR^{o4}, –SR^{s1}, –$N(R^{n2})_2$,

–$C(=O)N(R^{n2})_2$, –$N(R^{n2})C(=O)R^{c3}$, –$C(=O)R^{c3}$, –$C(=O)OR^{o4}$, –$OC(=O)R^{c3}$, –$S(=O)R^{s1}$, –$S(=O)_2R^{s1}$, –$S(=O)OR^{o4}$, –$OS(=O)R^{c3}$, –$S(=O)_2OR^{o4}$, –$OS(=O)_2R^{c3}$, –$S(=O)N(R^{n2})_2$,

–$S(=O)_2N(R^{n2})_2$, –$N(R^{n2})S(=O)R^{s1}$, –$N(R^{n2})S(=O)_2R^{s1}$, –$N(R^{n2})C(=O)OR^{o4}$,

–$OC(=O)N(R^{n2})_2$, –$N(R^{n2})C(=O)N(R^{n2})_2$, –$N(R^{n2})S(=O)N(R^{n2})_2$, –$N(R^{n2})S(=O)_2N(R^{n2})_2$, –$N(R^{n2})S(=O)OR^{o4}$, –$N(R^{n2})S(=O)_2OR^{o4}$, –$OS(=O)N(R^{n2})_2$, or –$OS(=O)_2N(R^{n2})_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

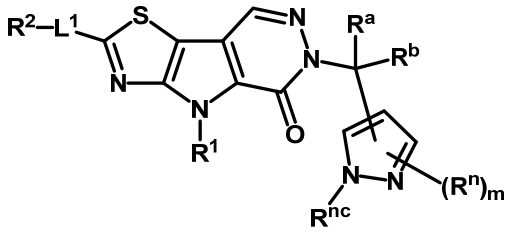
each instance of R^{o4} is independently hydrogen, an optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c3} is independently an optionally substituted −C_1-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted −C_1-C_6 alkyl or a sulfur protecting group;

and m is 0, 1, or 2.

18. The use of any one of claims 1-10 and 12-14, wherein the compound is of Formula (V-b):



(V-b),

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, −NO_2, −N_3, optionally substituted alkyl, –OR^{o3}, –$N(R^{n1})_2$, –$C(=O)N(R^{n1})_2$, or –$C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, −CN, −NO_2, −N_3, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, –OR^{o4}, –SR^{s1}, –$N(R^{n2})_2$,

–C(=O)N(R^{n2})$_2$, –N(R^{n2})C(=O)R^{c3}, –C(=O)R^{c3}, –C(=O)OR^{o4}, –OC(=O)R^{c3}, –S(=O)R^{s1}, –S(=O)$_2$$R^{s1}$, –S(=O)O$R^{o4}$, –OS(=O)$R^{c3}$, –S(=O)$_2OR^{o4}$, –OS(=O)$_2$$R^{c3}$, –S(=O)N($R^{n2}$)$_2$,

–S(=O)$_2$N(R^{n2})$_2$, –N(R^{n2})S(=O)R^{s1}, –N(R^{n2})S(=O)$_2$$R^{s1}$, –N($R^{n2}$)C(=O)O$R^{o4}$,

–OC(=O)N(R^{n2})$_2$, –N(R^{n2})C(=O)N(R^{n2})$_2$, –N(R^{n2})S(=O)N(R^{n2})$_2$, –N(R^{n2})S(=O)$_2$N(R^{n2})$_2$, –N(R^{n2})S(=O)OR^{o4}, –N(R^{n2})S(=O)$_2$OR^{o4}, –OS(=O)N(R^{n2})$_2$, or –OS(=O)$_2$N(R^{n2})$_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o4} is independently hydrogen, an optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

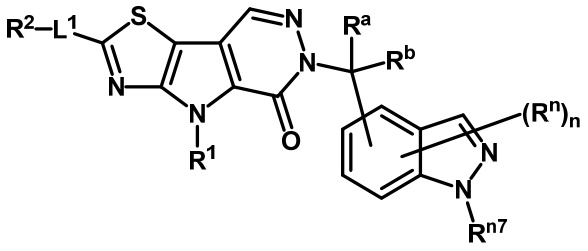
each instance of R^{c3} is independently an optionally substituted −C_1-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted −C_1-C_6 alkyl or a sulfur protecting group;

m is 0, 1, or 2; and

R^{nc} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group.

19. The use of any one of claims 1-9 and 11-14, wherein the compound is of Formula (VI):



(VI)

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, −NO_2, −N_3, optionally substituted alkyl, –OR^{o3}, –N(R^{n1})$_2$, –C(=O)N(R^{n1})$_2$, or –C(=O)R^{c2}, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, $-CN$, $-NO_2$, $-N_3$, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, $–OR^{o4}$, $–SR^{s1}$, $–N(R^{n2})_2$,

$–C(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)R^{c3}$, $–C(=O)R^{c3}$, $–C(=O)OR^{o4}$, $–OC(=O)R^{c3}$, $–S(=O)R^{s1}$, $–S(=O)_2R^{s1}$, $–S(=O)OR^{o4}$, $–OS(=O)R^{c3}$, $–S(=O)_2OR^{o4}$, $–OS(=O)_2R^{c3}$, $–S(=O)N(R^{n2})_2$,

$–S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)R^{s1}$, $–N(R^{n2})S(=O)_2R^{s1}$, $–N(R^{n2})C(=O)OR^{o4}$, $–OC(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)N(R^{n2})_2$, $– N(R^{n2})S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)OR^{o4}$, $–N(R^{n2})S(=O)_2OR^{o4}$, $–OS(=O)N(R^{n2})_2$, or $–OS(=O)_2N(R^{n2})_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o4} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

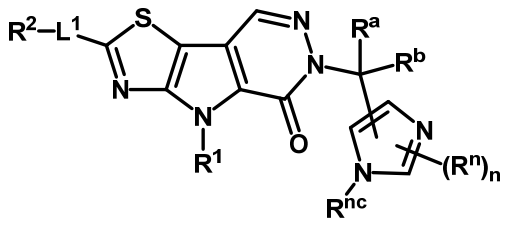
each instance of R^{c3} is independently an optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted $-C_1$-C_6 alkyl or a sulfur protecting group;

n is 0, 1, 2, or 3, as valency permits; and

R^{n7} is hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group.

20. The use of any one of claims 1-10 and 12-14, wherein the compound is of Formula (IX):



(IX),

or a pharmaceutically acceptable salt thereof, wherein

R^a and R^b are each independently hydrogen, halogen, –CN, $-NO_2$, $-N_3$, optionally substituted alkyl, $–OR^{o3}$, $–N(R^{n1})_2$, $–C(=O)N(R^{n1})_2$, or $–C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^n is independently hydrogen, a halogen, $-CN$, $-NO_2$, $-N_3$, an optionally substituted alkyl, an optionally substituted alkenyl, an optionally substituted alkynyl, an optionally substituted cycloalkyl, an optionally substituted aryl, an optionally substituted heterocyclyl, an optionally substituted heteroaryl, $–OR^{o4}$, $–SR^{s1}$, $–N(R^{n2})_2$,

$–C(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)R^{c3}$, $–C(=O)R^{c3}$, $–C(=O)OR^{o4}$, $–OC(=O)R^{c3}$, $–S(=O)R^{s1}$, $–S(=O)_2R^{s1}$, $–S(=O)OR^{o4}$, $–OS(=O)R^{c3}$, $–S(=O)_2OR^{o4}$, $–OS(=O)_2R^{c3}$, $–S(=O)N(R^{n2})_2$,

$–S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)R^{s1}$, $–N(R^{n2})S(=O)_2R^{s1}$, $–N(R^{n2})C(=O)OR^{o4}$,

$–OC(=O)N(R^{n2})_2$, $–N(R^{n2})C(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)N(R^{n2})_2$, $–N(R^{n2})S(=O)_2N(R^{n2})_2$, $–N(R^{n2})S(=O)OR^{o4}$, $–N(R^{n2})S(=O)_2OR^{o4}$, $–OS(=O)N(R^{n2})_2$, or $–OS(=O)_2N(R^{n2})_2$; or two instances of R^n attached to the same or adjacent carbon atoms, taken together with the carbon atoms to which they are attached to form an optionally substituted cycloalkyl or a heterocycloalkyl; wherein:

each instance of R^{n2} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o4} is independently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

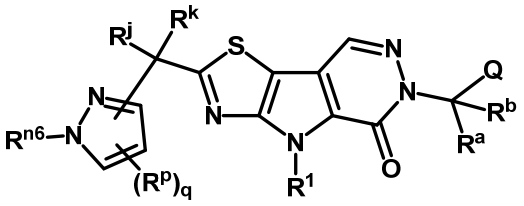
each instance of R^{c3} is independently an optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s1} is independently an optionally substituted −C_1-C_6 alkyl or a sulfur protecting group;

n is 0, 1, or 2; and

R^{nc} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group.

21. The use of any one of the preceding claims, wherein the compound is represented by the following structural formula:



(II')

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, −NO_2, −N_3, optionally substituted alkyl, –OR^{o3}, –$N(R^{n1})_2$, –$C(=O)N(R^{n1})_2$, or –$C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^j and R^k is independently selected from H, halogen, −CN, –OR^{o7}, –$N(R^{n5})_2$, –$N(R^{n5})C(=O)$ R^{c5}, –$C(=O)N(R^{n5})_2$, –$C(=O)R^{c5}$, –$C(=O)OR^{o7}$, –SR^{js}, –$S(=O)_2R^{js}$, or –$S(=O)R^{js}$, optionally substituted −C_1-C_6 alkyl; or R^j and R^k can be taken together with the carbon atom to form C=O, $C=NR^{jn}$, an optionally substituted C_3-C_6 monocyclic cycloalkyl ring or an optionally substituted C_3-C_6 monocyclic heterocyclyl ring;

each of R^{n5} and R^{jn} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, −OR^{o8}, or a nitrogen protecting group;

each instance of R^{o7} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{o8} is indepenently hydrogen, an optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c5} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^{js} is independently optionally substituted −C_1-C_6 alkyl, optionally substituted C_{6-12} aryl, optionally substituted heteroaryl, or a sulfur protecting group;

each instance of R^{p} is independently selected from hydrogen, halogen, −CN, −NO_2, −N_3, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl, optionally substituted heterocyclyl, optionally substituted heteroaryl, –OR^{o6}, –SR^{s2}, –$N(R^{n3})_2$, –$C(=O)N(R^{n3})_2$, –$N(R^{n3})C(=O)R^{c4}$, –$C(=O)R^{c4}$, –$C(=O)OR^{o6}$, –$OC(=O)R^{c4}$, –$S(=O)R^{s2}$, –$S(=O)_2R^{s2}$, –$S(=O)OR^{o6}$, –$OS(=O)R^{c4}$, –$S(=O)_2OR^{o6}$, –$OS(=O)_2R^{c4}$, –$S(=O)N(R^{n3})_2$, –$S(=O)_2N(R^{n3})_2$, –$N(R^{n3})S(=O)R^{s2}$, –$N(R^{n3})S(=O)_2R^{s2}$, –$N(R^{n3})C(=O)OR^{o6}$, –$OC(=O)N(R^{n3})_2$, –$N(R^{n3})C(=O)N(R^{n3})_2$, –$N(R^{n3})S(=O)N(R^{n3})_2$, –$N(R^{n3})S(=O)_2N(R^{n3})_2$, –$N(R^{n3})S(=O)OR^{o6}$, –$N(R^{n3})S(=O)_2OR^{o6}$, –$OS(=O)N(R^{n3})_2$, –$OS(=O)_2N(R^{n3})_2$, or two instances of R^{p} attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{n3} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

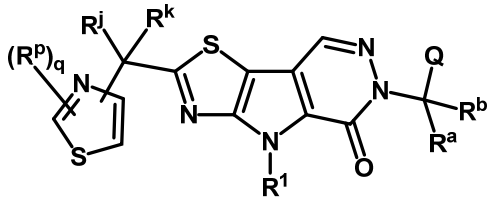
each instance of R^{o6} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c4} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^{s2} is independently optionally substituted −C_1-C_6 alkyl, or a sulfur protecting group; and

q is 0, 1, or 2.

22. The use of any one of claims 1-20, wherein the compound is represented by the following structural formula:



(III')

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, $-NO_2$, $-N_3$, optionally substituted alkyl, $–OR^{o3}$, $–N(R^{n1})_2$, $–C(=O)N(R^{n1})_2$, or $–C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^j and R^k is independently selected from H, halogen, –CN, $–OR^{o7}$, $–N(R^{n5})_2$, $–N(R^{n5})C(=O)\ R^{c5}$, $–C(=O)N(R^{n5})_2$, $–C(=O)R^{c5}$, $–C(=O)OR^{o7}$, $–SR^{js}$, $–S(=O)_2R^{js}$, or $–S(=O)R^{js}$, optionally substituted $-C_1$-C_6 alkyl; or R^j and R^k can be taken together with the carbon atom to form C=O, $C=NR^{jn}$, an optionally substituted C_3-C_6 monocyclic cycloalkyl ring or an optionally substituted C_3-C_6 monocyclic heterocyclyl ring;

each of R^{n5} and R^{jn} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, $-OR^{o8}$, or a nitrogen protecting group;

each instance of R^{o7} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{o8} is indepenently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c5} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{js} is independently optionally substituted $-C_1$-C_6 alkyl, optionally substituted C_{6-12} aryl, optionally substituted heteroaryl, or a sulfur protecting group;

each instance of R^p is independently selected from hydrogen, halogen, $-CN$,$-NO_2$,$-N_3$, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl, optionally substituted heterocyclyl, optionally substituted heteroaryl, $–OR^{o6}$, $–SR^{s2}$, $–N(R^{n3})_2$, $–C(=O)N(R^{n3})_2$, $–N(R^{n3})C(=O)R^{c4}$, $–C(=O)R^{c4}$, $–C(=O)OR^{o6}$, $–OC(=O)R^{c4}$, $–S(=O)R^{s2}$, $–S(=O)_2R^{s2}$, $–S(=O)OR^{o6}$, $–OS(=O)R^{c4}$, $–S(=O)_2OR^{o6}$, $–OS(=O)_2R^{c4}$, $–S(=O)N(R^{n3})_2$, $–S(=O)_2N(R^{n3})_2$, $–N(R^{n3})S(=O)R^{s2}$, $–N(R^{n3})S(=O)_2R^{s2}$,

$-N(R^{n3})C(=O)OR^{o6}$, $-OC(=O)N(R^{n3})_2$, $-N(R^{n3})C(=O)N(R^{n3})_2$, $-N(R^{n3})S(=O)N(R^{n3})_2$, $-N(R^{n3})S(=O)_2N(R^{n3})_2$, $-N(R^{n3})S(=O)OR^{o6}$, $-N(R^{n3})S(=O)_2OR^{o6}$, $-OS(=O)N(R^{n3})_2$, $-OS(=O)_2N(R^{n3})_2$, or two instances of R^p attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{n3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

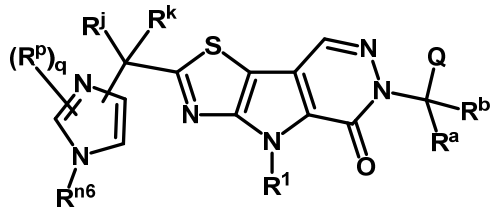
each instance of R^{o6} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c4} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s2} is independently optionally substituted $-C_1$-C_6 alkyl, or a sulfur protecting group; and

q is 0, 1, or 2.

23. The use of any one of claims 1-20, wherein the compound is represented by the following structural formula:



(IV')

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, $-CN$, $-NO_2$, $-N_3$, optionally substituted alkyl, $-OR^{o3}$, $-N(R^{n1})_2$, $-C(=O)N(R^{n1})_2$, or $-C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^j and R^k is independently selected from H, halogen, $-CN$, $-OR^{o7}$, $-N(R^{n5})_2$, $-N(R^{n5})C(=O)\ R^{c5}$, $-C(=O)N(R^{n5})_2$, $-C(=O)R^{c5}$, $-C(=O)OR^{o7}$, $-SR^{js}$,

$-S(=O)_2R^{js}$, or $-S(=O)R^{js}$, optionally substituted $-C_1$-C_6 alkyl; or R^j and R^k can be taken together with the carbon atom to form C=O, $C=NR^{jn}$, an optionally substituted C_3-C_6 monocyclic cycloalkyl ring or an optionally substituted C_3-C_6 monocyclic heterocyclyl ring;

each of R^{n5} and R^{jn} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, $-OR^{o8}$, or a nitrogen protecting group;

each instance of R^{o7} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{o8} is indepenently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c5} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{js} is independently optionally substituted $-C_1$-C_6 alkyl, optionally substituted C_{6-12} aryl, optionally substituted heteroaryl, or a sulfur protecting group;

each instance of R^p is independently selected from hydrogen, halogen, $-CN$, $-NO_2$, $-N_3$, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl, optionally substituted heterocyclyl, optionally substituted heteroaryl, $-OR^{o6}$, $-SR^{s2}$, $-N(R^{n3})_2$, $-C(=O)N(R^{n3})_2$, $-N(R^{n3})C(=O)R^{c4}$, $-C(=O)R^{c4}$, $-C(=O)OR^{o6}$, $-OC(=O)R^{c4}$, $-S(=O)R^{s2}$, $-S(=O)_2R^{s2}$, $-S(=O)OR^{o6}$, $-OS(=O)R^{c4}$, $-S(=O)_2OR^{o6}$, $-OS(=O)_2R^{c4}$, $-S(=O)N(R^{n3})_2$, $-S(=O)_2N(R^{n3})_2$, $-N(R^{n3})S(=O)R^{s2}$, $-N(R^{n3})S(=O)_2R^{s2}$, $-N(R^{n3})C(=O)OR^{o6}$, $-OC(=O)N(R^{n3})_2$, $-N(R^{n3})C(=O)N(R^{n3})_2$, $-N(R^{n3})S(=O)N(R^{n3})_2$, $-N(R^{n3})S(=O)_2N(R^{n3})_2$, $-N(R^{n3})S(=O)OR^{o6}$, $-N(R^{n3})S(=O)_2OR^{o6}$, $-OS(=O)N(R^{n3})_2$, $-OS(=O)_2N(R^{n3})_2$, or two instances of R^p attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{n3}, R^{nc}, and R^{nd} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o6} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

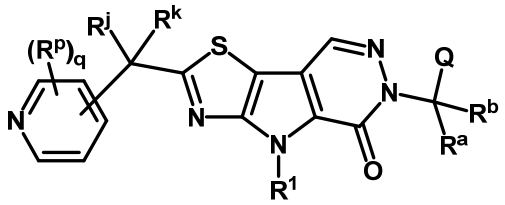
each instance of R^{c4} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{s2} is independently optionally substituted $-C_1$-C_6 alkyl, or a sulfur protecting group;

q is 0, 1, or 2; and

R^{n6} is hydrogen, an optionally substituted $–C_1$-C_6 alkyl, or a nitrogen protecting group.

24. The use of any one of claims 1-20, wherein the compound is represented by the following structural formula:



(V')

or a pharmaceutically acceptable salt thereof, wherein:

R^a and R^b are each independently hydrogen, halogen, –CN, $-NO_2$, $-N_3$, optionally substituted alkyl, $–OR^{o3}$, $–N(R^{n1})_2$, $–C(=O)N(R^{n1})_2$, or $–C(=O)R^{c2}$, or R^a and R^b can be taken together with the carbon atom to form optionally substituted cycloalkyl or optionally substituted heterocyclyl;

each instance of R^{n1} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or a nitrogen protecting group;

each instance of R^{o3} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c2} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^j and R^k is independently selected from H, halogen, –CN, $–OR^{o7}$, $–N(R^{n5})_2$, $–N(R^{n5})C(=O)\ R^{c5}$, $–C(=O)N(R^{n5})_2$, $–C(=O)R^{c5}$, $–C(=O)OR^{o7}$, $–SR^{js}$, $–S(=O)_2R^{js}$, or $–S(=O)R^{js}$, optionally substituted $-C_1$-C_6 alkyl; or R^j and R^k can be taken together with the carbon atom to form C=O, $C=NR^{jn}$, an optionally substituted C_3-C_6 monocyclic cycloalkyl ring or an optionally substituted C_3-C_6 monocyclic heterocyclyl ring;

each of R^{n5} and R^{jn} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, $-OR^{o8}$, or a nitrogen protecting group;

each instance of R^{o7} is independently hydrogen, optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{o8} is indepenently hydrogen, an optionally substituted $-C_1$-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c5} is independently optionally substituted $-C_1$-C_6 alkyl;

each instance of R^{js} is independently optionally substituted −C_1-C_6 alkyl, optionally substituted C_{6-12} aryl, optionally substituted heteroaryl, or a sulfur protecting group;

each instance of R^{p} is independently selected from hydrogen, halogen, −CN, −NO_2, −N_3, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted aryl, optionally substituted heterocyclyl, optionally substituted heteroaryl, –OR^{o6}, –SR^{s2}, –$N(R^{n3})_2$, –$C(=O)N(R^{n3})_2$, –$N(R^{n3})C(=O)R^{c4}$, –$C(=O)R^{c4}$, –$C(=O)OR^{o6}$, –$OC(=O)R^{c4}$, –$S(=O)R^{s2}$, –$S(=O)_2R^{s2}$, –$S(=O)OR^{o6}$, –$OS(=O)R^{c4}$, –$S(=O)_2OR^{o6}$, –$OS(=O)_2R^{c4}$, –$S(=O)N(R^{n3})_2$, –$S(=O)_2N(R^{n3})_2$, –$N(R^{n3})S(=O)R^{s2}$, –$N(R^{n3})S(=O)_2R^{s2}$, –$N(R^{n3})C(=O)OR^{o6}$, –$OC(=O)N(R^{n3})_2$, –$N(R^{n3})C(=O)N(R^{n3})_2$, –$N(R^{n3})S(=O)N(R^{n3})_2$, –$N(R^{n3})S(=O)_2N(R^{n3})_2$, –$N(R^{n3})S(=O)OR^{o6}$, –$N(R^{n3})S(=O)_2OR^{o6}$, –$OS(=O)N(R^{n3})_2$, –$OS(=O)_2N(R^{n3})_2$, or two instances of R^{p} attached to the same or adjacent carbon atoms, taken together with the atoms to which they are attached form an optionally substituted cycloalkyl or a heterocycloalkyl;

each instance of R^{n3}, R^{nc}, and R^{nd} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or a nitrogen protecting group;

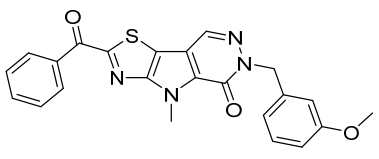
each instance of R^{o6} is independently hydrogen, optionally substituted −C_1-C_6 alkyl, or an oxygen protecting group;

each instance of R^{c4} is independently optionally substituted −C_1-C_6 alkyl;

each instance of R^{s2} is independently optionally substituted −C_1-C_6 alkyl, or a sulfur protecting group; and

q is 0, 1, 2, or 3.

25. The use of any one of the preceding claims, wherein the compound is selected from the following formulae:



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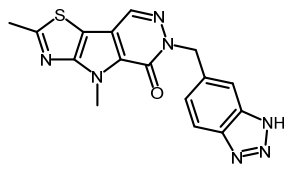

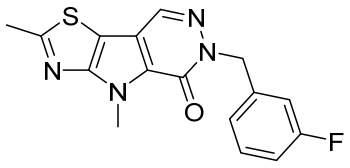

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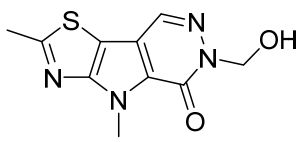

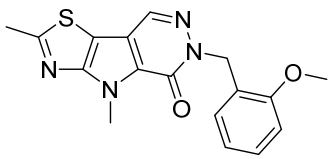
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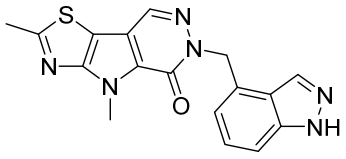
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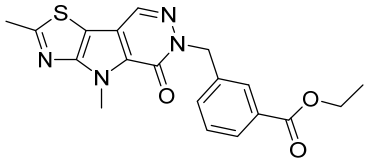
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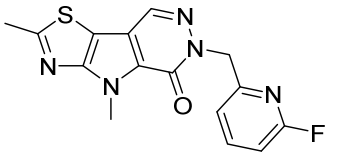
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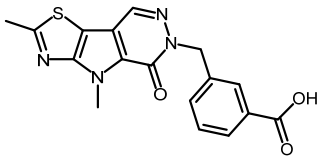
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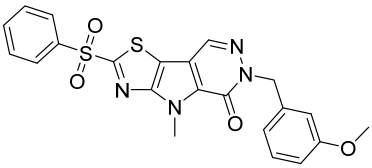
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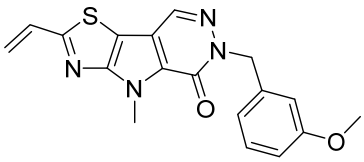
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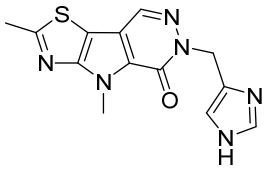
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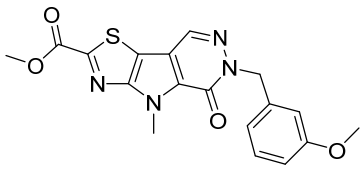
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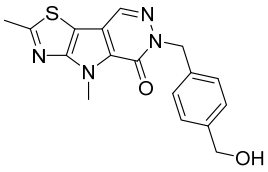
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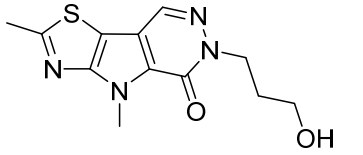
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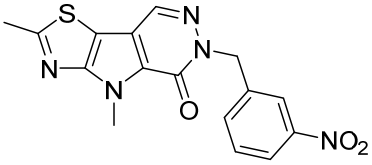
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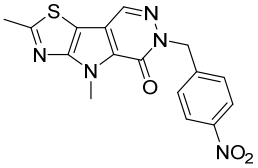
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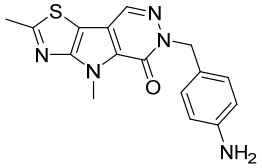
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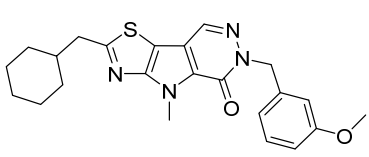
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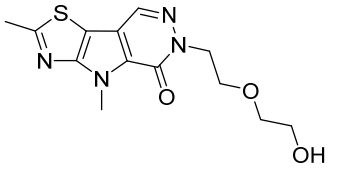
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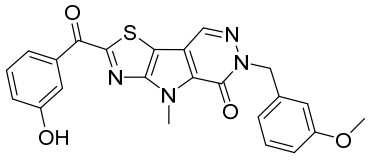
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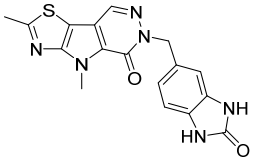
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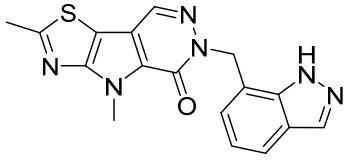
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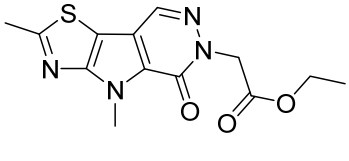
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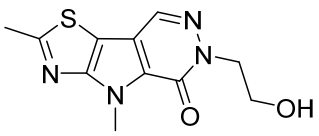
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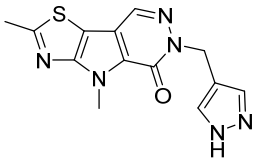
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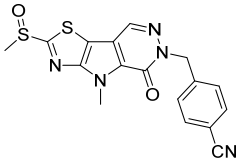
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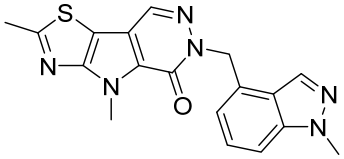
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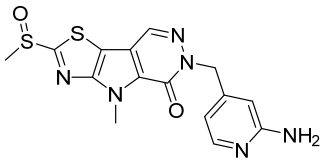
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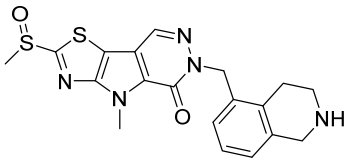
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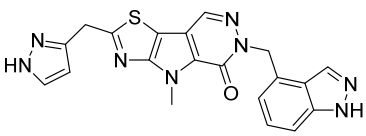
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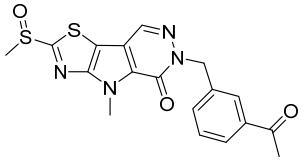
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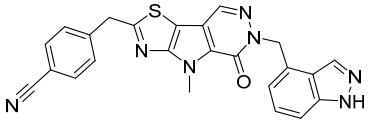
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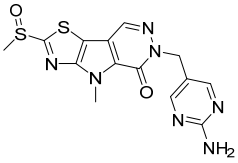
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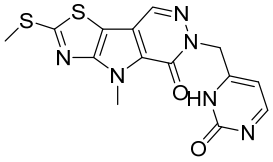
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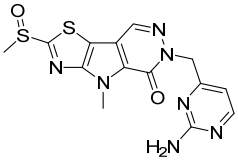
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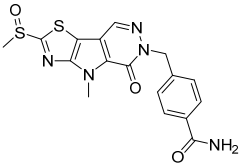
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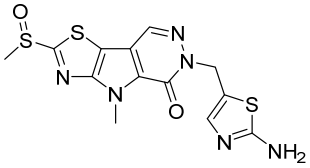
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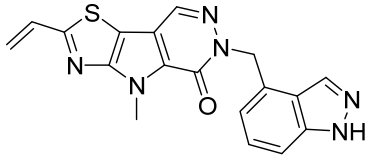
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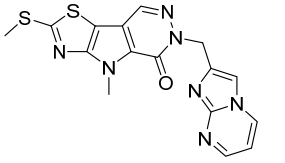
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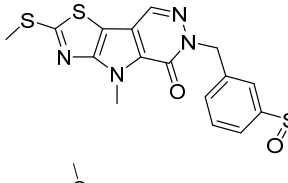
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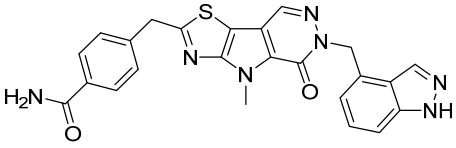
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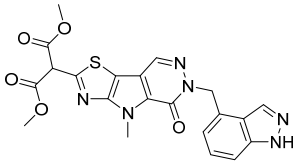
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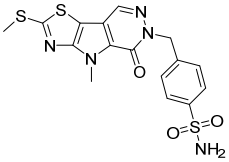
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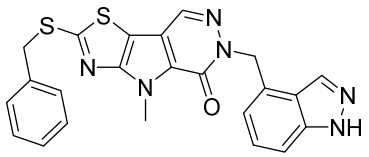
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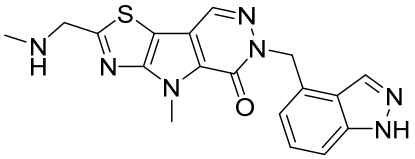
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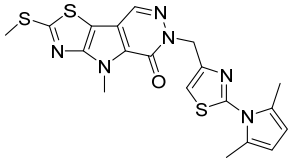
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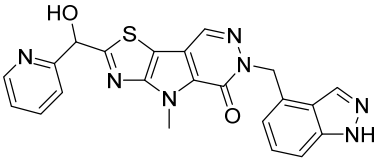
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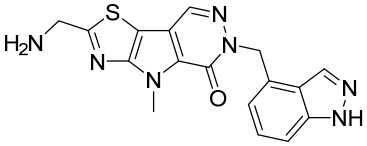
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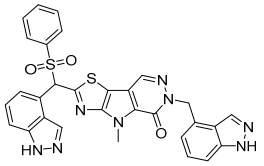
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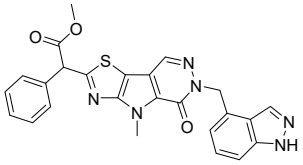
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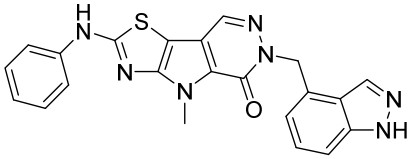
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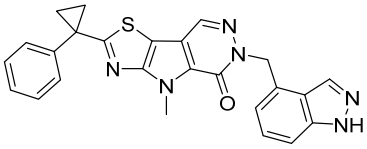
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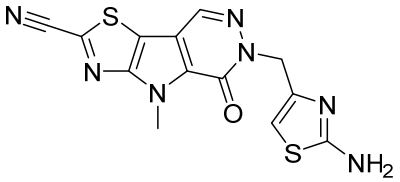
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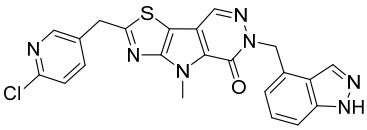
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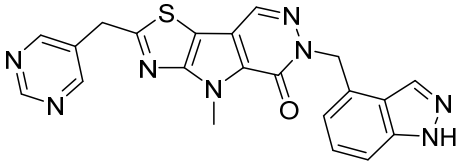
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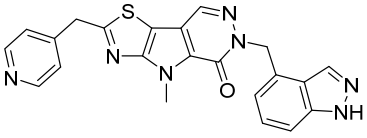
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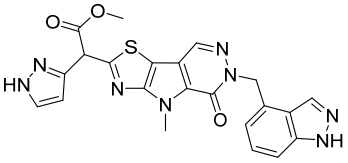
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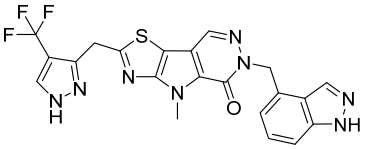
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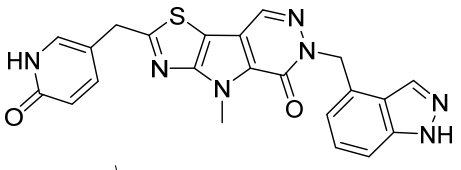
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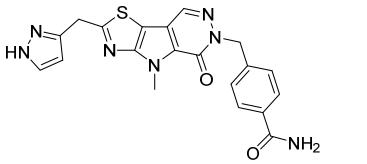
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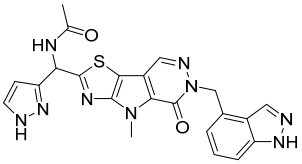
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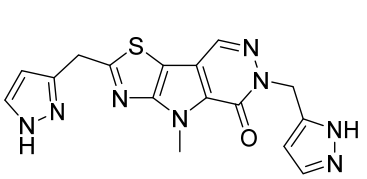
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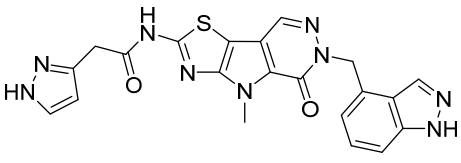
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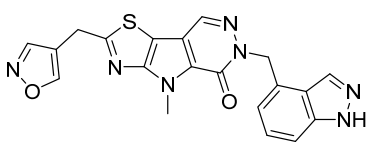
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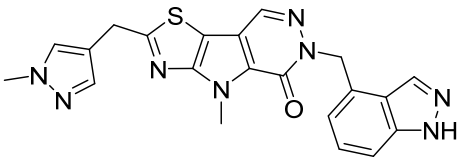
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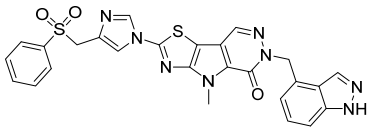
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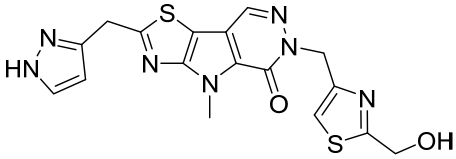
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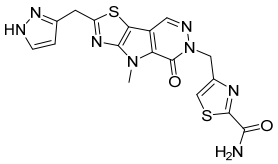
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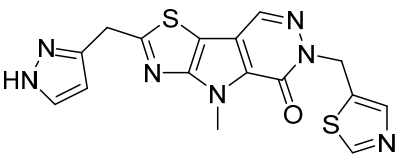
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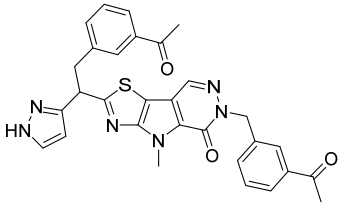
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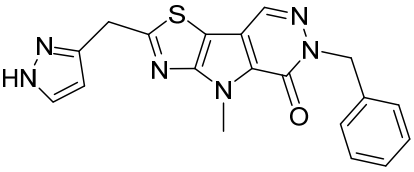
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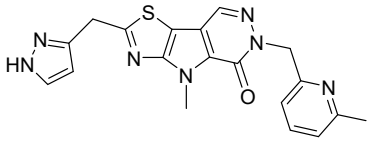
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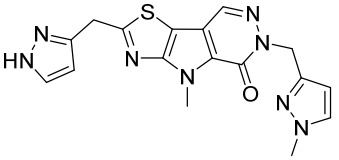
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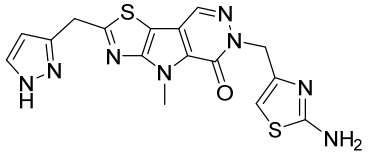
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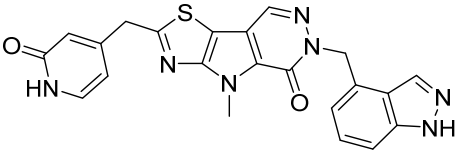
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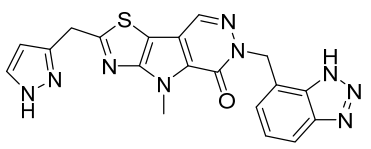
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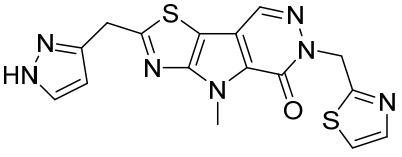
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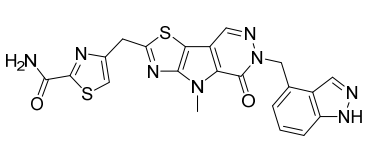
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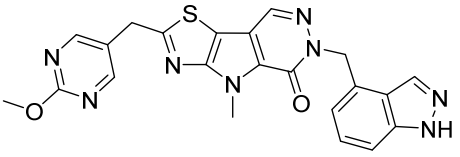
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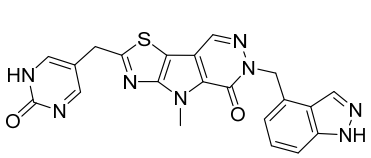
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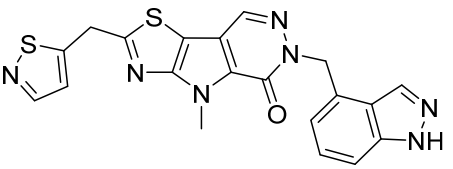
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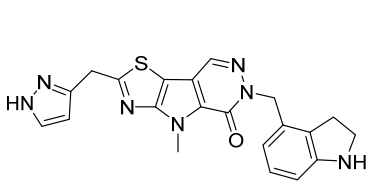
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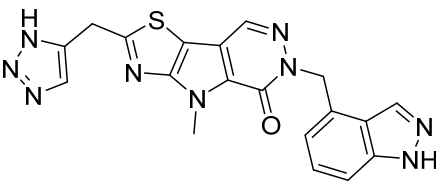
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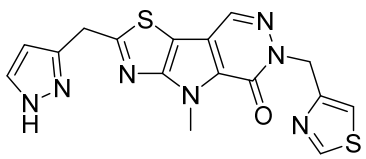
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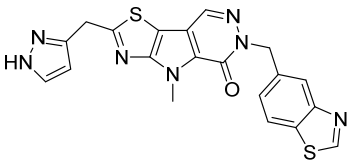
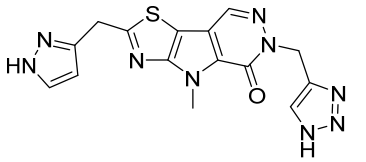
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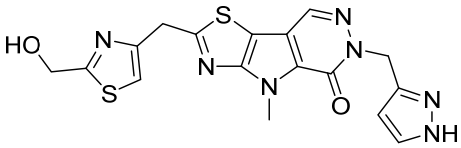
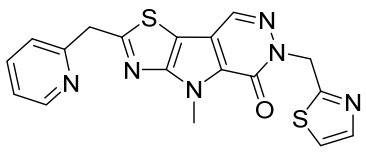
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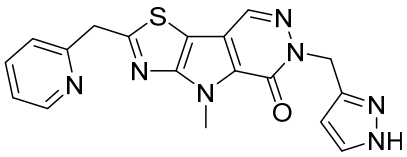
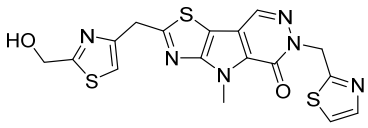
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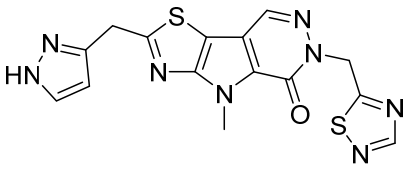
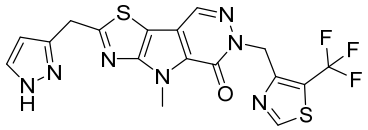
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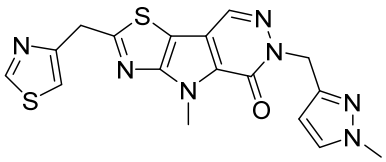
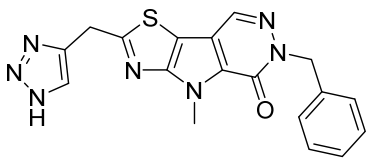
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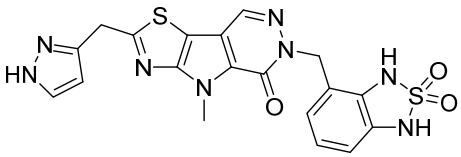
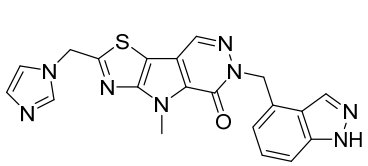
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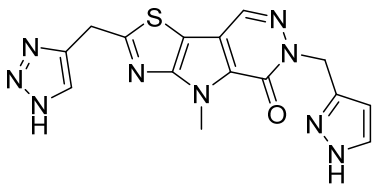
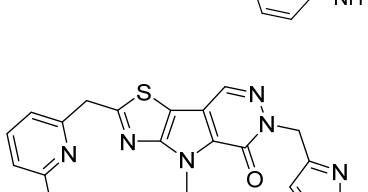
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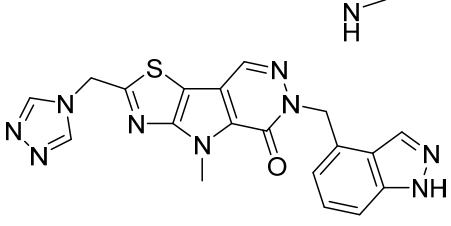

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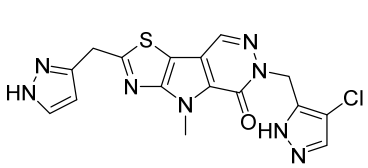
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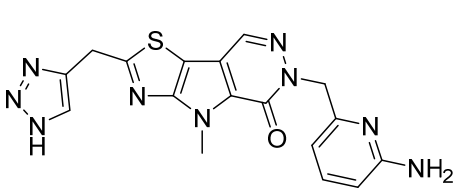

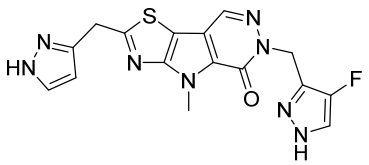
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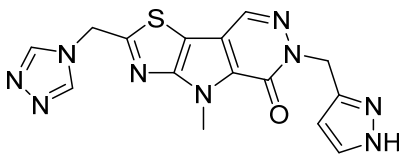
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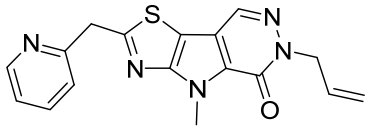
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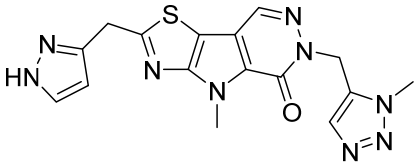
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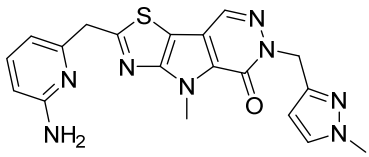
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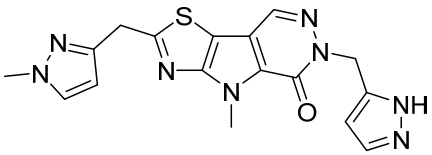
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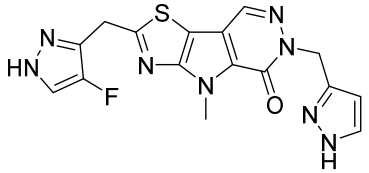
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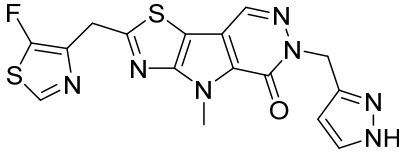
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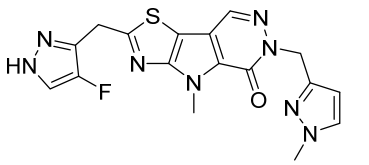
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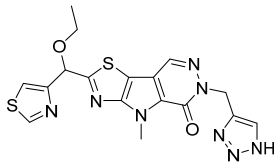
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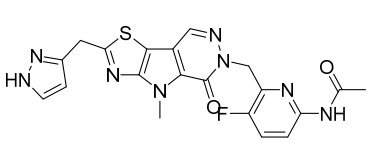
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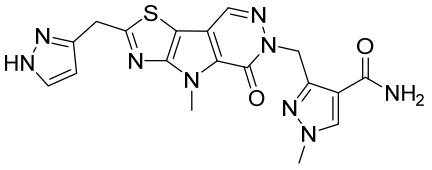
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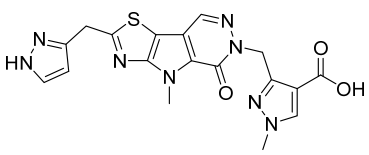
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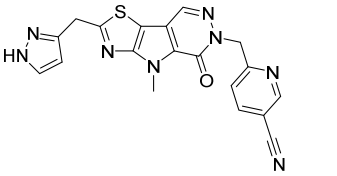
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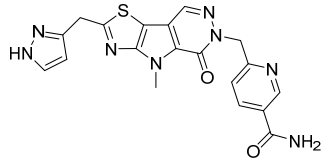
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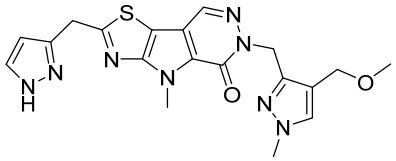
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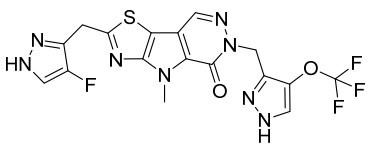
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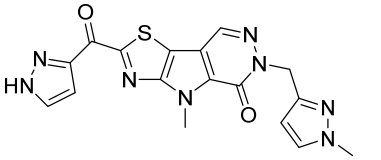
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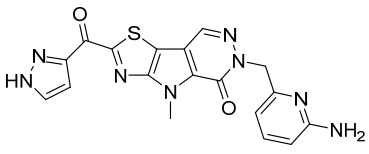
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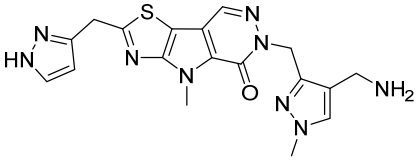
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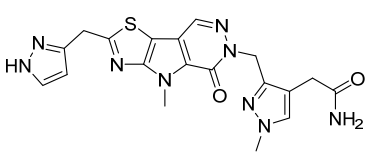
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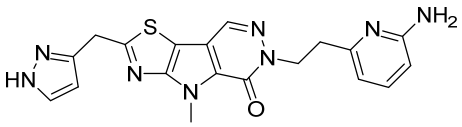
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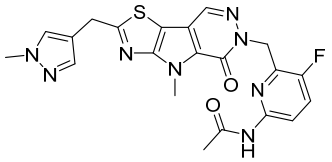
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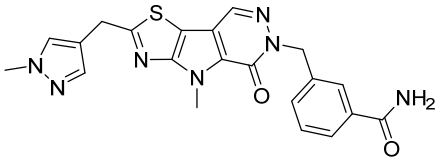
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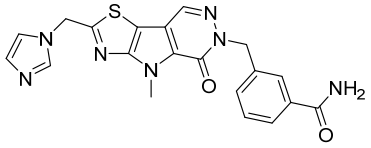
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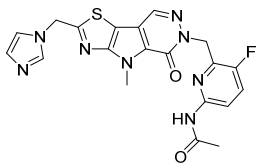
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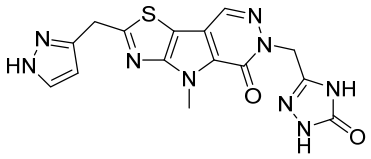
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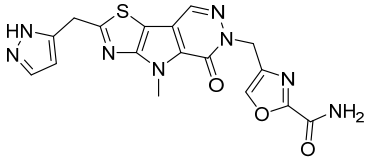
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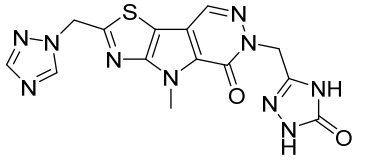
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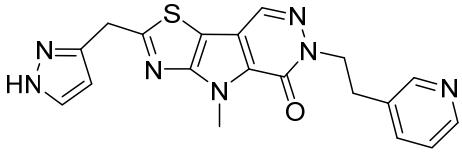
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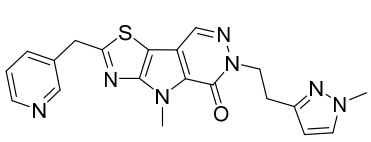
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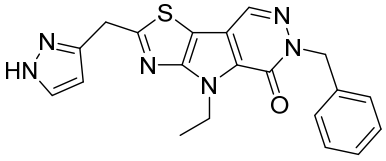
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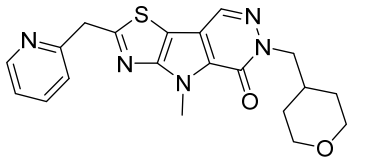
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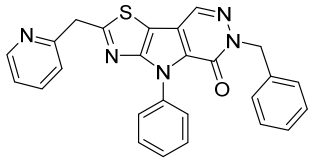
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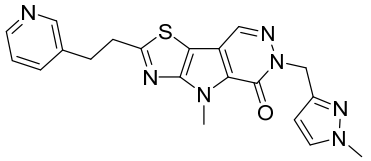
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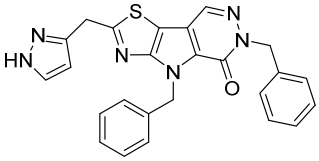
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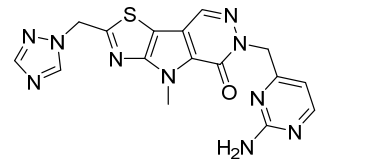
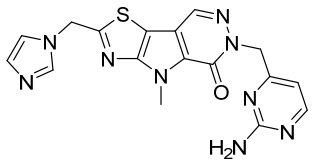
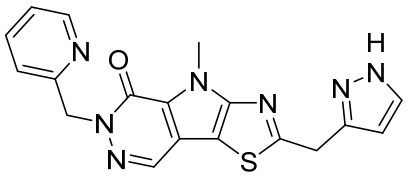

and


or a pharmaceutically acceptable salt thereof.

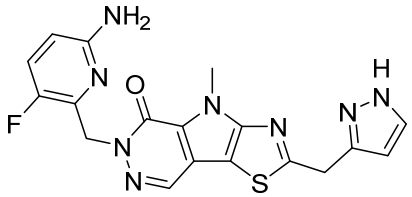
26. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

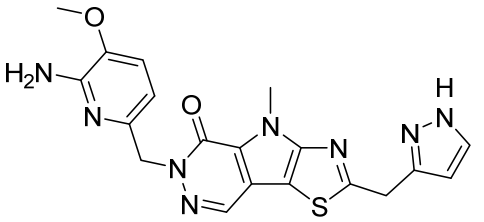
27. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

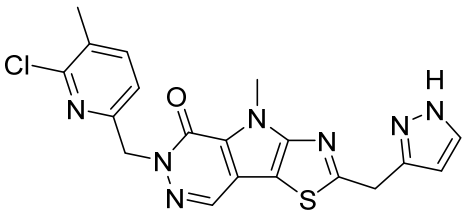
28. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

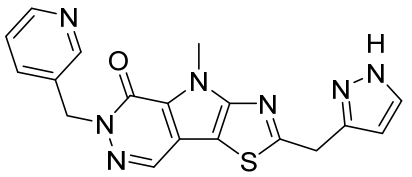
29. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

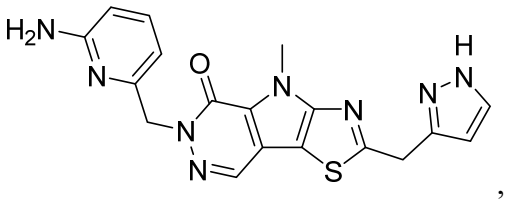
30. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

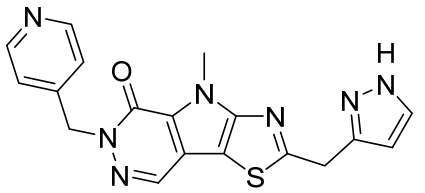
31. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

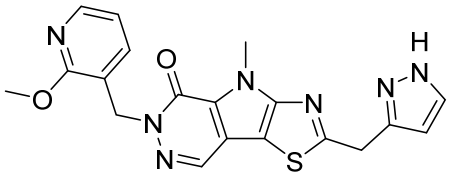
32. The use of any one of claims 1-5, wherein the compound is:



,

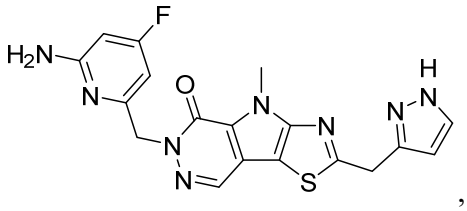
or a pharmaceutically acceptable salt thereof.

33. The use of any one of claims 1-5, wherein the compound is:



,

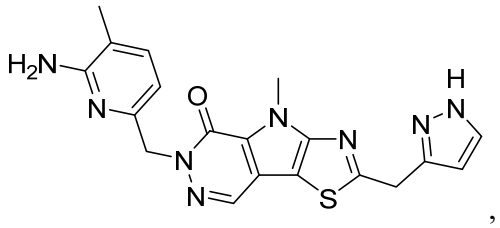
34. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

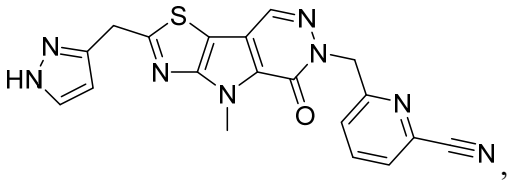
35. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.

36. The use of any one of claims 1-5, wherein the compound is:



,

or a pharmaceutically acceptable salt thereof.