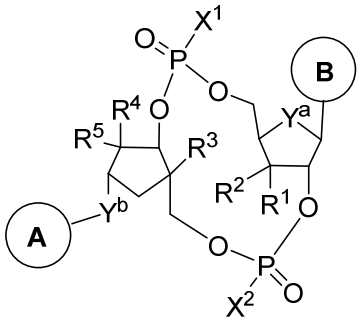
WHAT IS CLAIMED IS:

1. A compound of Formula I:



(I)

,

or a pharmaceutically acceptable salt thereof, wherein:

X^1 is -SH or -OH;

X^2 is -SH or -OH;

Y^a is –O-, -S-, or -CH_2-;

Y^b is –O-, -S-, -NH-, or -NR^a-, wherein R^a is C_1-C_4alkyl;

R^1 is hydrogen, fluoro, -OH, -NH_2, -OR^b, or -NHR^b;

R^2 is hydrogen or fluoro;

R^3 is hydrogen; R^4 is hydrogen, fluoro, -OH, -NH_2, -OR^b, or -NHR^b; or R^3 and R^4 are taken together to form -CH_2O-;

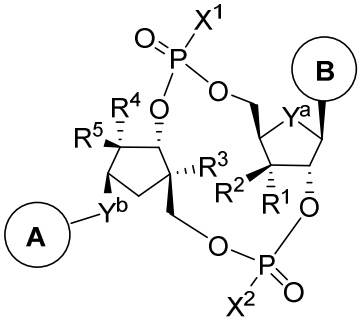
R^5 is hydrogen or fluoro;

R^b is C_1-C_6alkyl, halo(C_1-C_6)alkyl, or C_3-C_6cycloalkyl;

Ring A is an optionally substituted 5- or 6-membered monocyclic heteroaryl ring containing 1-4 heteroatoms selected from N, O, or S, or an optionally substituted 9- or 10-membered bicyclic heteroaryl ring containing 1-5 heteroatoms selected from N, O, or S; wherein Ring A comprises at least one N atom in the ring, and wherein Y^b is attached to a carbon atom of Ring A; and

Ring B is an optionally substituted 9- or 10-membered bicyclic heteroaryl ring containing 2-5 heteroatoms selected from N, O, or S; wherein Ring B comprises at least two N atoms in the ring.

2. The compound of claim 1, having Formula II:



(II)

,

or a pharmaceutically acceptable salt thereof.

3. The compound of claim 1 or 2 or a pharmaceutically acceptable salt thereof, wherein:

X^1 and X^2 are -SH; and

the phosphorus atom of each phosphorothioate linkage is chiral and is independently R_p or S_p.

4. The compound of claim 3 or a pharmaceutically acceptable salt thereof, wherein:

X^1 and X^2 are -SH; and

the phosphorus atom of each phosphorothioate linkage is R_p.

5. The compound of any one of claims 1-4 or a pharmaceutically acceptable salt thereof, wherein Y^a is -O-.

6. The compound of any one of claims 1 to 5 or a pharmaceutically acceptable salt thereof, wherein Y^b is –O-.

7. The compound of any one of claims 1 to 6 or a pharmaceutically acceptable salt thereof, wherein R^1 is hydrogen, fluoro, -OH-, or $-OCH_2CF_3$, and R^2 is hydrogen or fluoro.

8. The compound of any one of claims 1 to 7 or a pharmaceutically acceptable salt thereof, wherein:

R^3 is hydrogen;

R^4 is hydrogen, fluoro, or -OH; and

R^5 is hydrogen or fluoro.

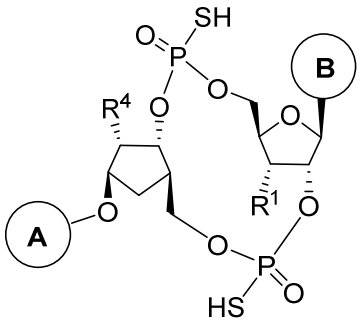
9. The compound of any one of claims 1 to 6 or a pharmaceutically acceptable salt thereof, wherein:

R^1 is fluoro or OH;

R^4 is hydrogen or fluoro; and

R^2, R^3, and R^5 are hydrogen.

10. The compound of claim 1, having Formula (IV):



(IV)

,

or a pharmaceutically acceptable salt thereof,

wherein R^1 and R^4 are each independently hydrogen, fluoro, -OH, or $-OCH_2CF_3$.

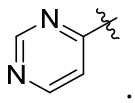
11. The compound of claim 10 or a pharmaceutically acceptable salt thereof, wherein:

the phosphorus atom of each phosphorothioate linkage is chiral and is independently R_p or S_p.

12. The compound of any one of claims 1 to 11 or a pharmaceutically acceptable salt thereof, wherein:

Ring A is an optionally substituted 6-membered monocyclic heteroaryl ring containing 1-3 N atoms.

13. The compound of claim 11 or a pharmaceutically acceptable salt thereof, wherein:
Ring A is:



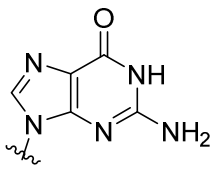
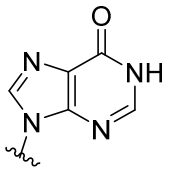
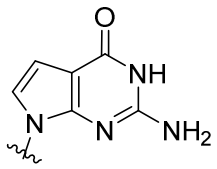
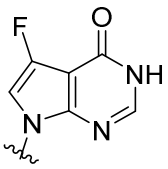
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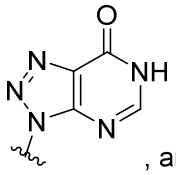
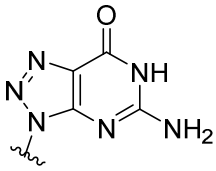
14. The compound of any one of claims 1 to 13 or a pharmaceutically acceptable salt thereof, wherein:

Ring B is an optionally substituted 9-membered bicyclic heteroaryl ring containing 3-5 N atoms; and

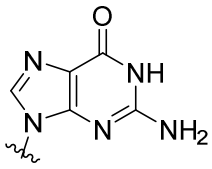
the Y^a containing 5-membered ring is attached to a nitrogen atom of Ring B.

15. The compound of claim 14 or a pharmaceutically acceptable salt thereof, wherein Ring B is selected from:

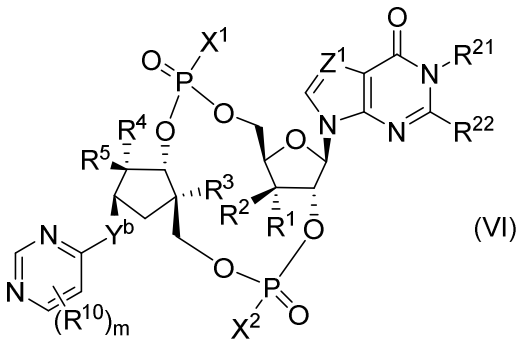

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16. The compound of claim 15 or a pharmaceutically acceptable salt thereof, wherein Ring B is:


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17. The compound of claim 1, having Formula (VI):


(VI)

or a pharmaceutically acceptable salt thereof, wherein

X^1 is -SH or -OH;

X^2 is -SH or -OH;

Y^b is -O-, -S-, -NH-, or –NMe-;

R^1 is hydrogen, fluoro, -OH, or -OR^b;

R^2 is hydrogen or fluoro;

R^3 is hydrogen; R^4 is hydrogen, fluoro, or -OH;

R^5 is hydrogen or fluoro;

R^b is C_1-C_6alkyl, halo(C_1-C_6)alkyl, or C_3-C_6cycloalkyl;

each R^{10} is independently hydrogen, halogen, -OH, -NH_2, C_1-C_6alkyl, halo(C_1-C_6)alkyl, C_3-C_6cycloalkyl, -OR^{11}, -NHR^{11}, -CN, -NO_2, or -C(O)NHR^{12};

R^{11} is C_1-C_6alkyl, halo(C_1-C_6)alkyl, or C_3-C_6cycloalkyl;

R^{12} is hydrogen, C_1-C_6alkyl, halo(C_1-C_6)alkyl, or C_3-C_6cycloalkyl;

m is 0, 1, or 2;

Z^1 is N, CH, or CF;

R^{21} is hydrogen or -CH_3; and

R^{22} is hydrogen, -NH_2, or -CH_3.

18. The compound of claim 17 or a pharmaceutically acceptable salt thereof, wherein Y^b is -O-.

19. The compound of any one of claims 17 and 18 or a pharmaceutically acceptable salt thereof, wherein X^1 and X^2 are -SH, and wherein the phosphorus atom of each phosphorothioate linkage is chiral and is independently R_p or S_p.

20. The compound of any one of claims 17 to 19 or a pharmaceutically acceptable salt thereof, wherein R^2, R^3, and R^5 are hydrogen.

21. The compound of any one of claims 17, 18, 19 and 20 or a pharmaceutically acceptable salt thereof, wherein R^1 is hydrogen, fluoro, or -OH.

22. The compound of any one of claims 17, 18, 19, 20 and 21 or a pharmaceutically acceptable salt thereof, wherein R^4 is hydrogen or fluoro.

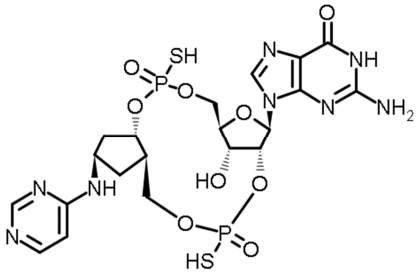
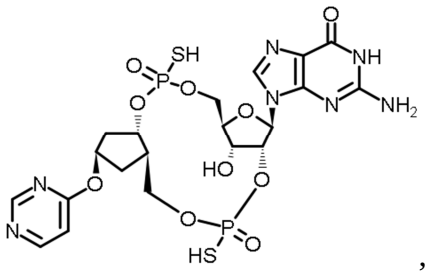
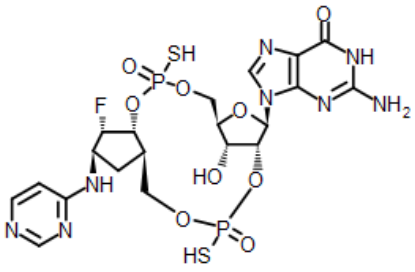
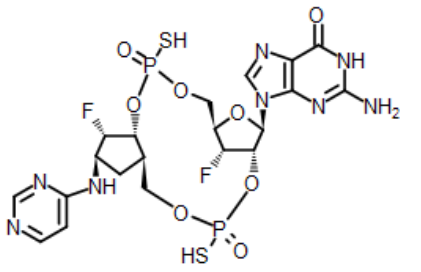
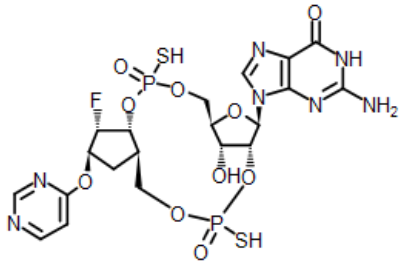
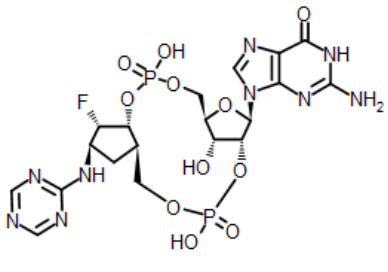
23. The compound of any one of claims 17 to 22 or a pharmaceutically acceptable salt thereof, wherein m is 0.

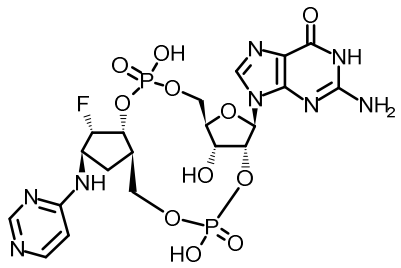
24. The compound of any one of claims 17 to 23 or a pharmaceutically acceptable salt thereof, wherein Z^1 is N.

25. The compound of any one of claims 17 to 24 or a pharmaceutically acceptable salt thereof, wherein R^{21} is hydrogen.

26. The compound of any one of claims 17 to 25 or a pharmaceutically acceptable salt thereof, wherein R^{22} is NH_2.

27. The compound of claim 1 or a pharmaceutically acceptable salt thereof, wherein the compound is selected from:


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28. A pharmaceutical composition comprising (a) the compound of any one of claims 17 to 27 or a pharmaceutically acceptable salt thereof, and (b) a pharmaceutically acceptable carrier.

29. A composition for treating a cell proliferation disorder in a subject comprising a therapeutically effective amount of the compound of any one of claims 17 to 27 or a pharmaceutically acceptable salt thereof.

30. The composition of claim 29, wherein the cell proliferation disorder is cancer.

31. A vaccine composition comprising an antigen and the compound of any one of claims 17 to 27 or a pharmaceutically acceptable salt thereof.