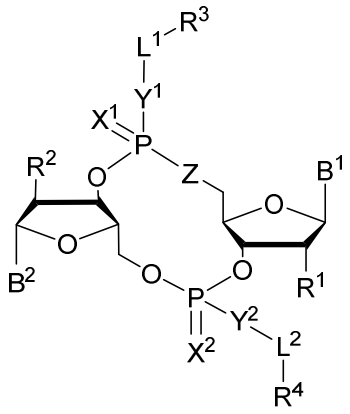
CLAIMS

1. A compound of Formula (I):



Formula (I)

or a pharmaceutically acceptable salt or stereoisomer thereof, wherein:

Z is either S or O;

each of B^1 and B^2 is independently a purinyl nucleobase or pyrimidinyl nucleobase;

each of X^1 and X^2 is independently O or S;

each of Y^1 and Y^2 is independently O, S, or NR^5;

each of L^1 and L^2 is independently absent, C_1-C_6 alkyl or C_1-C_6 heteroalkyl, wherein each alkyl and heteroalkyl is optionally substituted with R^6;

each of R^1 and R^2 is independently hydrogen, halo, -CN, C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), or OR^7;

each of R^3 and R^4 is independently hydrogen, C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), C_1-C_{20} heteroalkyl (e.g., C_1-C_6 heteroalkyl), $OC(O)OC_1$-C_{20} alkyl (e.g., C_1-C_6 alkyl), cycloalkyl, heterocyclyl, aryl, or heteroaryl, wherein each alkyl, heteroalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl is optionally substituted with one or more R^8;

R^5 is hydrogen or C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl);

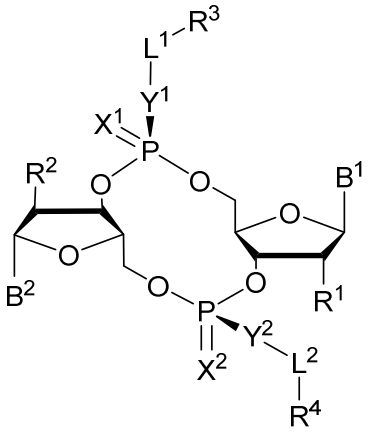
R^6 is halo, -CN, C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), OR^7, oxo, cycloalkyl, heterocyclyl, aryl, or heteroaryl, wherein each alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl is optionally substituted with one or more R^9;

R^7 is hydrogen, C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), cycloalkyl, heterocyclyl, aryl, or heteroaryl, wherein each alkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl is optionally substituted with one or more R^9;

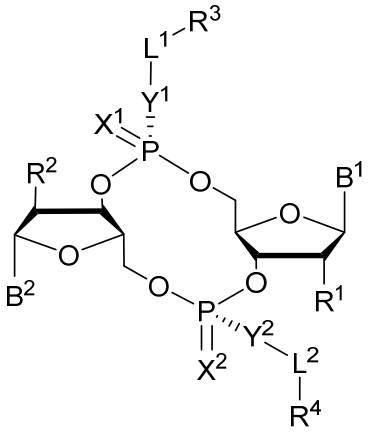
each R^8 is independently C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), C_1-C_{20} heteroalkyl, C(O)-C_1-C_{20} alkyl, OC(O)-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), C(O)O-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), OC(O)O-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), C(O)N(R^5)-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), N(R^5)C(O)-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), OC(O)N(R^5)-C_1-C_{20} alkyl (e.g., C_1-C_6 alkyl), O-aryl, O-heteroaryl, C(O)-aryl, C(O)-heteroaryl, OC(O)-aryl, C(O)O-aryl, OC(O)-heteroaryl, C(O)O-heteroaryl, C(O)O-aryl, C(O)O-heteroaryl, C(O)N(R^5)-aryl, C(O)N(R^5)-heteroaryl, N(R^5)C(O)-aryl, N(R^5)$_2$C(O)-aryl, or N(R^5)C(O)-heteroaryl, S(O)$_2$N(R^5)-aryl, wherein each alkyl, heteroalkyl, aryl, and heteroaryl is optionally substituted by one or more R^9;

and each R^9 is independently C_1-C_{20} alkyl, O-C_1-C_{20} alkyl, C_1-C_{20} heteroalkyl, halo, -CN, OH, oxo, aryl, heteroaryl, O-aryl, or O-heteroaryl.

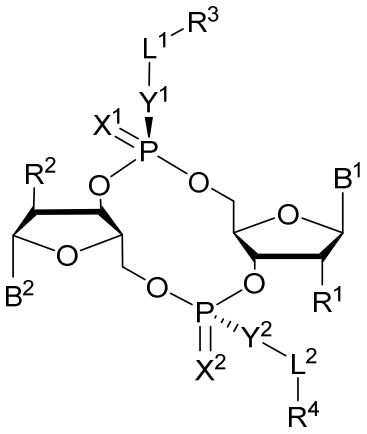
2. The compound of claim 1, wherein the compound is a compound of Formulas (I-b), (I-c), (I-d), or (I-e):



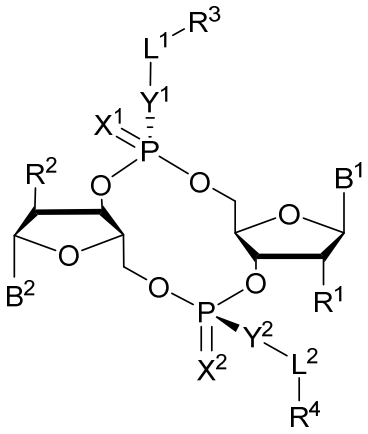
Formula (I-b)



Formula (I-c)



Formula (I-d)



Formula (I-e)

or a pharmaceutically acceptable salt thereof, wherein each of B^1, B^2, X^1, X^2, Y^1, Y^2, L^1, L^2, R^1, R^2, R^3, R^4, and subvariables thereof are defined as in claim 1.

3. The compound of claim 1 or 2, wherein B^1 is a purinyl nucleobase and B^2 is a pyrimidinyl nucleobase.

4. The compound of any one of claims 1-3, wherein B^1 is adenosinyl or guanosinyl and B^2 is cytosinyl, thyminyl, or uracilyl.

5. The compound of any one of claims 1-4, wherein B^1 is adenosinyl, and B^2 is uracilyl.

6. The compound of any one of claims 1-5, wherein each of R^1 and R^2 is independently hydrogen, halo, or OR^7.

7. The compound of any one of claims 1-6, wherein each of R^1 and R^2 is independently halo (e.g., fluoro).

8. The compound of any one of claims 1-5, wherein each of R^1 and R^2 is not hydrogen or OR^7.

9. The compound of any one of claims 1-8, wherein each of X^1 and X^2 is independently O.

10. The compound of any one of claims 1-9, wherein each of Y^1 and Y^2 is independently O or S.

11. The compound of any one of claims 1-10, wherein one of Y^1 or Y^2 is O and the other of Y^1 or Y^2 is S.

12. The compound of any one of claims 1-10, wherein each of Y^1 or Y^2 is independently S.

13. The compound of any one of claims 1-10, wherein each of Y^1 or Y^2 is independently O.

14. The compound of any one of claims 1-13, wherein each of L^1 and L^2 is independently C_1-C_6 alkyl (e.g., CH_2).

15. The compound of any one of claims 1-14, wherein each of R^3 and R^4 is independently hydrogen, aryl, or heteroaryl, wherein aryl and heteroaryl is optionally substituted with 1-5 R^8.

16. The compound of any one of claims 1-15, wherein R^3 is aryl or heteroaryl, each of which is optionally substituted with 1-5 R^8, and R^4 is hydrogen.

17. The compound of any one of claims 1-15, wherein R^3 is phenyl substituted with 1 R^8 and R^4 is hydrogen.

18. The compound of any one of claims 1-15, wherein each of R^3 and R^4 is independently phenyl substituted with 1 R^8.

19. The compound of any one of claims 1-10, wherein each of Y^1 and Y^2 is O and each of R^3 and R^4 is independently hydrogen.

20. The compound of any one of claims 1-11, wherein Y^2 is O and R^4 is hydrogen.

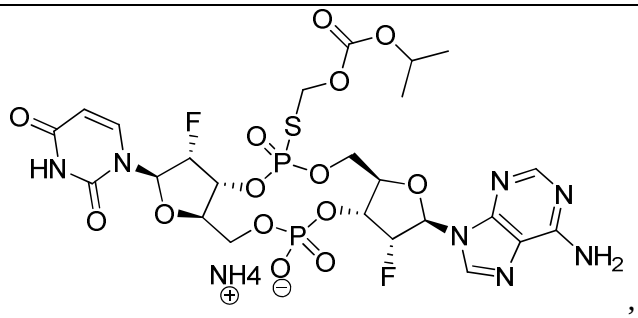
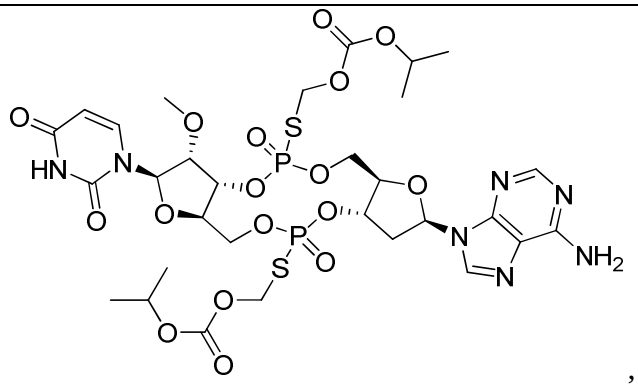
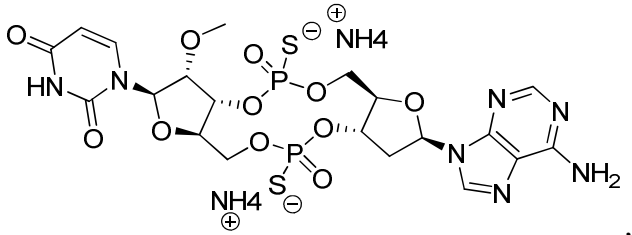
21. The compound of any one of claims 1-10, wherein each of Y^1 and Y^2 is independently S and each of R^3 and R^4 is independently substituted with 1 R^8.

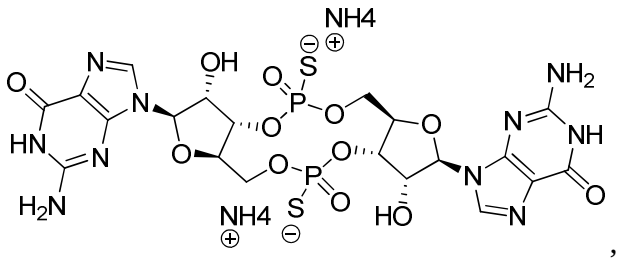
22. The compound of any one of claims 1-10, wherein Y^1 is S and R^3 is substituted with 1 R^8.

23. The compound of any one of claims 1-22, wherein R^8 is OC(O)-aryl optionally substituted by 1-5 R^9 (e.g., 1 R^9).

24. The compound of any one of claims 1-23, wherein R^9 is O-C_1-C_{12} alkyl (e.g., O-$CH_2(CH_2)_8CH_3$).

25. The compound of claim 1, wherein the compound is selected from:

Structure
 ,
 ,
 ,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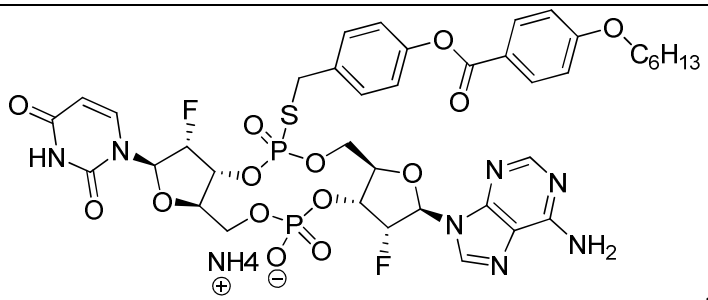
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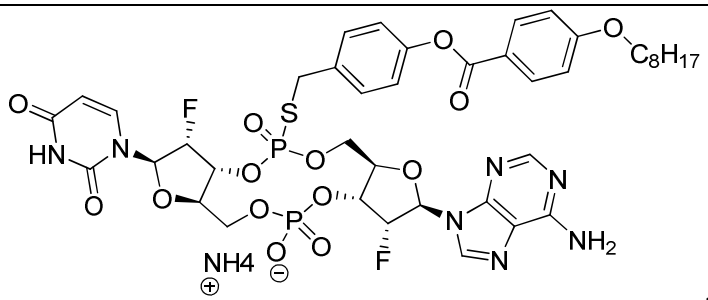
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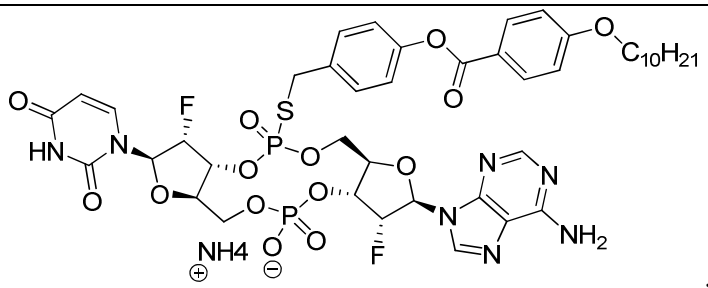
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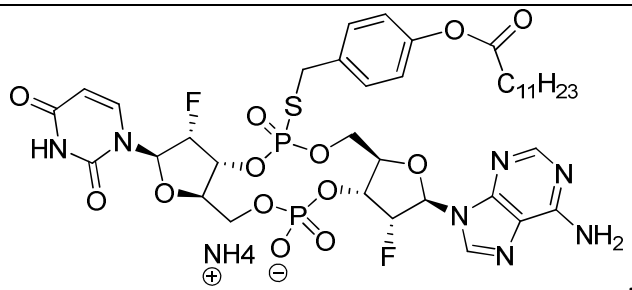
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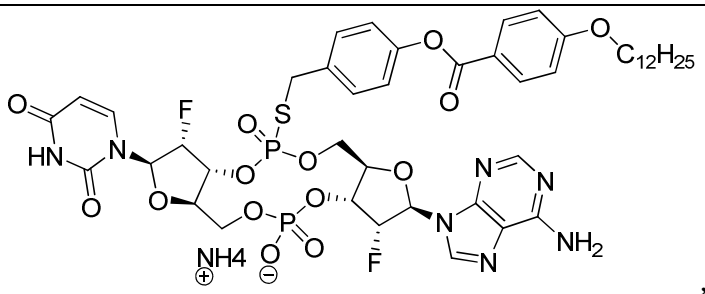
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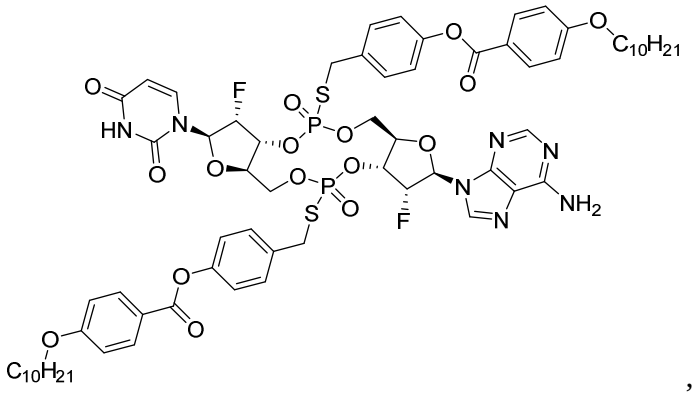
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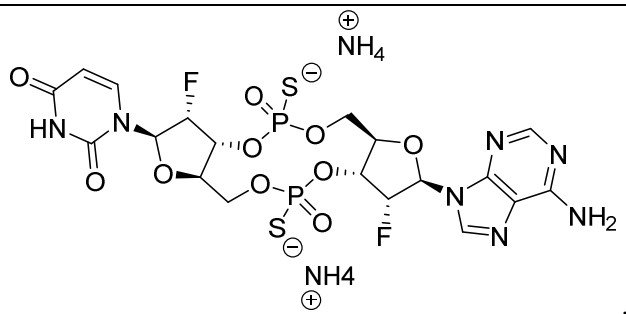
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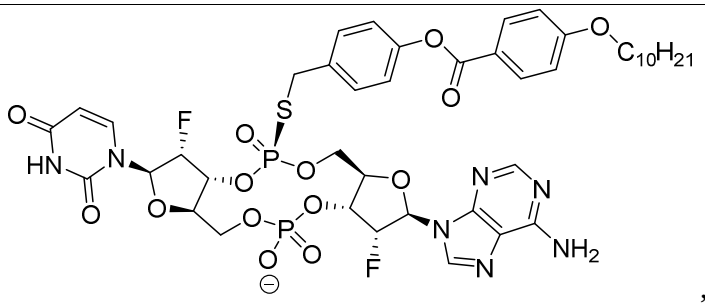
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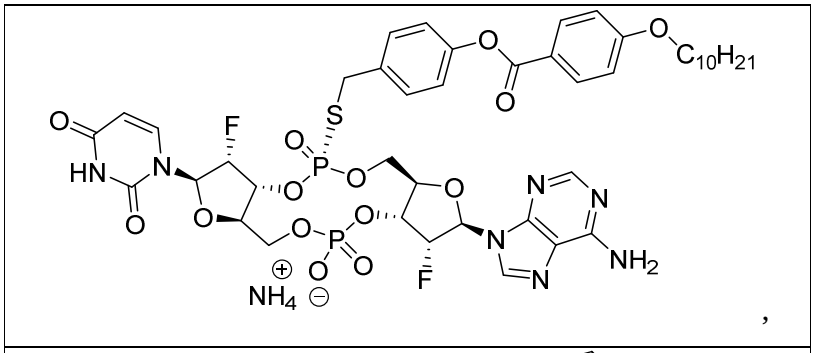
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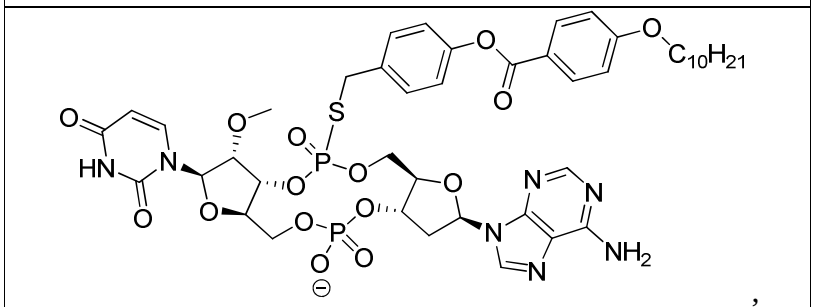
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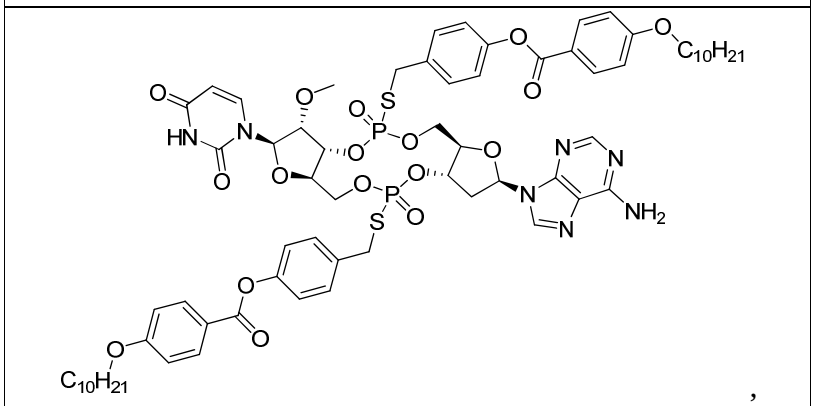
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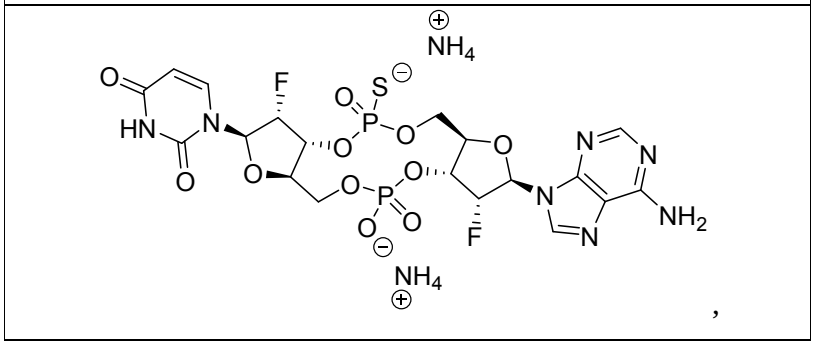
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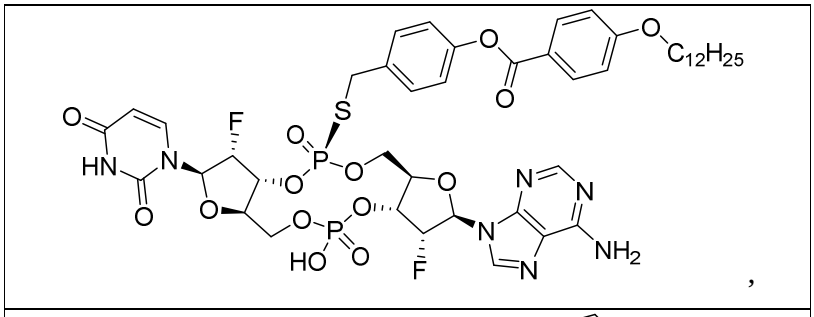
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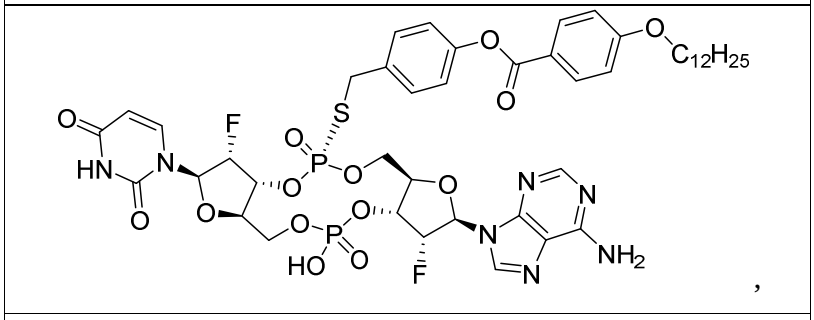
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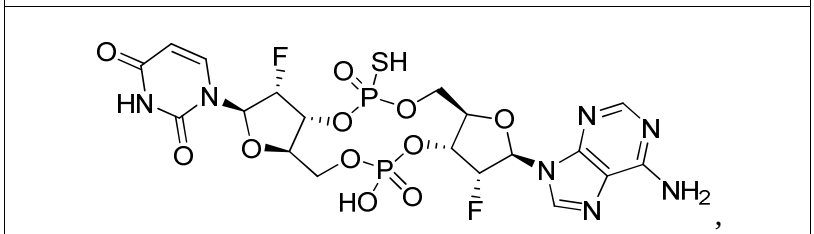
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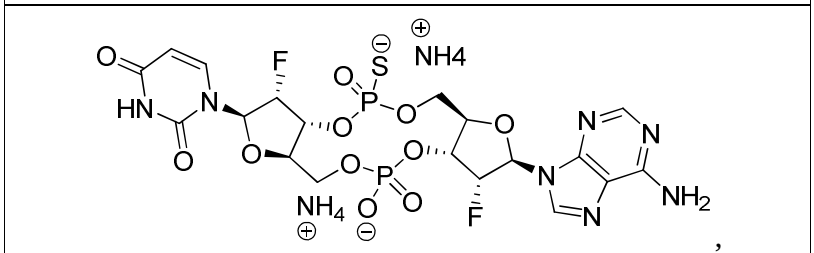
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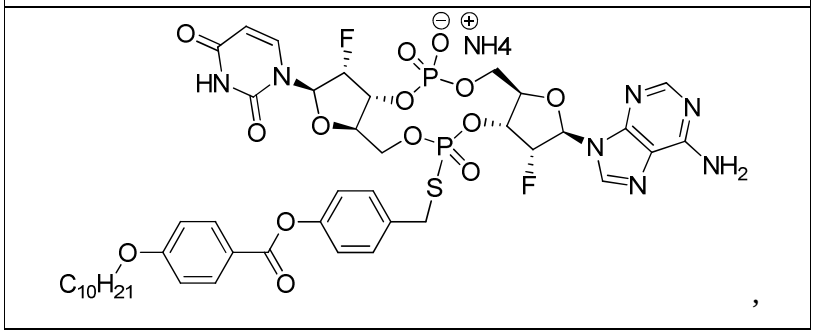
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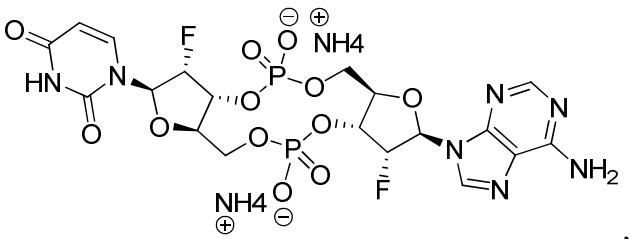
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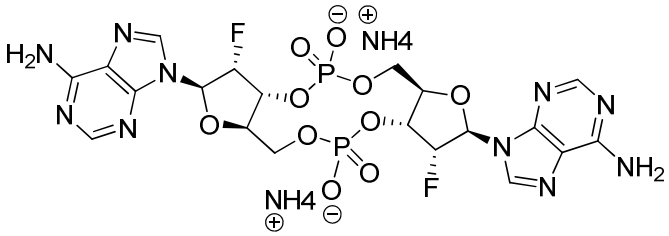
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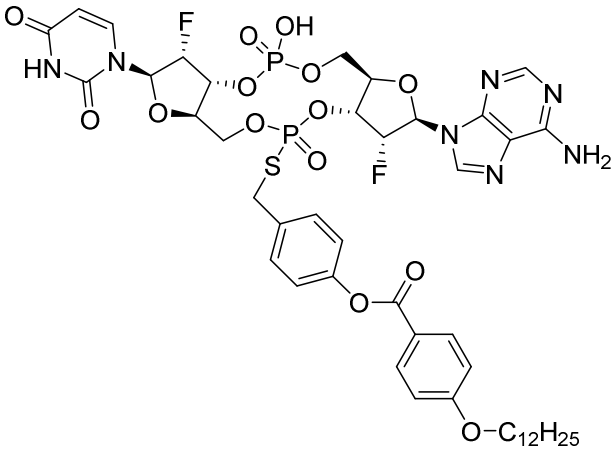
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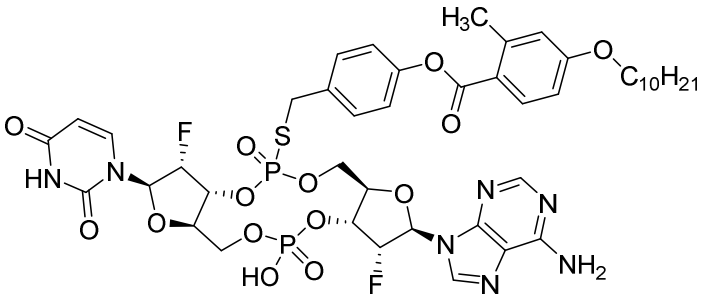
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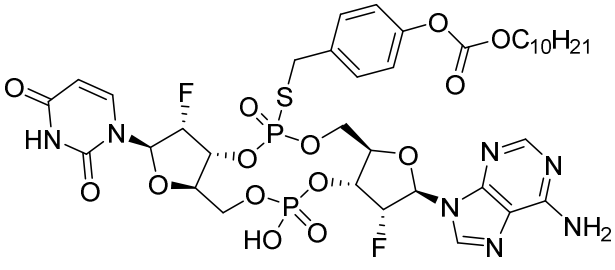
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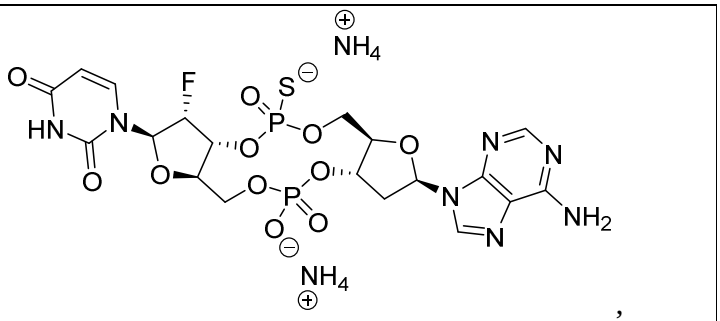
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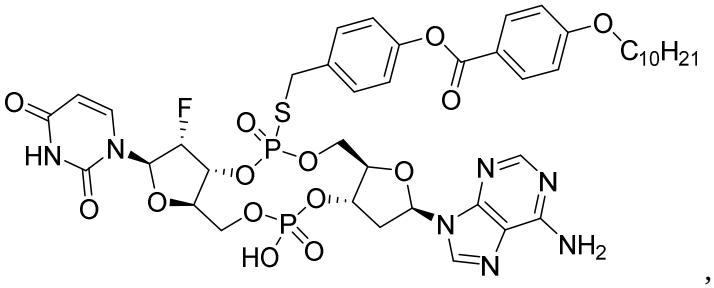
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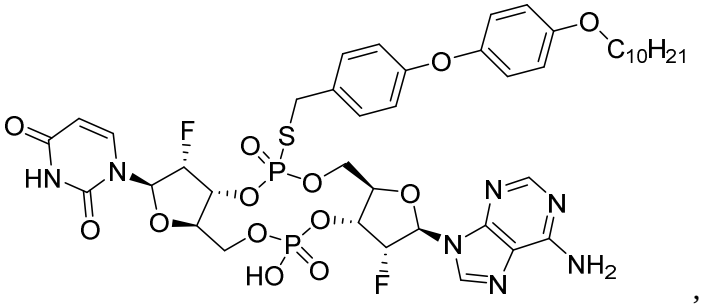
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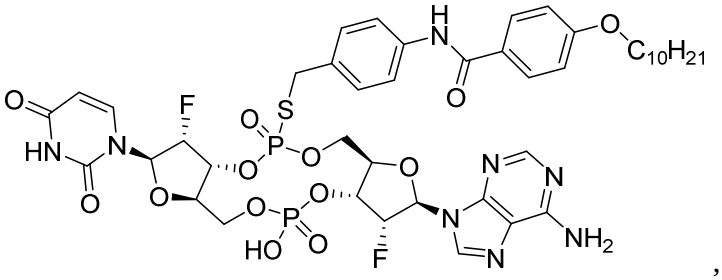
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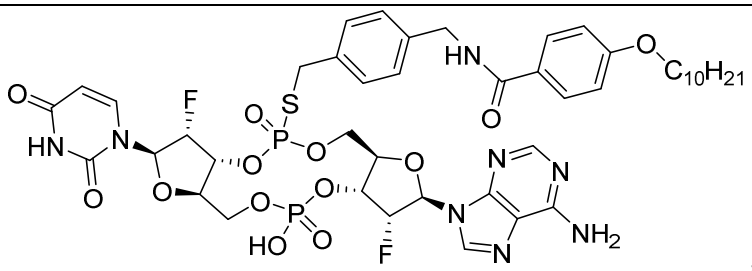
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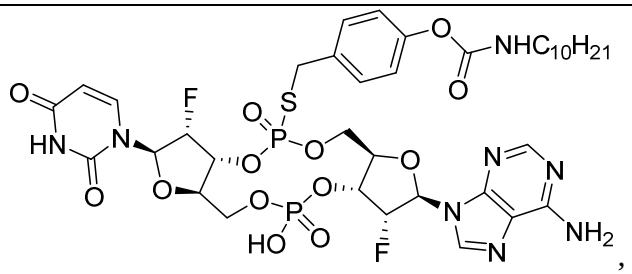
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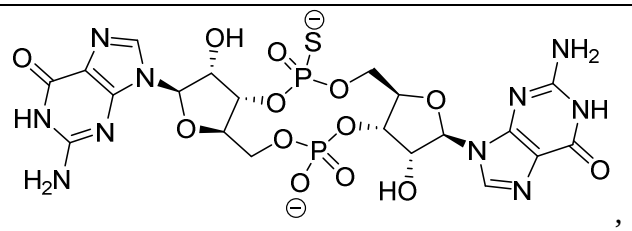
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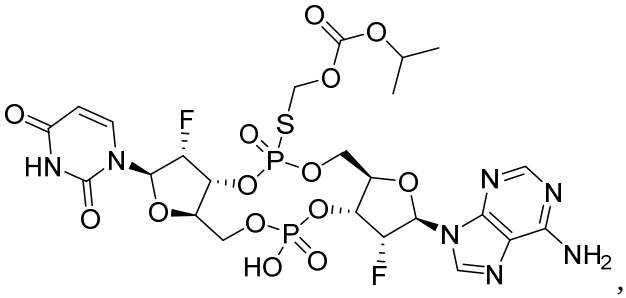
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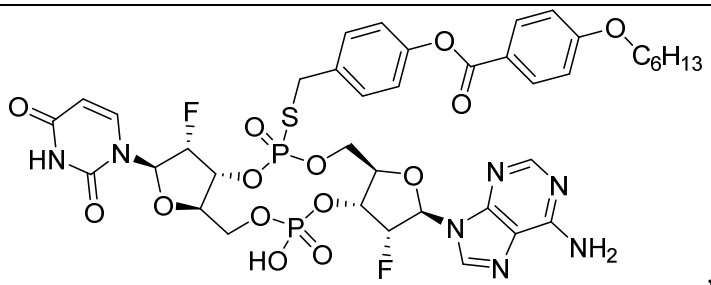
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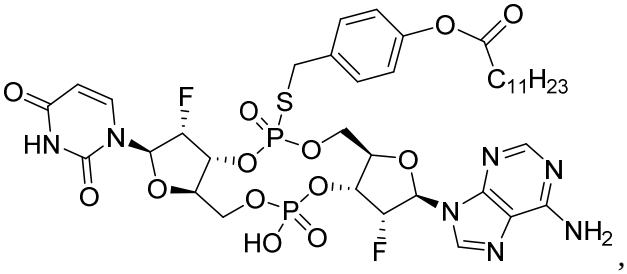
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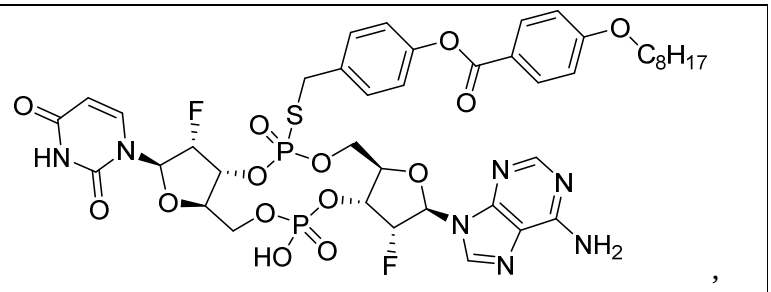
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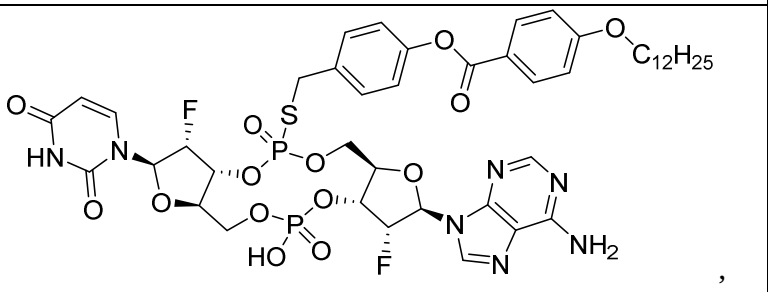
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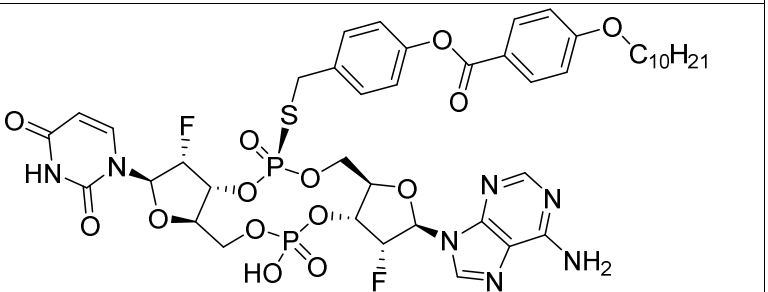
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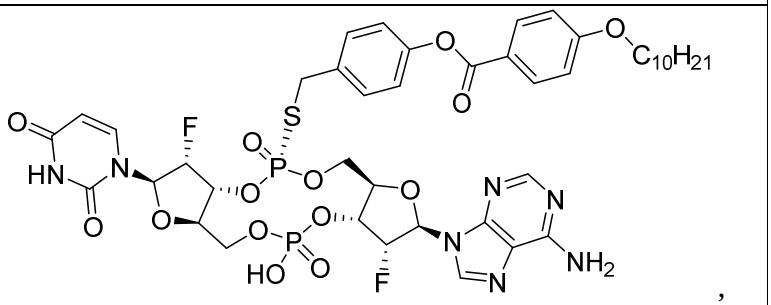
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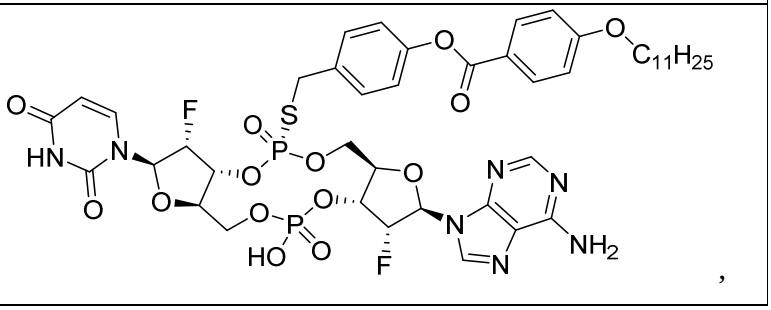
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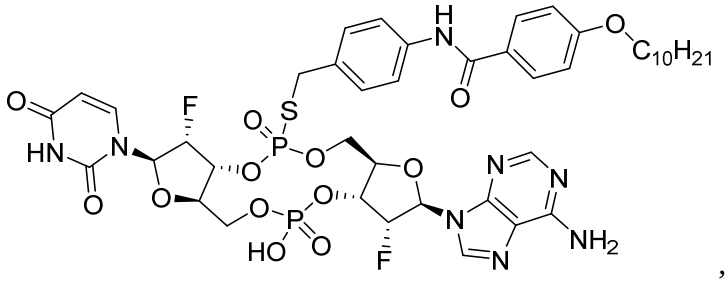
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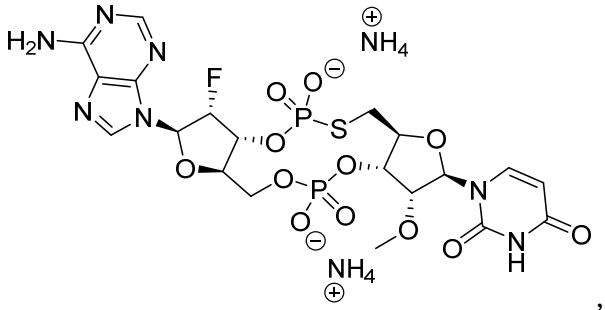
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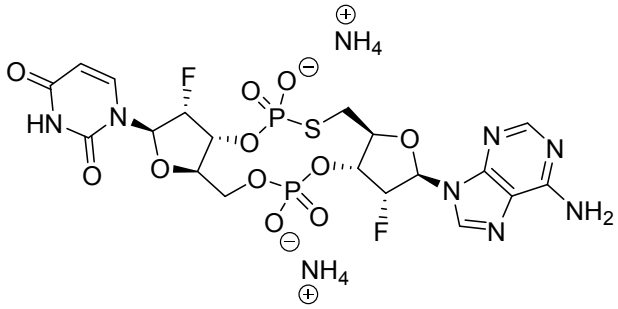
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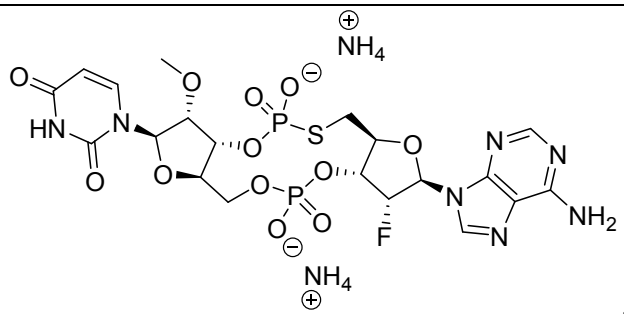
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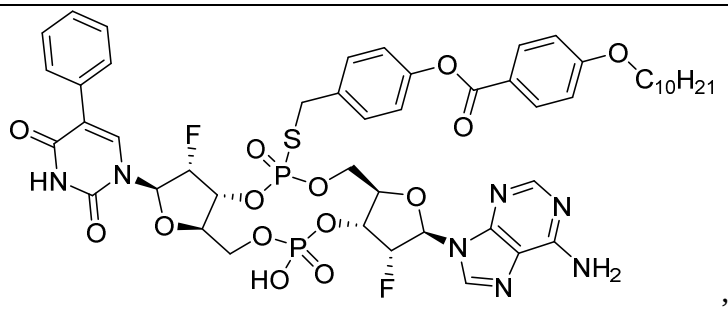
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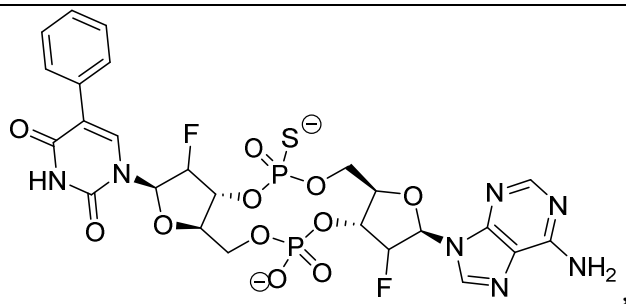
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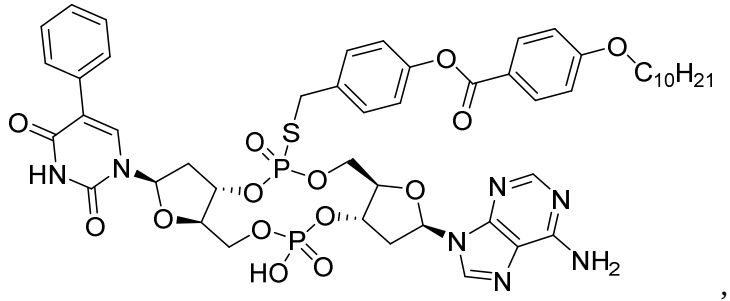
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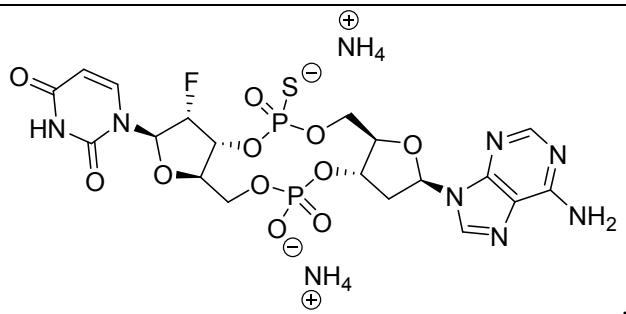
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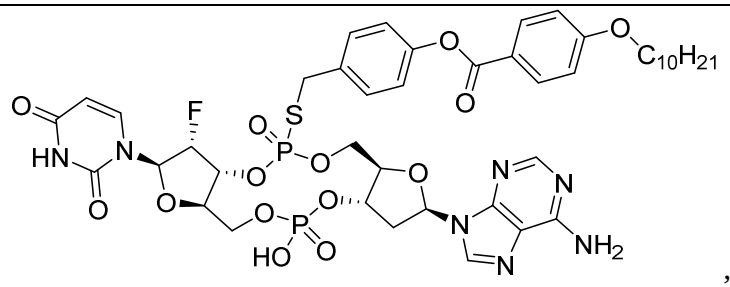
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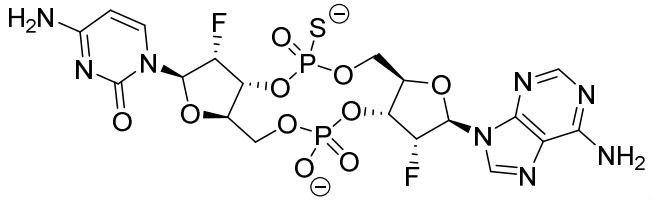
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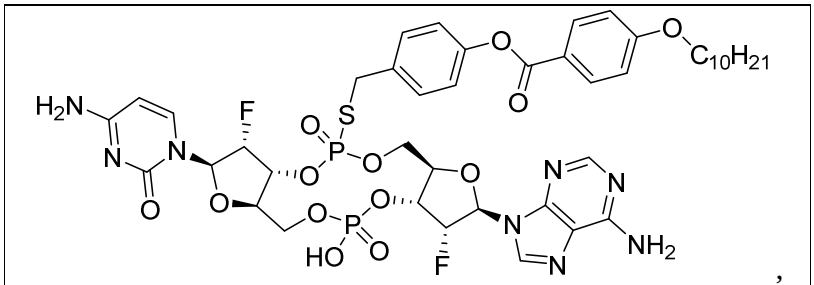
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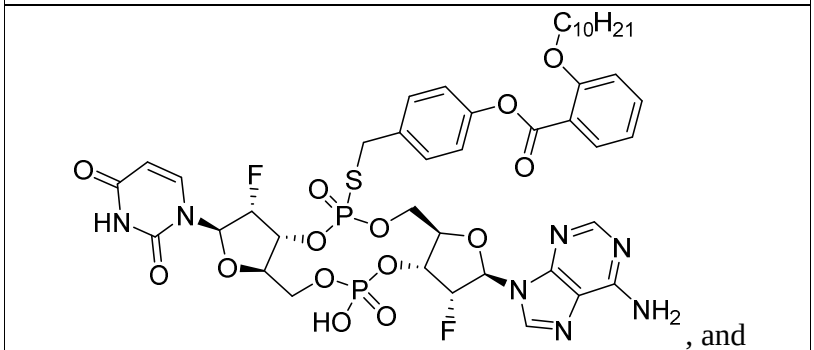
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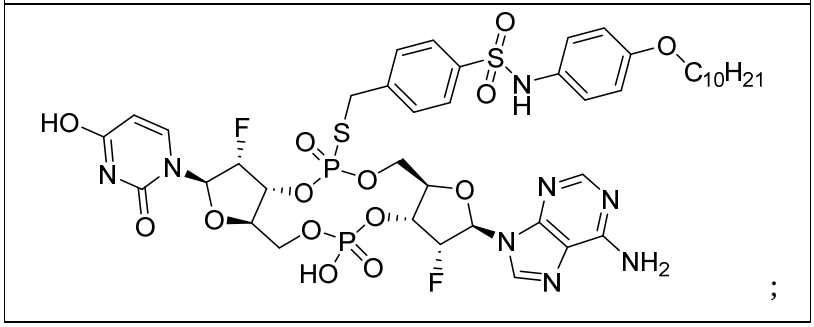
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or a pharmaceutically acceptable salt thereof.

26. Use of a compound of any one of claims 1-25 in the manufacture of a medicament for the treatment of cancer.

27. The use of claim 26, wherein the cancer is a cancer of the breast, bone, brain, cervix, colon, gastrointestinal tract, eye, gall bladder, lymph nodes, blood, lung, liver, skin, mouth, prostate, ovary, penis, pancreas, uterus, testicles, stomach, thymus, thyroid, or other part of the body.

28. The use of claim 26, wherein the cancer is a cancer of the liver.

29. The use of any one of claims 26-28, wherein the medicament is for intratumoral administration.

30. The use of any one of claims 26-28, wherein the medicament is for oral administration.

31. The use of any one of claims 26-28, wherein the medicament is for parenteral administration (e.g., intravenous, subcutaneous, intraperitoneal, or intramuscular administration).

32. The use of claim 31, wherein the medicament is for intraperitoneal administration.

33. The use of any one of claims 26-32, wherein the medicament further comprises an additional agent (e.g., an anticancer agent).

34. The use of claim 33, wherein the additional agent comprises methotrexate, 5-fluorouracil, doxorubicin, vincristine, bleomycin, vinblastine, dacarbazine, toposide, cisplatin, epirubicin, or sorafenib tosylate.

35. Use of a compound of any one of claims 1-25 in the manufacture of a medicament for immune-modulation.

36. Use of a compound of any one of claims 1-25 in the manufacture of a medicament for inducing an immune response.

37. The use of claim 36, wherein the immune response comprises antitumoral immunity.

38. The use of claim 36 or 37, wherein the immune response comprises induction of a PRR (e.g., STING, RIG-I, or MDA5).