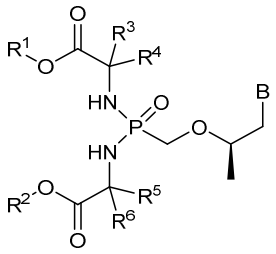
CLAIMS

We claim:

1. A compound of formula (**I**):



I

or a pharmaceutically acceptable salt thereof, wherein

R^1 and R^2 are independently chosen from C_{1-12}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, C_{7-12}spirocycloalkyl-C_{1-4}alkylene, bridged C_{5-10}bicycloalkyl, bridged C_{5-10}bicycloalkyl-C_{1-4}alkylene, fused C_{5-10}bicycloalkyl, C_{10-16}dispirocycloalkyl, C_{10-16}dispirocycloalkyl-C_{1-4}alkylene, bridged C_{9-12}tricycloalkyl, bridged C_{9-12}tricycloalkyl-C_{1-4}alkylene, C_{3-7}cycloalkyl-C_{3-7}cycloalkylene, and 5- to 7-membered monocyclic heterocyclyl having from 1 to 3 heteroatoms chosen from N, O, and S, wherein each C_{1-12}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a;

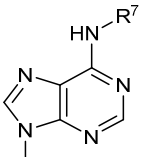
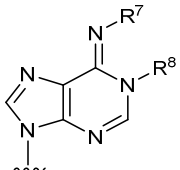
R^3, R^4, R^5, and R^6 are independently chosen from C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene, wherein each C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene is optionally substituted with from one to three R^b; or optionally:

R^3 and R^4 together with the carbon atom to which they are attached form a 3- to 6- membered saturated or partially unsaturated carbocyclic ring optionally substituted with from one to three R^b; and R^5 and R^6 are independently chosen from C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene, wherein each C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene is optionally substituted with from one to three R^b; or

R^3 and R^4 are independently chosen from C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene, wherein each C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene is optionally substituted with from one to three R^b; and R^5 and R^6 together with the carbon atom to which they are attached form a 3- to 6- membered

saturated or partially unsaturated carbocyclic ring optionally substituted with from one to three R^b; or

R^3 and R^4 together with the carbon atom to which they are attached form a 3- to 6- membered saturated or partially unsaturated carbocyclic ring optionally substituted with from one to three R^b; and R^5 and R^6 together with the carbon atom to which they are attached form a 3- to 6- membered saturated or partially unsaturated carbocyclic ring optionally substituted with from one to three R^b;

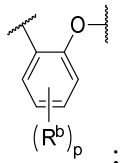
B is  or ;

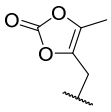
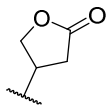
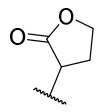
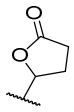
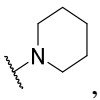
R^7 is hydrogen or R^8;

R^8 is $–L^1–(L^2)_m–(L^3)_n–R^{8a}$;

L^1 is chosen from a bond, –C(O)–, and –C(O)O–;

L^2 is $C_{1\text{-}6}$alkylene;

L^3 is –C(O)O– or ;

R^{8a} is chosen from $C_{1\text{-}12}$alkyl, aryl, –C(O)–aryl, –C(O)–$C_{1\text{-}4}$alkyl, –S–C(O)–$C_{1\text{-}4}$alkyl, , , , , and , wherein aryl and –C(O)–aryl are optionally substituted with one or two R^c;

each R^a is independently chosen from $C_{1\text{-}4}$alkyl, halo, $C_{1\text{-}4}$haloalkyl, and –O–$C_{1\text{-}4}$alkyl;

each R^b is independently $C_{1\text{-}4}$alkyl;

each R^c is independently $C_{1\text{-}4}$alkyl or –OC(O)–$C_{1\text{-}4}$alkyl;

m and n are independently 0 or 1; and

p is 0, 1, or 2.

2. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are independently chosen from $C_{1\text{-}8}$alkyl, aryl-$C_{1\text{-}4}$alkylene, $C_{3\text{-}7}$cycloalkyl, $C_{3\text{-}7}$cycloalkyl-$C_{1\text{-}4}$alkylene, aryl-$C_{3\text{-}7}$cycloalkylene, $C_{7\text{-}12}$spirocycloalkyl, $C_{7\text{-}12}$spirocycloalkyl-$C_{1\text{-}4}$alkylene, bridged $C_{5\text{-}10}$bicycloalkyl, bridged $C_{5\text{-}10}$bicycloalkyl-$C_{1\text{-}4}$alkylene, fused $C_{5\text{-}10}$bicycloalkyl, $C_{10\text{-}16}$dispirocycloalkyl, $C_{10\text{-}16}$dispirocycloalkyl-$C_{1\text{-}4}$alkylene, bridged $C_{9\text{-}12}$tricycloalkyl, bridged $C_{9\text{-}}$

$_{12}$tricycloalkyl-C_{1-4}alkylene, C_{3-7}cycloalkyl-C_{3-7}cycloalkylene, and 5- to 7-membered monocyclic heterocyclyl having from 1 to 3 heteroatoms chosen from N, O, and S, wherein each C_{1-8}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

3. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are independently chosen from C_{1-8}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, C_{7-12}spirocycloalkyl-C_{1-4}alkylene, bridged C_{5-10}bicycloalkyl-C_{1-4}alkylene, fused C_{5-10}bicycloalkyl, C_{10-16}dispirocycloalkyl-C_{1-4}alkylene, bridged C_{9-12}tricycloalkyl-C_{1-4}alkylene, C_{3-7}cycloalkyl-C_{3-7}cycloalkylene, and 5- to 7-membered monocyclic heterocyclyl having from 1 to 3 heteroatoms chosen from N, O, and S, wherein each C_{1-8}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

4. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are independently chosen from C_{1-8}alkyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, C_{7-12}spirocycloalkyl, C_{7-12}spirocycloalkyl-C_{1-4}alkylene, and bridged C_{5-10}bicycloalkyl-C_{1-4}alkylene, wherein each C_{1-8}alkyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

5. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are independently chosen from C_{5-8}alkyl, C_{5-7}cycloalkyl, C_{5-7}cycloalkyl-C_{1-4}alkylene, C_{7-9}spirocycloalkyl, C_{7-9}spirocycloalkyl-C_{1-4}alkylene, and bridged C_{5-7}bicycloalkyl-C_{1-4}alkylene, wherein each C_{5-8}alkyl, C_{5-7}cycloalkyl, C_{5-7}cycloalkyl-C_{1-4}alkylene, C_{7-9}spirocycloalkyl, C_{7-9}spirocycloalkyl-C_{1-4}alkylene, and bridged C_{5-7}bicycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

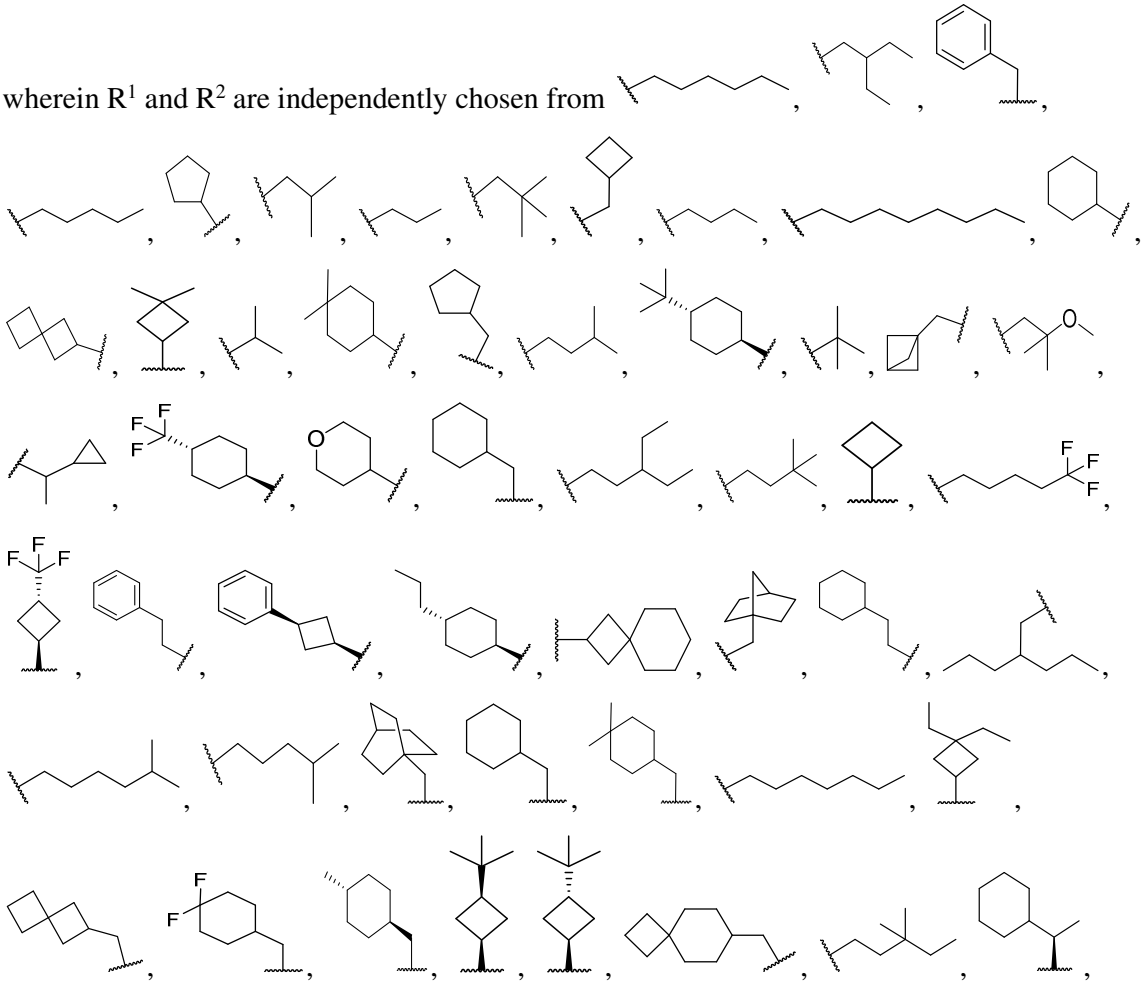
6. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are different.

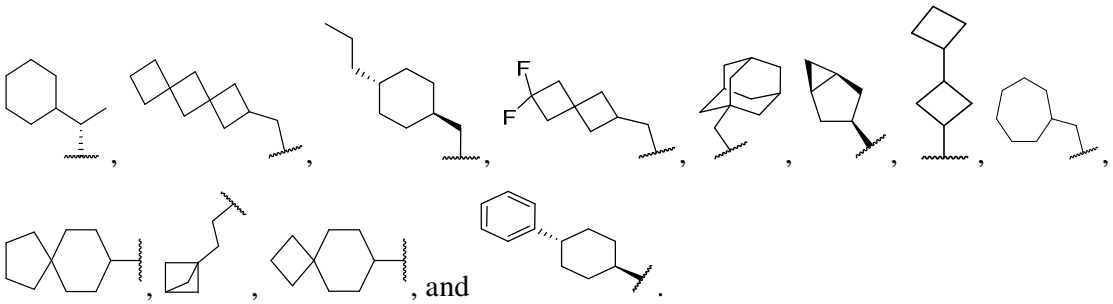
7. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are the same.

8. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are the same and chosen from C_{1-8}alkyl, aryl-C_{1-4}alkylene, C_{3-7}cycloalkyl, C_{3-}

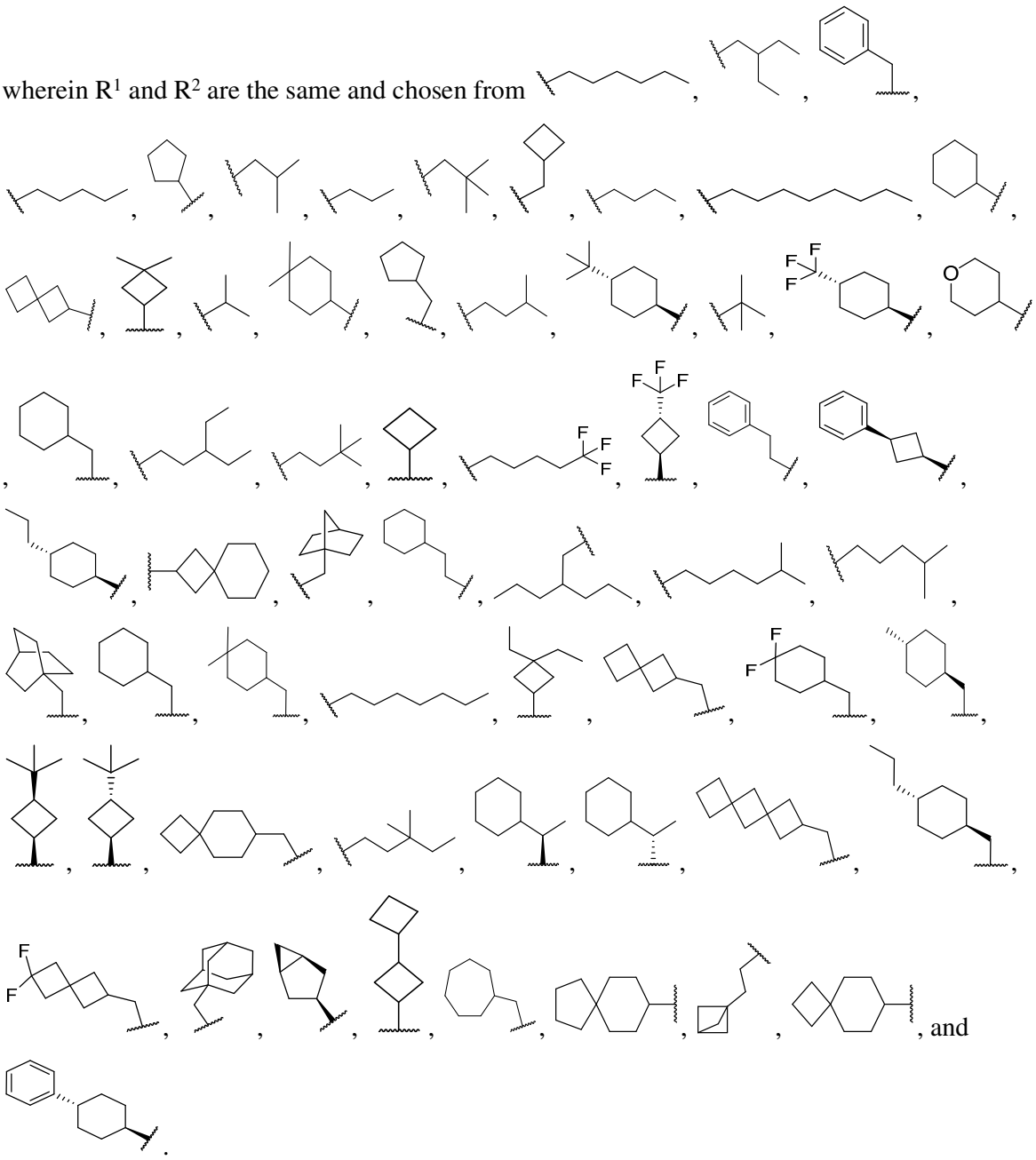
$_{7}$cycloalkyl-C_{1-4}alkylene, aryl-C_{3-7}cycloalkylene, C_{7-12}spirocycloalkyl, C_{7-12}spirocycloalkyl-C_{1-4}alkylene, bridged C_{5-10}bicycloalkyl-C_{1-4}alkylene, fused C_{5-10}bicycloalkyl, C_{10-16}dispirocycloalkyl-C_{1-4}alkylene, bridged C_{9-12}tricycloalkyl-C_{1-4}alkylene, C_{3-7}cycloalkyl-C_{3-7}cycloalkylene, and 5- to 7-membered monocyclic heterocyclyl having from 1 to 3 heteroatoms chosen from N, O, and S, wherein each C_{1-8}alkyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

9. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are the same and chosen from C_{1-8}alkyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, C_{7-12}spirocycloalkyl, C_{7-12}spirocycloalkyl-C_{1-4}alkylene, and bridged C_{5-10}bicycloalkyl-C_{1-4}alkylene, wherein each C_{1-8}alkyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkyl-C_{1-4}alkylene, C_{7-12}spirocycloalkyl, and C_{7-12}spirocycloalkyl-C_{1-4}alkylene is optionally substituted with from one to three R^a.

10. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are independently chosen from 



11. The compound of any one of claims 1-5, or a pharmaceutically acceptable salt thereof, wherein R^1 and R^2 are the same and chosen from



12. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, wherein R^3, R^4, R^5, and R^6 are each independently chosen from methyl, ethyl, cyclopropyl, and benzyl, wherein each methyl, ethyl, cyclopropyl, and benzyl is optionally substituted with from one to three R^b.

13. The compound of any one of claims 1-12, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^5 are the same.

14. The compound of any one of claims 1-13, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^5 are both methyl.

15. The compound of any one of claims 1-12, or a pharmaceutically acceptable salt thereof, wherein R^4 and R^6 are the same.

16. The compound of any one of claims 1-12 and 15, or a pharmaceutically acceptable salt thereof, wherein R^4 and R^6 are both ethyl or both benzyl.

17. The compound of any one of claims 1-12, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 are the same.

18. The compound of any one of claims 1-12 and 17, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 are both methyl.

19. The compound of any one of claims 1-12, or a pharmaceutically acceptable salt thereof, wherein R^5 and R^6 are the same.

20. The compound of any one of claims 1-12 and 19, or a pharmaceutically acceptable salt thereof, wherein R^5 and R^6 are both methyl.

21. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 together with the carbon atom to which they are attached form a cyclopropane ring or a cyclobutane ring, wherein the cyclopropane ring or the cyclobutane ring is optionally substituted with from one to three R^b; and R^5 and R^6 are independently chosen from $C_{1\text{-}4}$alkyl, $C_{3\text{-}6}$cycloalkyl, and aryl-$C_{1\text{-}4}$alkylene, wherein each $C_{1\text{-}4}$alkyl, $C_{3\text{-}6}$cycloalkyl, and aryl-$C_{1\text{-}4}$alkylene is optionally substituted with from one to three R^b.

22. The compound of claim 21, or a pharmaceutically acceptable salt thereof, wherein R^5 and R^6 are independently chosen from methyl, ethyl, cyclopropyl, and benzyl, wherein each methyl, ethyl, cyclopropyl, and benzyl is optionally substituted with from one to three R^b.

23. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 are independently chosen from C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene, wherein each C_{1-4}alkyl, C_{3-6}cycloalkyl, and aryl-C_{1-4}alkylene is optionally substituted with from one to three R^b; and R^5 and R^6 together with the carbon atom to which they are attached form a cyclopropane ring or a cyclobutane ring, wherein the cyclopropane ring or the cyclobutane ring is optionally substituted with from one to three R^b.

24. The compound of claim 23, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 are independently chosen from methyl, ethyl, cyclopropyl, and benzyl, wherein each methyl, ethyl, cyclopropyl, and benzyl is optionally substituted with from one to three R^b.

25. The compound any one of claims 1-11, or a pharmaceutically acceptable salt thereof, wherein R^3 and R^4 together with the carbon atom to which they are attached form a cyclopropane ring or a cyclobutane ring, wherein the cyclopropane ring or the cyclobutane ring is optionally substituted with from one to three R^b; and R^5 and R^6 together with the carbon atom to which they are attached form a cyclopropane ring or a cyclobutane ring, wherein the cyclopropane ring or the cyclobutane ring is optionally substituted with from one to three R^b.

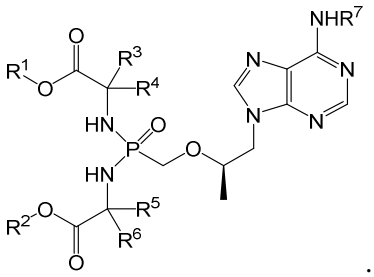
26. The compound of any one of claims 1-25, or a pharmaceutically acceptable salt thereof, wherein each R^b is independently methyl or ethyl.

27. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, wherein R^3, R^4, R^5, and R^6 are the same.

28. The compound of claim 27, or a pharmaceutically acceptable salt thereof, wherein R^3, R^4, R^5, and R^6 are each methyl or cyclopropyl.

29. The compound of claim 27, or a pharmaceutically acceptable salt thereof, wherein R^3, R^4, R^5, and R^6 are each methyl.

30. The compound of any one of claims 1-29, or a pharmaceutically acceptable salt thereof, having the formula (**II**):



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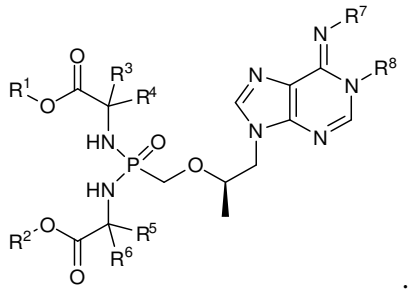
II

31. The compound of any one of claims 1-29, or a pharmaceutically acceptable salt thereof, having the formula (**III**):



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III

~~32. The compound of any one of claims 1-31, or a pharmaceutically acceptable salt thereof, wherein R^7 is R^8.~~

~~33. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is $-L^1-L^2-L^3-R^{8a}$.~~

~~34. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is $-L^1-(L^3)_n-R^{8a}$.~~

~~35. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is $-L^1-(L^2)_m-R^{8a}$.~~

~~36. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is $-L^1-L^3-R^{8a}$.~~

~~37. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein, R^8 is $-L^1-L^2-R^{8a}$.~~

~~38. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is $-L^1-R^{8a}$.~~

~~39. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is R^{8a}.~~

~~40. The compound of any one of claims 1-38, or a pharmaceutically acceptable salt thereof, wherein L^1 is a bond.~~

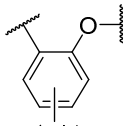
41. The compound of any one of claims 1-38, or a pharmaceutically acceptable salt thereof, wherein L^1 is –C(O)–.

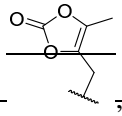
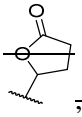
42. The compound of any one of claims 1-38, or a pharmaceutically acceptable salt thereof, wherein L^1 is –C(O)O–.

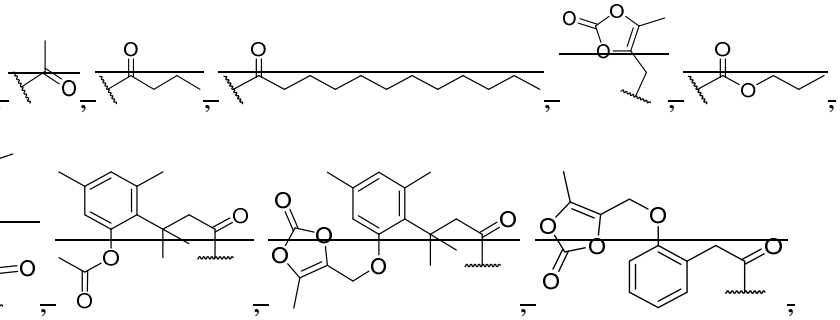
43. The compound of any one of claims 1-33, 35, and 37, or a pharmaceutically acceptable salt thereof, wherein L^2 is chosen from –CH_2–, –CH_2–CH_2–, –CH_2–CH_2–CH_2–, –CH_2–CH_2–CH_2–CH_2–, –CH_2–$C(CH_3)_2$–, –CH_2–CH_2–CH_2–CH_2–CH_2–, –CH_2–$C(CH_3)_2$–CH_2–, –CH_2–CH_2–$C(CH_3)_2$–, –CH_2–$C(CH_3)_2$–CH_2–CH_2–, and –CH_2–CH_2–CH_2–$C(CH_3)_2$–.

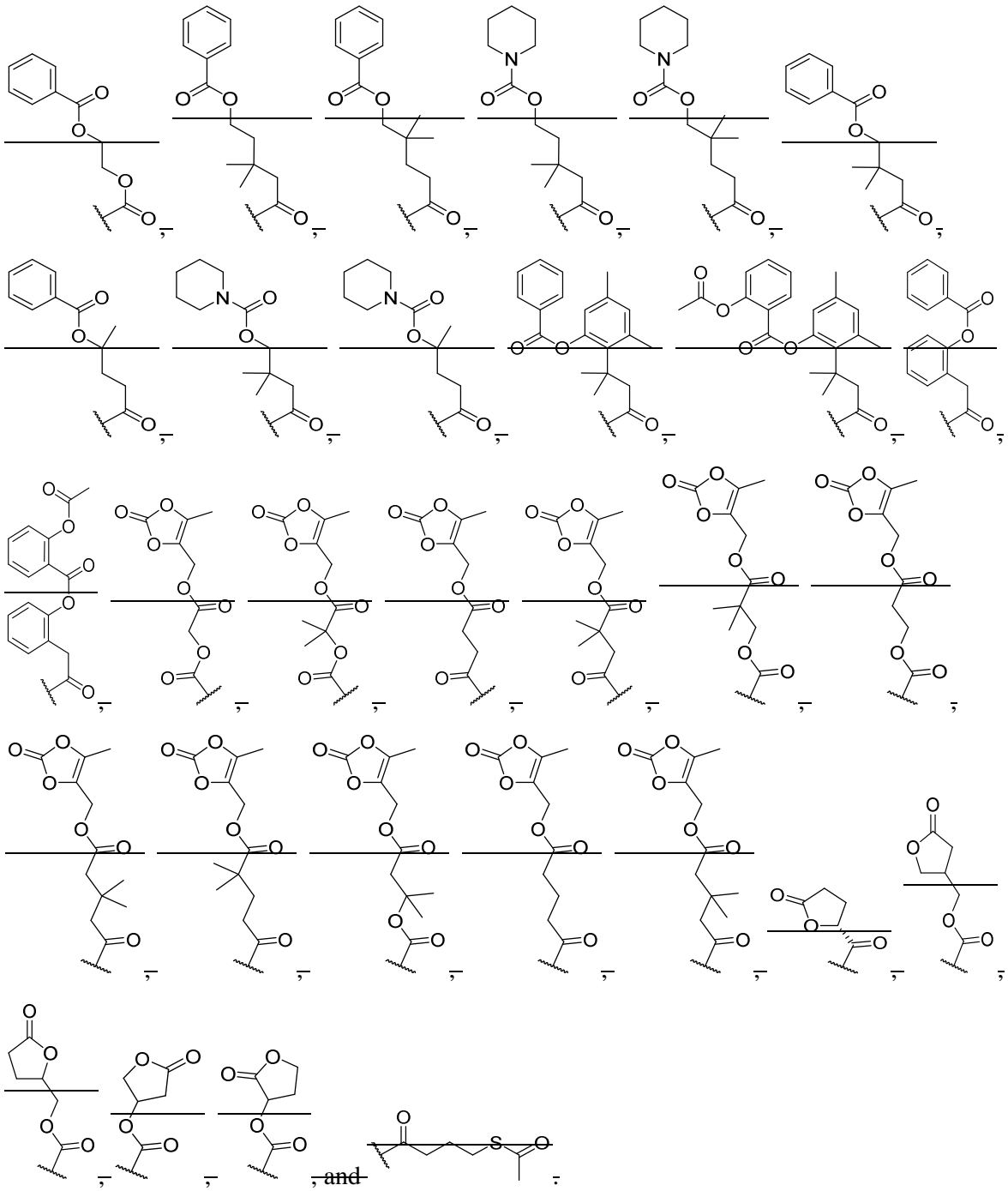
44. The compound of any one of claims 1-33, 35, and 37, or a pharmaceutically acceptable salt thereof, wherein L^2 is chosen from –CH_2–, –CH_2–CH_2–, –CH_2–CH_2–CH_2–, –CH_2–$C(CH_3)_2$–, –CH_2–$C(CH_3)_2$–CH_2–, –CH_2–CH_2–$C(CH_3)_2$–, and –CH_2–$C(CH_3)_2$–CH_2–CH_2–.

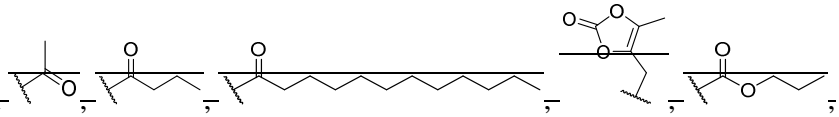
45. The compound of any one of claims 1-34, and 36, or a pharmaceutically acceptable salt thereof, wherein L^3 is –C(O)O–.

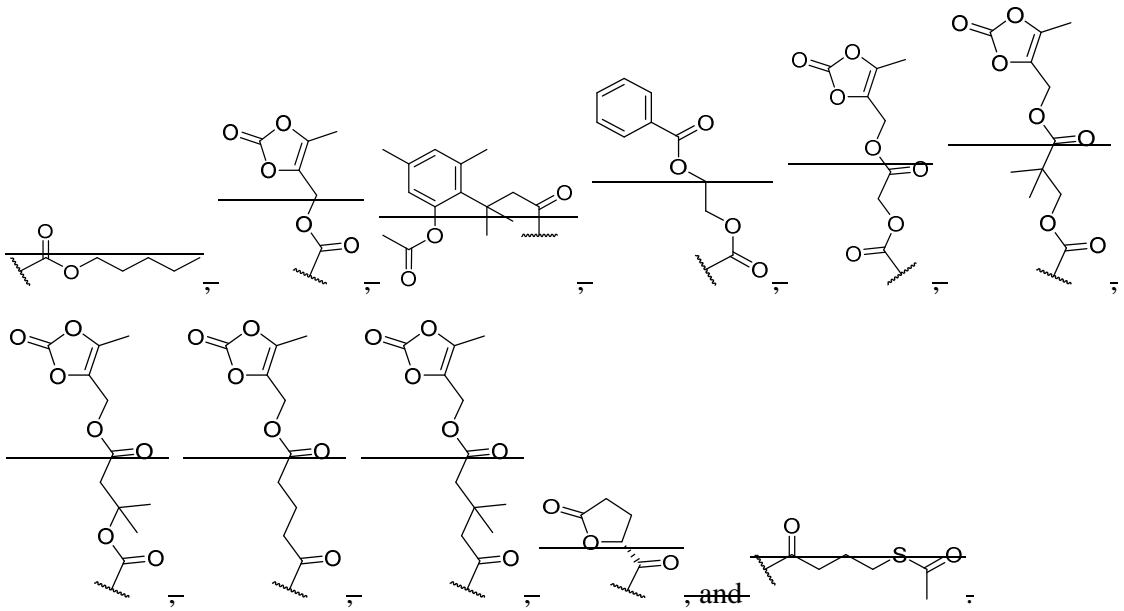
46. The compound of any one of claims 1-34 and 36, or a pharmaceutically acceptable salt thereof, wherein L^3 is .

47. The compound of any one of claims 1-39, or a pharmaceutically acceptable salt thereof, wherein R^{8a} is chosen from C_{1-12}alkyl, aryl, –C(O)–C_{1-4}alkyl, –S–C(O)–C_{1-4}alkyl, , and , wherein aryl is optionally substituted with one or two R^e.

48. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is chosen from .

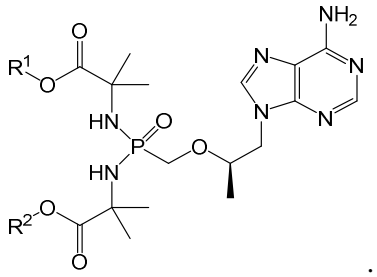


~~49. The compound of any one of claims 1-32, or a pharmaceutically acceptable salt thereof, wherein R^8 is chosen from~~ 



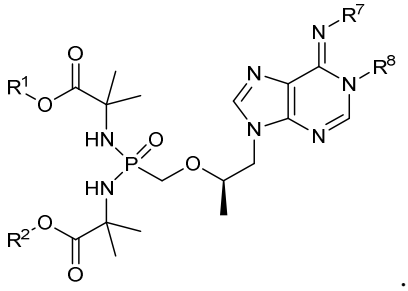
~~50. The compound of any one of claims 1-31, or a pharmaceutically acceptable salt thereof, wherein R^7 is hydrogen.~~

32. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, having the formula (**IV**):



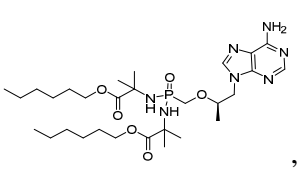
IV

33. The compound of any one of claims 1-11, or a pharmaceutically acceptable salt thereof, having the formula (**V**):



V

34. The compound of claim 1, wherein the compound is chosen from~~A compound of formula~~: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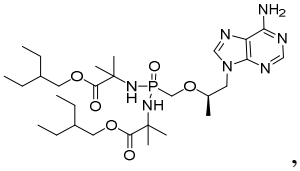
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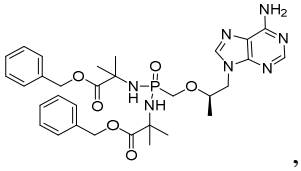
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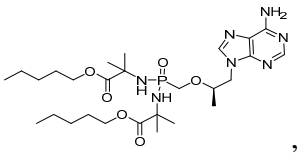
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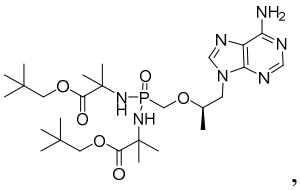
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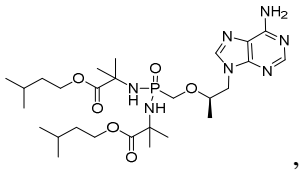
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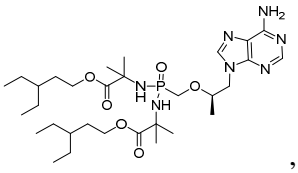
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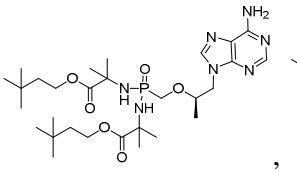
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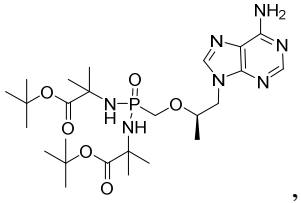
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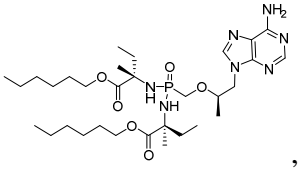
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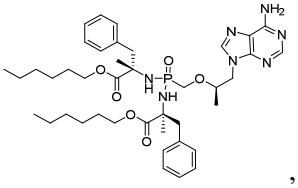
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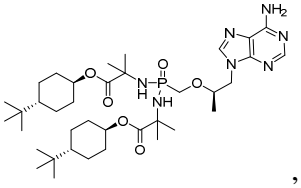
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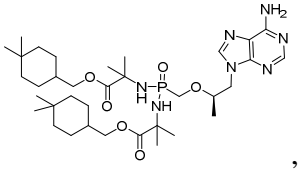
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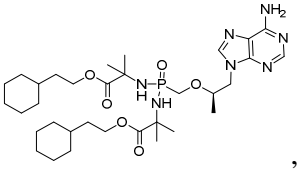
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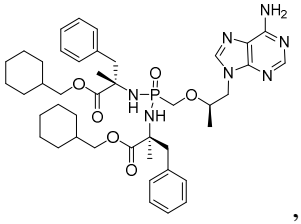
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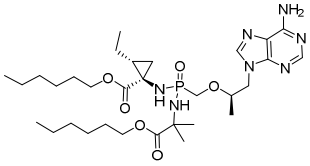
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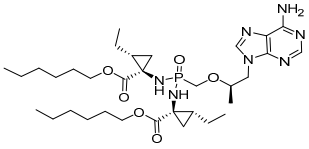
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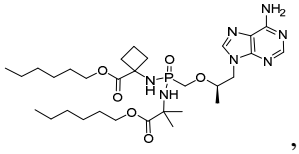
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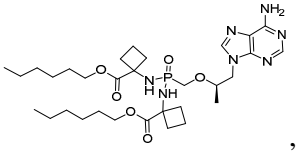
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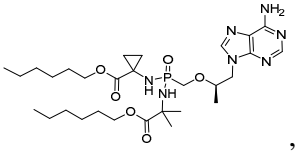
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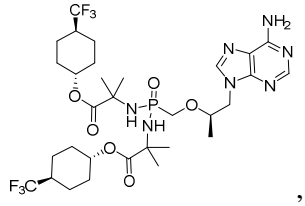
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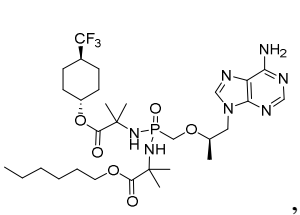
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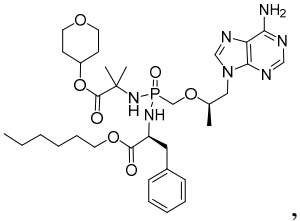
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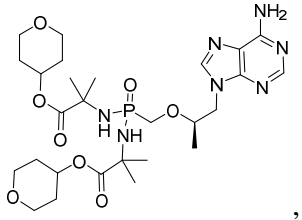
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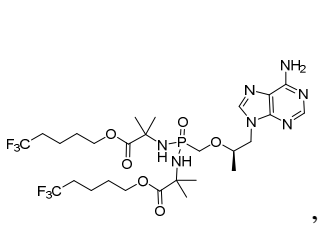
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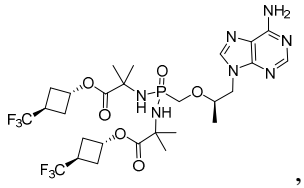
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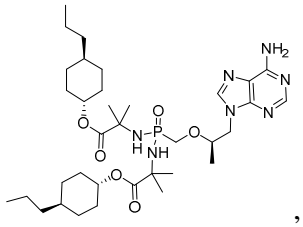
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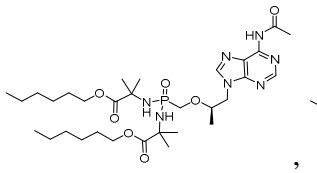
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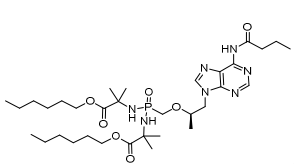
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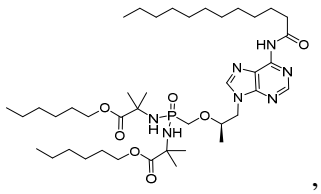
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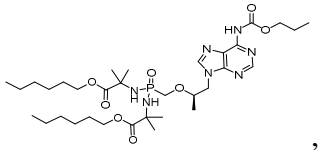
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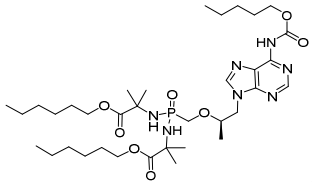
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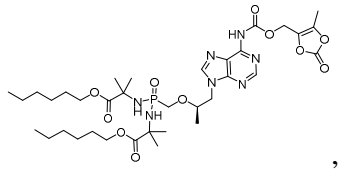
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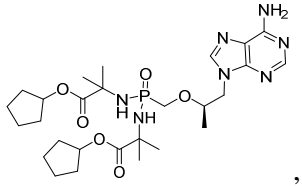
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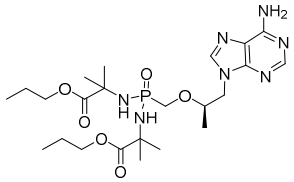
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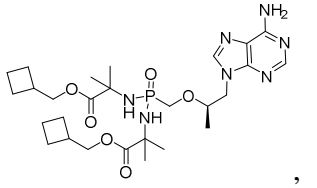
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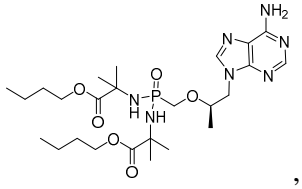
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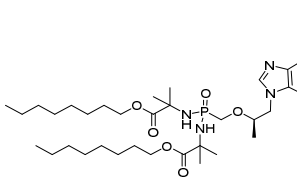
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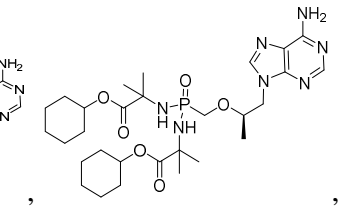
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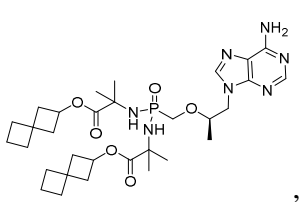
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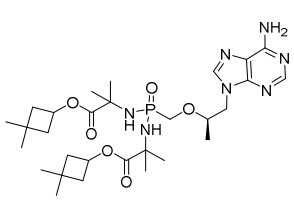
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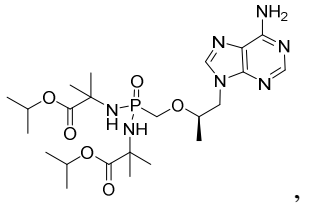
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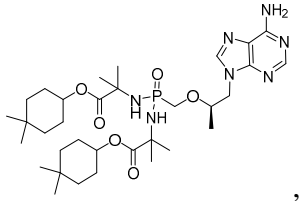
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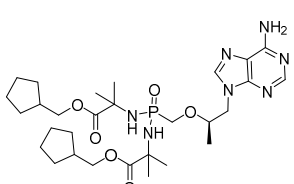
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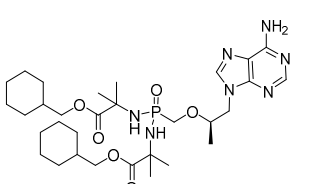
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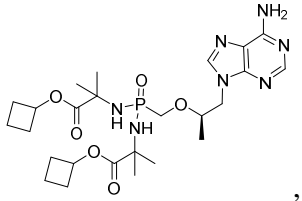
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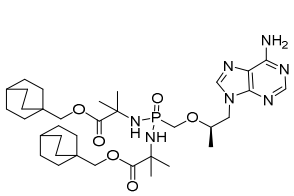
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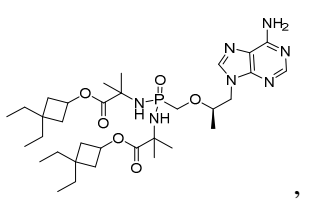
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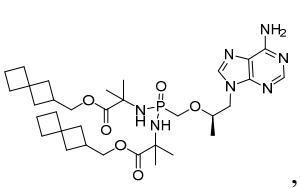
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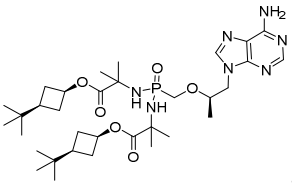
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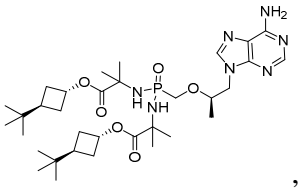
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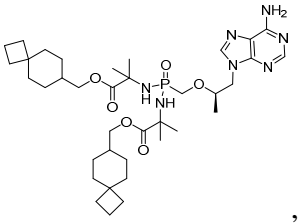
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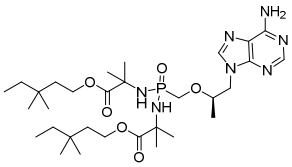
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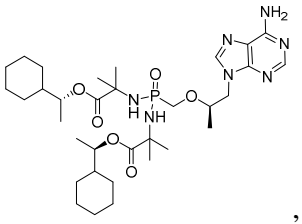
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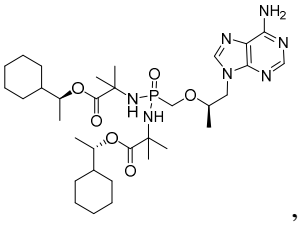
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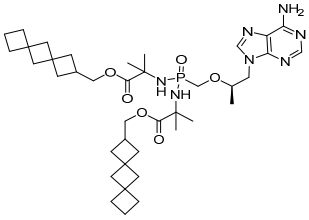
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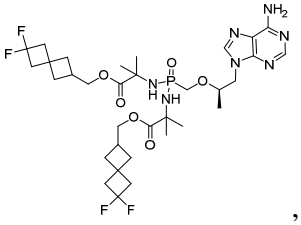
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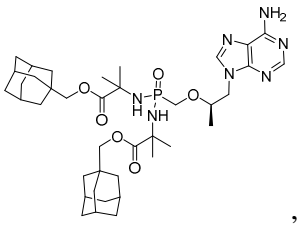
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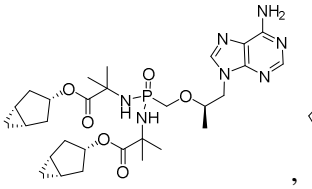
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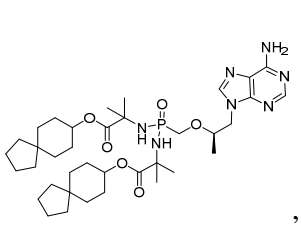
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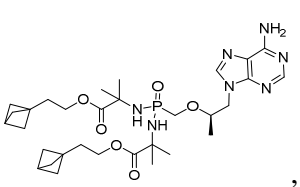
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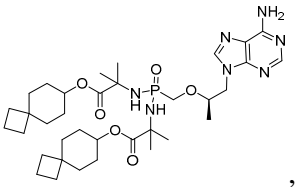
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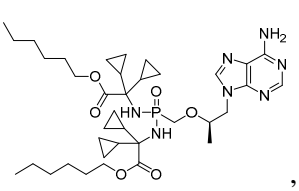
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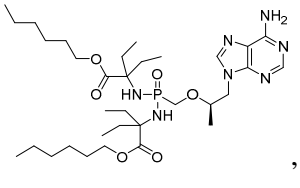
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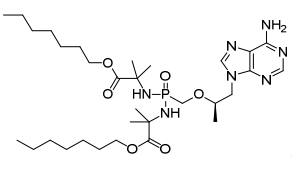
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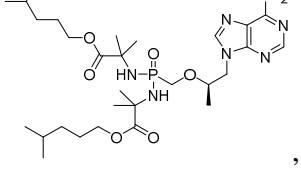
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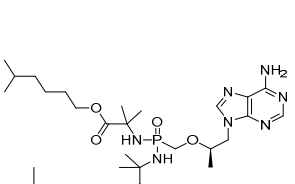
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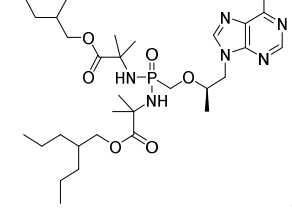
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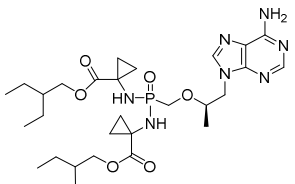
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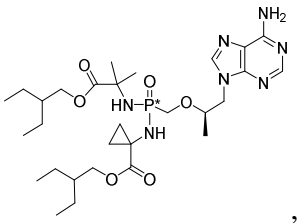
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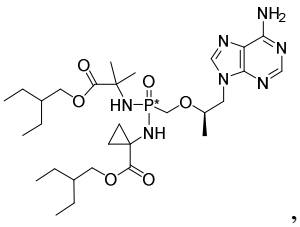
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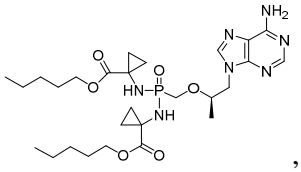
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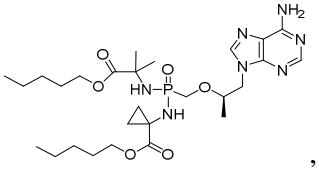
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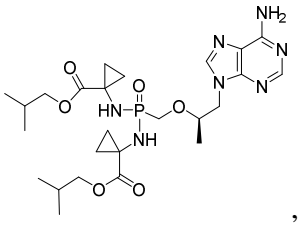
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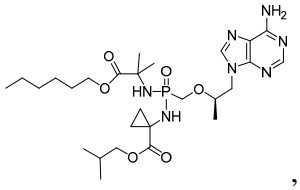
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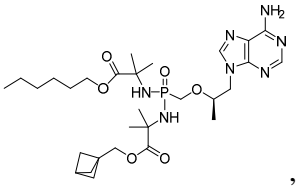
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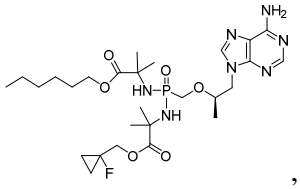
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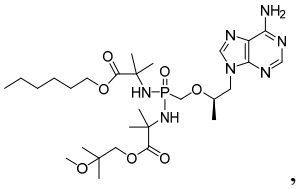
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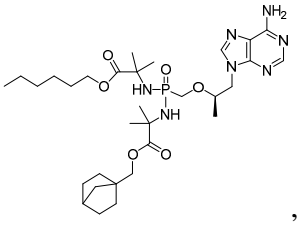
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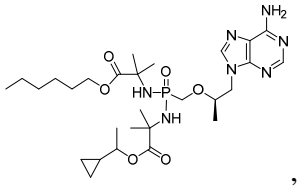
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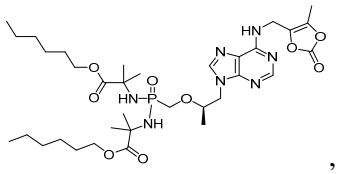
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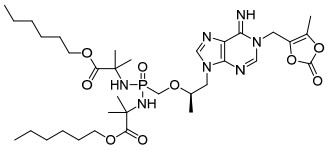
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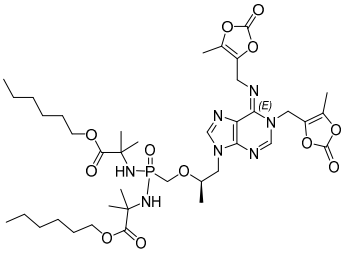
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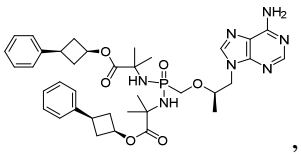
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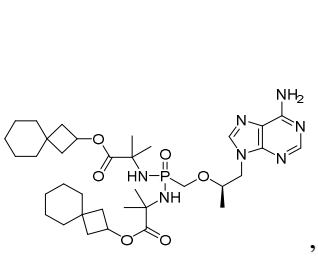
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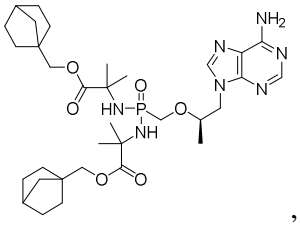
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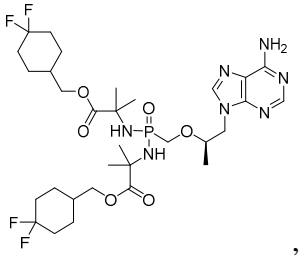
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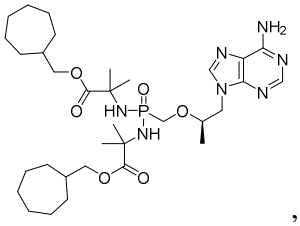
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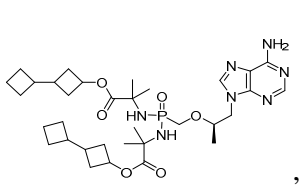
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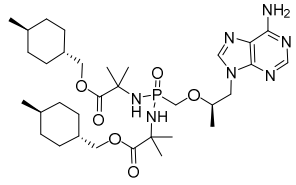
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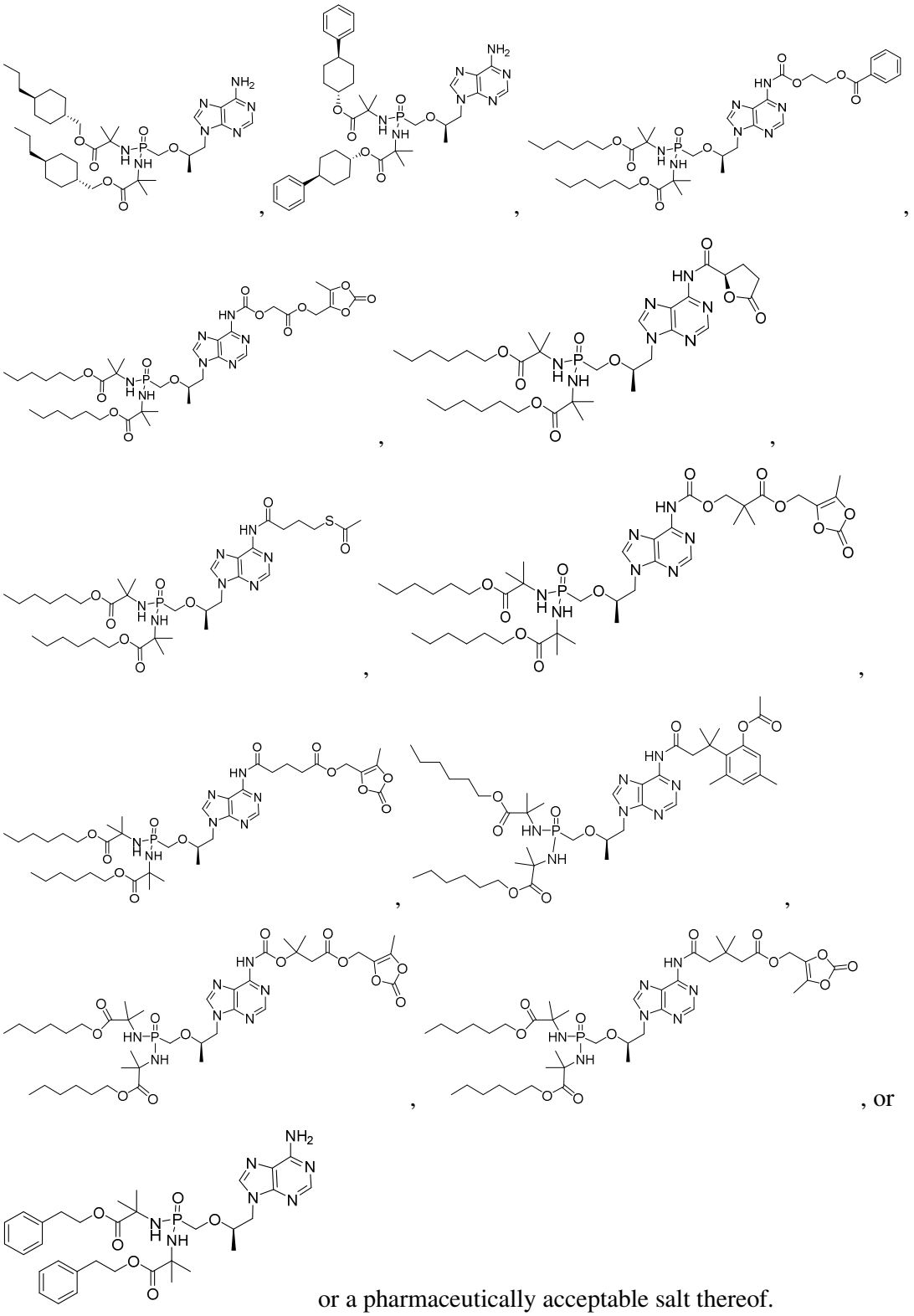
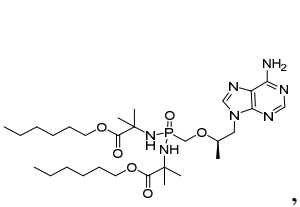


or a pharmaceutically acceptable salt thereof.

35. The compound of claim 1, wherein the compound is chosen from~~A compound of formula~~: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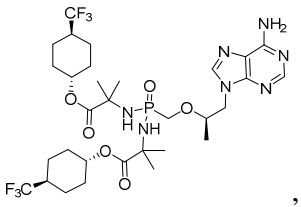
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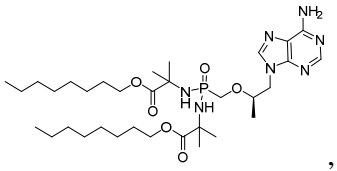
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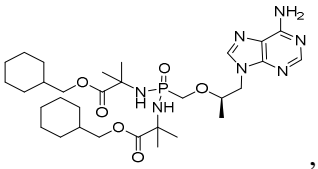
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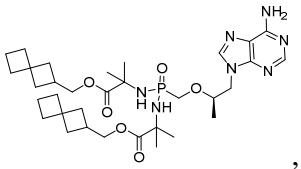
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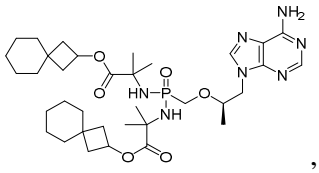
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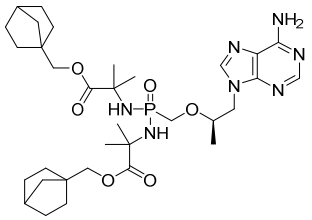
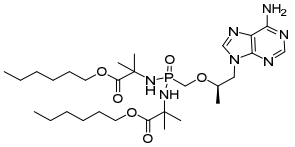
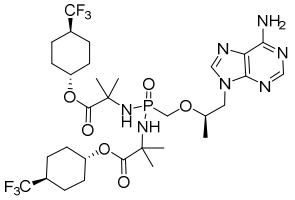

or a pharmaceutically acceptable salt thereof.

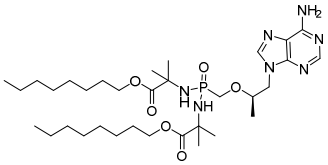
36. The compound of claim 1, wherein the compound is


or a pharmaceutically acceptable salt thereof.

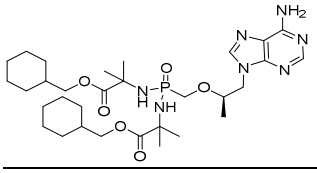
37. The compound of claim 1, wherein the compound is


or a pharmaceutically acceptable salt thereof.

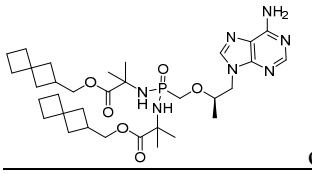
38. The compound of claim 1, wherein the compound is


or a pharmaceutically acceptable salt thereof.

39. The compound of claim 1, wherein the compound is

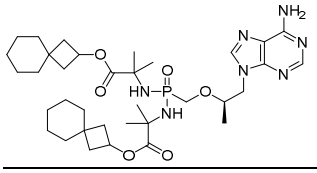

or a pharmaceutically acceptable salt thereof.

40. The compound of claim 1, wherein the compound is



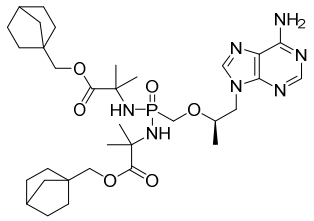
or a pharmaceutically acceptable salt thereof.

41. The compound of claim 1, wherein the compound is



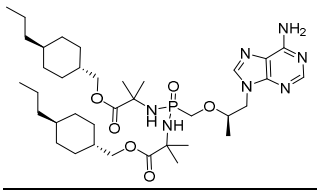
or a pharmaceutically acceptable salt thereof.

42. The compound of claim 1, wherein the compound is



or a pharmaceutically acceptable salt thereof.

43. The compound of claim 1, wherein the compound is



or a pharmaceutically acceptable salt thereof.

44. A pharmaceutical composition comprising a therapeutically effective amount of a compound of any one of claims 1-4354, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable excipient.

5645. The pharmaceutical composition of claim 44, further comprising one, two, three, or four additional therapeutic agents.

5746. The pharmaceutical composition of claim 4556, wherein the additional therapeutic agent or agents are anti-HIV agents.

5847. The pharmaceutical composition of claim 4556 or 4657, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV

bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

~~59~~48. The pharmaceutical composition of any one of claims 45~~56~~-47~~58~~, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

~~60. The pharmaceutical composition of claim 56, wherein the additional therapeutic agent or agents are anti-HBV agents.~~

~~61. The pharmaceutical composition of claim 56 or 60, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3-kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~62. The pharmaceutical composition of any one of claims 56, 60, and 61, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~63~~49. The pharmaceutical composition of any one of claims 44-~~62~~48, wherein the pharmaceutical composition is for parenteral administration.

64. A pharmaceutical composition comprising a means for maintaining the therapeutically effective concentration of TFV-DP in PBMCs for an extended period of time, and a pharmaceutically acceptable excipient, wherein the means for maintaining the therapeutically effective concentration of TFV-DP in PBMCs for an extended period of time is a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof.

65. The pharmaceutical composition of claim 64, further comprising one, two, three, or four additional therapeutic agents.

66. The pharmaceutical composition of claim 65, wherein the additional therapeutic agent or agents are anti-HIV agents.

67. The pharmaceutical composition of claim 65 or 66, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, other drugs for treating HIV, and combinations thereof.

68. The pharmaceutical composition of any one of claims 65-67, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

69. A pharmaceutical composition comprising a means for maintaining the therapeutically effective concentration of TFV-DP in PHHs for an extended period of time, and a pharmaceutically acceptable excipient, wherein the means for maintaining the therapeutically effective concentration of TFV-DP in PHHs for an extended period of time is a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof.

70. The pharmaceutical composition of claim 69, further comprising one, two, three, or four additional therapeutic agents.

71. The pharmaceutical composition of claim 70, wherein the additional therapeutic agent or agents are anti-HBV agents.

72. The pharmaceutical composition of claim 70 or 71, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3 kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.

73. The pharmaceutical composition of any one of claims 70-72, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.

74. The pharmaceutical composition of any one of claims 69-73, wherein the pharmaceutical composition is for parenteral administration.

75. A kit comprising a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof, and instructions for use.

76. The kit of claim 75, further comprising one, two, three, or four additional therapeutic agents.

77. The kit of claim 76, wherein the additional therapeutic agent or agents are anti-HIV agents.

78. The kit of claim 76 or 77, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase

~~inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.~~

~~79. The kit of any one of claims 76-78, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.~~

~~80. The kit of claim 76, wherein the additional therapeutic agent or agents are anti-HBV agents.~~

~~81. The kit of claim 76 or 80, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR-T cell therapy, thymosin agonists, retinoic acid-inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3-kinase (PI3K) inhibitors, indoleamine-2, 3-dioxygenase (IDO1) pathway inhibitors, anti-OX40, anti-CD40, anti-CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~82. The kit of any one of claims 76, 80, and 81, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~83. A kit comprising a pharmaceutical composition of any one of claims 55-74 and instructions for use.~~

84. The kit of claim 83, further comprising one, two, three, or four additional therapeutic agents.

85. The kit of claim 84, wherein the additional therapeutic agent or agents are anti-HIV agents.

86. The kit of claim 84 or 85, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

87. The kit of any one of claims 84-86, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

88. The kit of claim 84, wherein the additional therapeutic agent or agents are anti-HBV agents.

89. The kit of claim 84 or 88, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR-T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3-kinase (PI3K) inhibitors, indoleamine-2, 3-dioxygenase (IDO1) pathway inhibitors, anti-OX40, anti-CD40, anti-CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP,

~~nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~90. The kit of any one of claims 84, 88, and 89, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~91~~50. ~~A method of treating an HIV infection, comprising administering to a subject in need thereof a therapeutically effective amount~~Use of a compound of any one of claims 1-~~54~~43, or a pharmaceutically acceptable salt thereof, or a pharmaceutical composition of any one of claims ~~44~~-49, in the manufacture of a medicament for treating an HIV infection.

~~92~~51. The ~~method~~ use of claim ~~91~~50, wherein the medicament is to be administered in combination with ~~further comprising administering to the subject a therapeutically effective amount of~~ one, two, three, or four additional therapeutic agents.

~~93~~52. The ~~method~~ use of claim ~~92~~51, wherein the additional therapeutic agent or agents are anti-HIV agents.

~~94~~53. The ~~method~~ use of claim ~~92~~51 or ~~93~~52, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

~~95~~54. The ~~method~~ use of any one of claims ~~92~~51-~~94~~53, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

~~96~~55. The ~~method~~ use of any one of claims ~~91~~50-~~95~~54, wherein the medicament is to be administered~~ration is~~ intravenously, subcutaneously, or intramuscularly.

~~97. A method of treating an HIV infection, comprising administering to a subject in need thereof a pharmaceutical composition of any one of claims 55-74.~~

98. The method of claim 97, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.

99. The method of claim 98, wherein the additional therapeutic agent or agents are anti-HIV agents.

100. The method of claim 98 or 99, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

101. The method of any one of claims 98-100, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

102. The method of any one of claims 97-101, wherein the administration is intravenous, subcutaneous, or intramuscular.

103. A method of preventing an HIV infection, comprising administering to a subject at risk thereof a therapeutically effective amount of a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof.

104. The method of claim 103, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.

105. The method of claim 104, wherein the additional therapeutic agent or agents are anti-HIV agents.

106. The method of claim 104 or 105, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell

and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

107. The method of any one of claims 103-106, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

108. The method of any one of claims 103-107, wherein the administration is intravenous, subcutaneous, or intramuscular.

109. A method of preventing an HIV infection, comprising administering to a subject at risk thereof a pharmaceutical composition of any one of claims 55-74.

110. The method of claim 109, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.

111. The method of claim 110, wherein the additional therapeutic agent or agents are anti-HIV agents.

112. The method of claim 110 or 111, wherein the additional therapeutic agent or agents are chosen from HIV protease inhibitors, HIV non-nucleoside or non-nucleotide inhibitors of reverse transcriptase, HIV nucleoside or nucleotide inhibitors of reverse transcriptase, HIV integrase inhibitors, HIV capsid inhibitors, gp41 inhibitors, CXCR4 inhibitors, gp120 inhibitors, CCR5 inhibitors, Nef inhibitors, latency reversing agents, HIV bNAbs, agonists of TLR7, TLR8, and TLR9, HIV vaccines, cytokines, immune checkpoint inhibitors, FLT3 ligands, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HIV antigens, pharmacokinetic enhancers, and other drugs for treating HIV, and combinations thereof.

113. The method of any one of claims 110-112, wherein the additional therapeutic agent or agents are chosen from dolutegravir, cabotegravir, islatravir, darunavir, bictegravir, elsulfavirine, rilpivirine, and lenacapavir, and combinations thereof.

114. The method of any one of claims 109-113, wherein the administration is intravenous, subcutaneous, or intramuscular.

115. A method of treating an HBV infection, comprising administering to a subject in need thereof a therapeutically effective amount of a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof.

116. The method of claim 115, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.

117. The method of claim 116, wherein the additional therapeutic agent or agents are anti-HBV agents.

118. The method of claim 116 or 117, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3 kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.

119. The method of any one of claims 116 118, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.

120. The method of any one of claims 115 119, wherein the administration is intravenous, subcutaneous, or intramuscular.

121. A method of treating an HBV infection, comprising administering to a subject in need thereof a pharmaceutical composition of any one of claims 55 74.

122. The method of claim 121, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.

~~123. The method of claim 122, wherein the additional therapeutic agent or agents are anti-HBV agents.~~

~~124. The method of claim 122 or 123, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3 kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~125. The method of any one of claims 122 124, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~126. The method of any one of claims 121 125, wherein the administration is intravenous, subcutaneous, or intramuscular.~~

~~127. A method of preventing an HBV infection, comprising administering to a subject at risk thereof a therapeutically effective amount of a compound of any one of claims 1 54, or a pharmaceutically acceptable salt thereof.~~

~~128. The method of claim 127, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.~~

~~129. The method of claim 128, wherein the additional therapeutic agent or agents are anti-HBV agents.~~

~~130. The method of claim 128 or 129, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3 kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~131. The method of any one of claims 128-130, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~132. The method of any one of claims 127-131, wherein the administration is intravenous, subcutaneous, or intramuscular.~~

~~133. A method of preventing an HBV infection, comprising administering to a subject at risk thereof a therapeutically effective amount of a pharmaceutical composition of any one of claims 55-74.~~

~~134. The method of claim 133, further comprising administering to the subject a therapeutically effective amount of one, two, three, or four additional therapeutic agents.~~

~~135. The method of claim 134, wherein the additional therapeutic agent or agents are anti-HBV agents.~~

~~136. The method of claim 134 or 135, wherein the additional therapeutic agent or agents are chosen from HBV combination drugs, HBV vaccines, HBV polymerase inhibitors, HBV capsid~~

~~modulators, agonists of TLR7, TLR8, and TLR9, cytokines, immune checkpoint inhibitors, FLT3 ligands, interferon alpha receptor ligands, interferon alpha, interferon lambda, hyaluronidase inhibitors, hepatitis B surface antigen (HBsAg) inhibitors, HBV X protein (HBx) inhibitors, cyclophilin inhibitors, HBV viral entry inhibitors, antisense oligonucleotides, short interfering RNAs (siRNA) and DNA directed RNA interference (ddRNAi), endonuclease modulators, ribonucleotide reductase inhibitors, HBV E antigen (HBeAg) inhibitors, covalently closed circular DNA (cccDNA) inhibitors, farnesoid X receptor agonists, HBV antibodies, T cell and NK cell recruiting bispecific antibodies, chimeric T cell receptors targeting HBV antigens or peptides, CAR T cell therapy, thymosin agonists, retinoic acid inducible gene 1 stimulators, NOD2 stimulators, phosphatidylinositol 3 kinase (PI3K) inhibitors, indoleamine 2, 3 dioxygenase (IDO1) pathway inhibitors, anti OX40, anti CD40, anti CD160, HBV gene editors, PAPD5/PAPD7 inhibitors, ZCCHC14 inhibitors, Bruton's tyrosine kinase (BTK) inhibitors, epigenetic regulators, inducers of tertiary lymphoid aggregates, antagonists of IAP/XIAP, nucleic acid polymers, modulators of lipid metabolism or trafficking, arginase inhibitors, and other drugs for treating HBV, and combinations thereof.~~

~~137. The method of any one of claims 134 136, wherein the additional therapeutic agent or agents are chosen from adefovir, entecavir, telbivudine, lamivudine, and lenacapavir, and combinations thereof.~~

~~138. The method of any one of claims 133 137, wherein the administration is intravenous, subcutaneous, or intramuscular.~~

~~139. Use of a compound of any one of claims 1 54, or a pharmaceutically acceptable salt thereof, for treating an HIV infection.~~

~~140. Use of a pharmaceutical composition of any one of claims 55 74, for treating an HIV infection.~~

~~141. Use of a compound of any one of claims 1 54, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating an HIV infection.~~

~~142. A compound of any one of claims 1 54, or a pharmaceutically acceptable salt thereof, for use in treating an HIV infection.~~

~~143. A pharmaceutical composition of any one of claims 55 74, for use in treating an HIV infection.~~

~~144. Use of a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof, for treating an HBV infection.~~

~~145. Use of a pharmaceutical composition of any one of claims 55-74, for treating an HBV infection.~~

~~146. Use of a compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for treating an HBV infection.~~

~~147. A compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof, for use in treating an HBV infection.~~

~~148. A pharmaceutical composition of any one of claims 55-74, for use in treating an HBV infection.~~

~~149. A compound of any one of claims 1-54, or a pharmaceutically acceptable salt thereof, for use in medical therapy.~~

~~150. A pharmaceutical composition of any one of claims 55-74, for use in medical therapy.~~