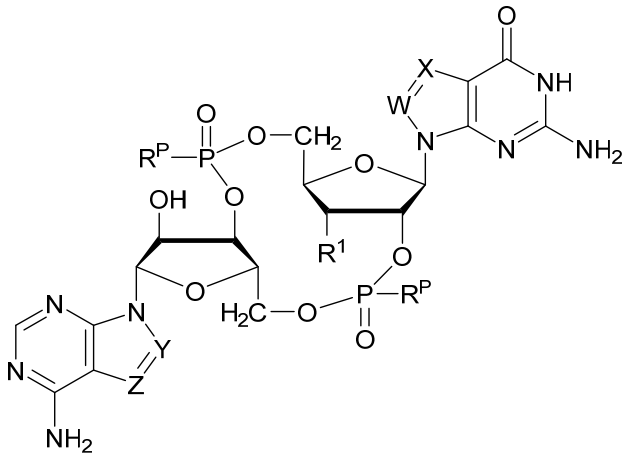
CLAIMS

1. An antibody-drug conjugate (ADC) having the structure of Formula Ia:

$$Ab\text{-}[\text{-}L\text{-}D]_n \qquad \text{(Formula Ia)}$$

wherein:

"D" represents a cyclic di-nucleotide (CDN) having the structure of Formula IIk:



Formula IIk

wherein

W, X, Y, and Z are independently CH or N;

R^1 is $C_{2\text{-}4}$alkyl substituted with an amino or $C_{1\text{-}6}$alkylamino group;

R^P is, independently for each occurrence, hydroxyl, thiol, $C_{1\text{-}6}$alkyl, $\text{-}BH_3^-$, or -NR'R", wherein R' and R" are, independently for each occurrence, hydrogen or $C_{1\text{-}6}$alkyl optionally substituted with one or more groups selected from halogen, thiol, hydroxyl, carboxyl, $C_{1\text{-}6}$alkoxy, $C_{1\text{-}6}$hydroxyalkoxy, $\text{-}OC(O)C_{1\text{-}6}$alkyl, $\text{-}N(H)C(O)C_{1\text{-}6}$alkyl, $\text{-}N(C_{1\text{-}3}\text{alkyl})C(O)C_{1\text{-}6}$alkyl, amino, $C_{1\text{-}6}$alkylamino, di($C_{1\text{-}6}$alkyl)amino, oxo, and azido; or R' and R" on the same nitrogen together form a $C_{3\text{-}5}$heterocyclic ring;

or a pharmaceutically acceptable salt thereof;

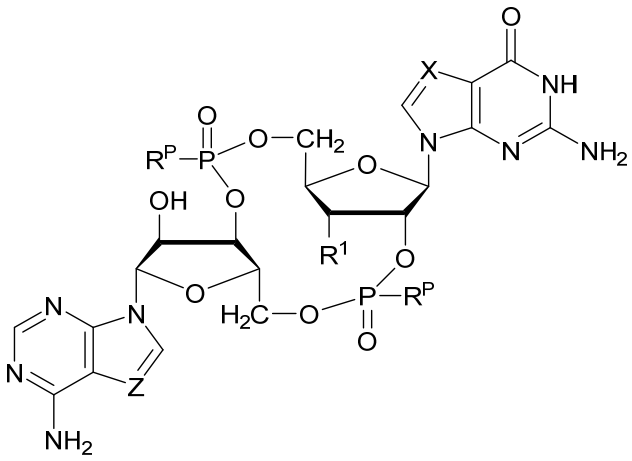
"Ab" represents an antibody or binding fragment thereof which binds a target antigen;

"L" represents, independently for each occurrence, a linker linking one or more occurrences of D to Ab;

"n" represents the number of occurrences of D linked to Ab via the linker (L);

and wherein the CDN (D) is covalently bound to linker (L) at the amino or C_{1-6}alkylamino group at the R^1 position of the CDN.

2. The ADC of claim 1, wherein D is a CDN having the structure of Formula IIm:



Formula IIm

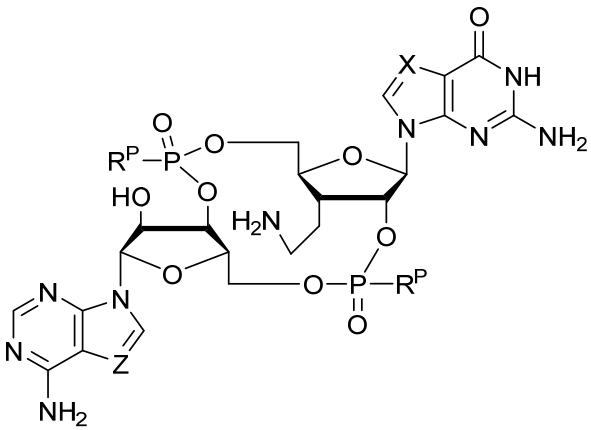
wherein

R^1 is ethyl substituted with an amino or C_{1-6}alkylamino group; and

R^P, independently for each occurrence, is hydroxyl or thiol;

or is a pharmaceutically acceptable salt thereof.

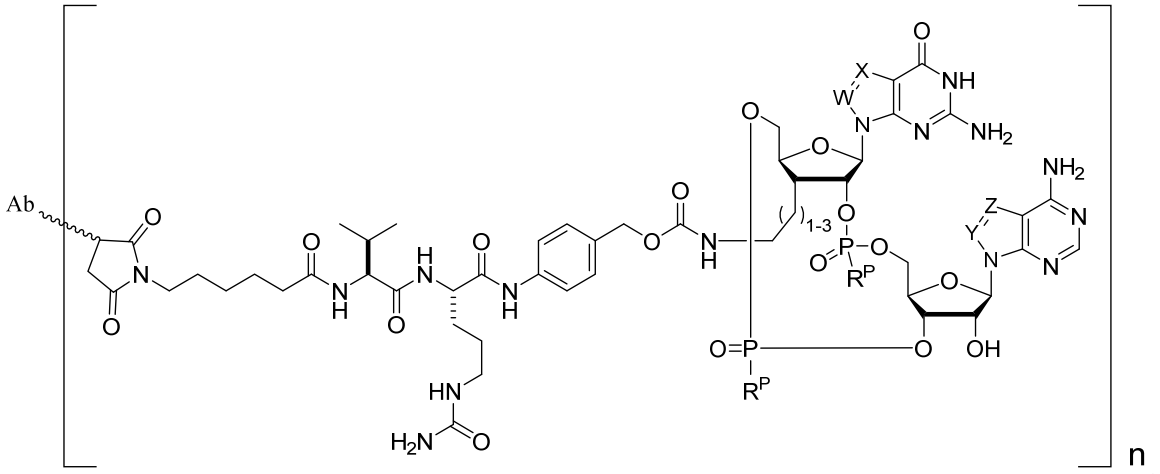
3. The ADC of claim 2, wherein the ADC is derived from a structure of Formula IIn:



Formula IIn

or is a pharmaceutically acceptable salt thereof.

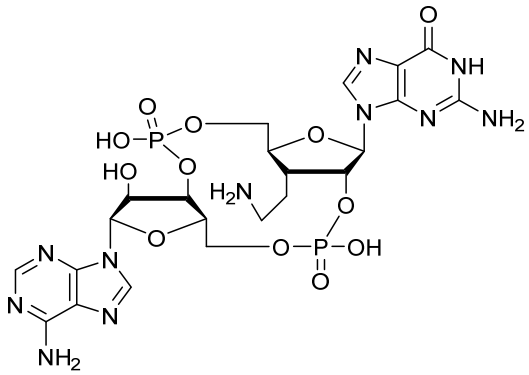
4. The ADC of claim 1, wherein the ADC has the structure of Formula III:



Formula III

5. The ADC of claim 1, wherein R^P, independently for each occurrence, is hydroxyl or thiol.

6. The ADC of claim 1, wherein the ADC is derived from a CDN with the following structure:



or is a pharmaceutically acceptable salt thereof.

7. The ADC of claim 1, wherein L comprises a cleavable linker that is an acid-cleavable linker.

8. The ADC of claim 1, wherein L comprises a cleavable linker that is a reducible linker.

9. The ADC of claim 8, wherein the reducible linker is a disulfide linker.

10. The ADC of claim 1, wherein L comprises a cleavable linker that is an enzyme-cleavable linker.

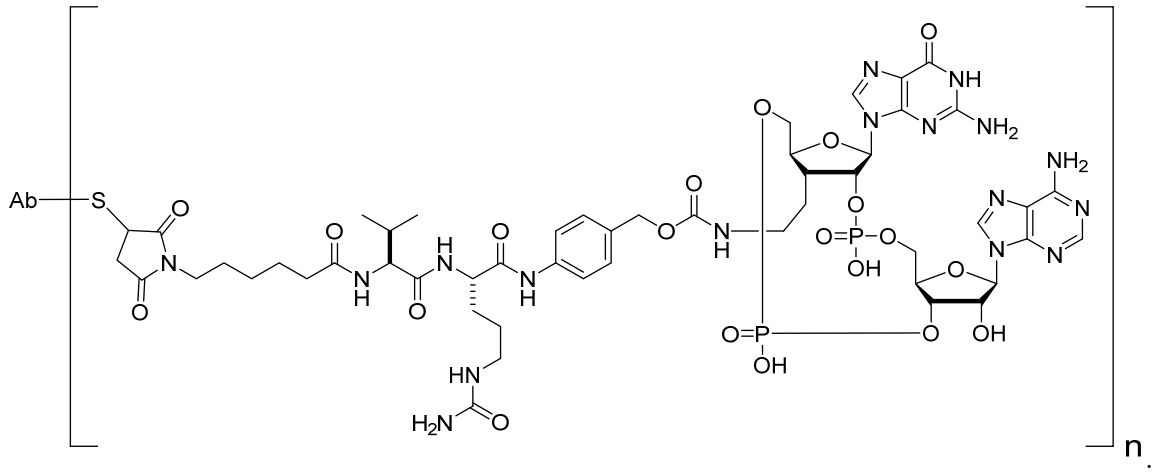
11. The ADC of claim 10, wherein the enzyme-cleavable linker is selected from a polypeptide, tetrapeptide, dipeptide, and a β-glucuronide linker.

12. The ADC of claim 10, wherein the enzyme cleavable linker is cleavable by a lysosomal enzyme that is a cathepsin.

13. The ADC of claim 1, wherein L is coupled to Ab via a maleimide group, an activated disulfide, an active ester, a haloformate, an acid halide, an alkyl halide, or a benzyl halide.

14. The ADC of claim 1, having a covalent linkage formed between L and Ab with a thiol group or primary amino group on Ab.

15. The ADC of claim 1, wherein the ADC has the following structure:

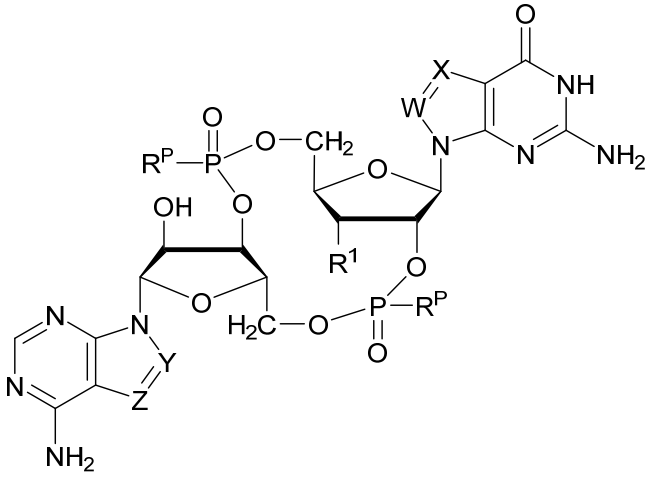


16. The ADC of claim 1, wherein n is 1, 2, 3, 4, 5, 6, 7, or 8.

17. The ADC of claim 1, wherein Ab is an antibody that binds to PD-L1, to an antigen that is a Growth Factor Receptor (GFR), to CD47, to an antigen preferentially expressed or overexpressed in cancer cells, or to an antigen derived from a microbe that infects human cells.

18. A pharmaceutical composition comprising the ADC of claim 1 and a pharmaceutically acceptable carrier.

19. A compound, wherein the compound is of Formula IIk:



Formula IIk

wherein

W, X, Y, and Z are independently CH or N;

R^1 is ethyl substituted with an amino or C_{1-6}alkylamino group;

R^P is, independently for each occurrence, hydroxyl, thiol, C_{1-6}alkyl, $-BH_3^-$, or -NR'R", wherein R' and R" are, independently for each occurrence, hydrogen or C_{1-6}alkyl optionally substituted with one or more groups selected from halogen, thiol, hydroxyl, carboxyl, C_{1-6}alkoxy, C_{1-6}hydroxyalkoxy, $-OC(O)C_{1-6}$alkyl, $-N(H)C(O)C_{1-6}$alkyl, $-N(C_{1-3}$alkyl$)C(O)C_{1-6}$alkyl, amino, C_{1-6}alkylamino, di(C_{1-6}alkyl)amino, oxo, and azido; or R' and R" on the same nitrogen together form a C_{3-5}heterocyclic ring;

or is a pharmaceutically acceptable salt thereof.

20. The compound of claim 19, wherein R^P, independently for each occurrence, is hydroxyl or thiol.

21. The compound of claim 19, wherein Y and W are both CH.

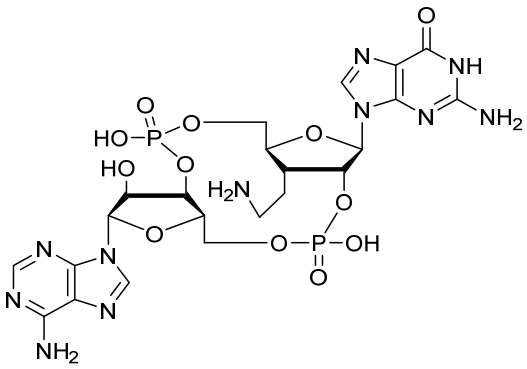
22. The compound of claim 19, wherein X and Z are both N.

23. The compound of claim 19, wherein R^1 is ethyl substituted with an amino group.

24. The compound of claim 19, wherein R^1 is ethyl substituted with a C_{1-6}alkylamino group.

25. The compound of claim 19, wherein both occurrences of R^P are hydroxyl.

26. The compound of claim 19, wherein the compound is



or is a pharmaceutically acceptable salt thereof.

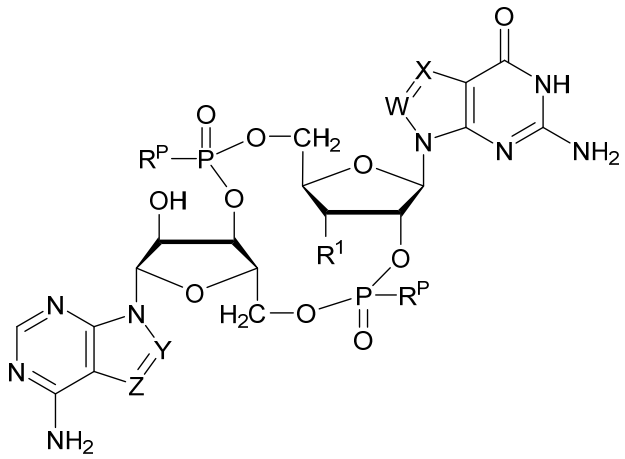
27. The ADC of claim 5, wherein both occurrences of R^P are hydroxyl.

28. A pharmaceutical composition comprising the ADC of claim 6 and a pharmaceutically acceptable carrier.

29. A compound of the formula L-CDN, wherein

L is a linker that includes a site capable of coupling to a complementary site on an antibody or antigen-binding fragment;

CDN is a cyclic dinucleotide having the structure of Formula IIk:



Formula IIk

wherein

W, X, Y, and Z are independently CH or N;

R^1 is $C_{2\text{-}4}$alkyl substituted with an amino or $C_{1\text{-}6}$alkylamino group;

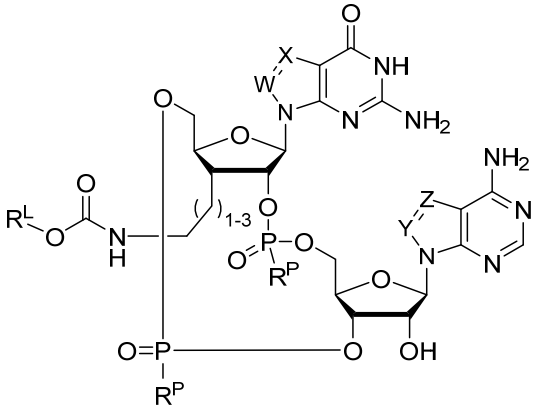
R^P is, independently for each occurrence, hydroxyl, thiol, $C_{1\text{-}6}$alkyl, $-BH_3^-$, or –NR'R", wherein R' and R" are, independently for each occurrence, hydrogen or $C_{1\text{-}6}$alkyl optionally substituted with one or more groups selected from halogen, thiol, hydroxyl, carboxyl, $C_{1\text{-}6}$alkoxy, $C_{1\text{-}6}$hydroxyalkoxy, -OC(O)$C_{1\text{-}6}$alkyl, -N(H)C(O)$C_{1\text{-}6}$alkyl, -N($C_{1\text{-}3}$alkyl)C(O)$C_{1\text{-}6}$alkyl, amino, $C_{1\text{-}6}$alkylamino, di($C_{1\text{-}6}$alkyl)amino, oxo, and azido; or R' and R" on the same nitrogen together form a $C_{3\text{-}5}$heterocyclic ring;

or a pharmaceutically acceptable salt thereof; and

CDN is coupled to L at the amino or $C_{1\text{-}6}$alkylamino group of R^1.

30. The compound of claim 29, wherein CDN is coupled to L via an amide, a carbamate, or a urea group.

31. The compound of claim 30, wherein the compound has the structure of Formula IXb:



Formula IXb

wherein R^L represents the remainder of the linker L.

32. The compound of claim 29, wherein R^P, independently for each occurrence, is hydroxyl or thiol.

33. The compound of claim 29, wherein Y and W are both CH.

34. The compound of claim 29, wherein X and Z are both N.

35. The compound of claim 29, wherein R^1 is ethyl substituted with an amino group.

36. The compound of claim 29, wherein R^1 is ethyl substituted with a $C_{1\text{-}6}$alkylamino group.

37. The compound of claim 36, wherein R^1 is ethyl substituted with a methylamino group.

38 The compound of claim 29, wherein at least one occurrence of R^P is hydroxyl.

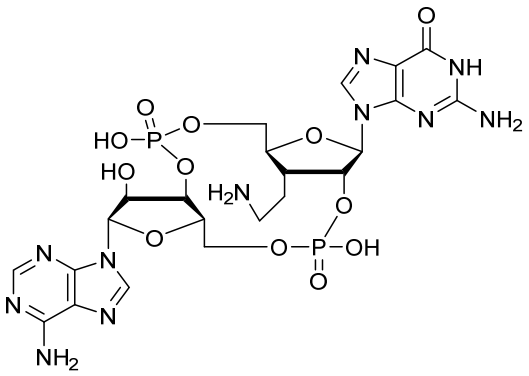
39. The compound of claim 38, wherein both occurrences of R^P are hydroxyl.

40. The compound of claim 38, wherein one occurrence of R^P is hydroxyl and the other is thiol.

41. The compound of claim 29, wherein at least one occurrence of R^P is thiol.

42. The compound of claim 41, wherein both occurrences of R^P are thiol.

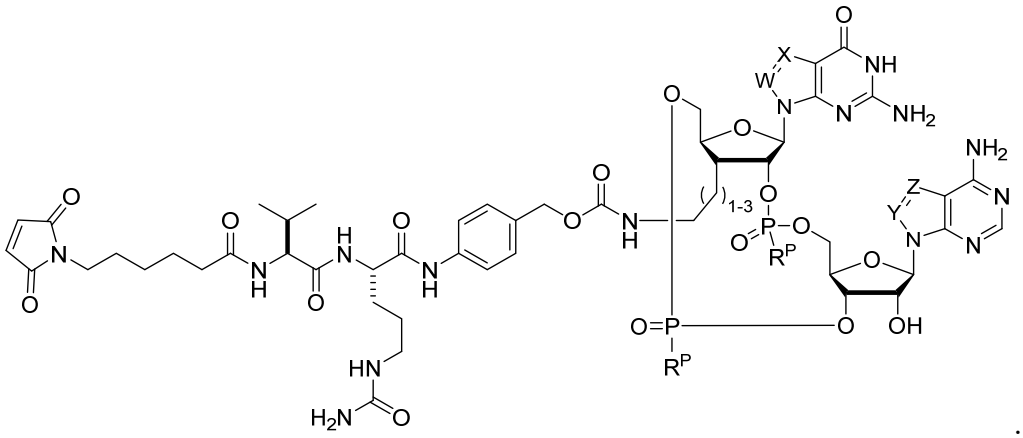
43. The compound of claim 29, wherein the CDN has the following structure:



or is a pharmaceutically acceptable salt thereof.

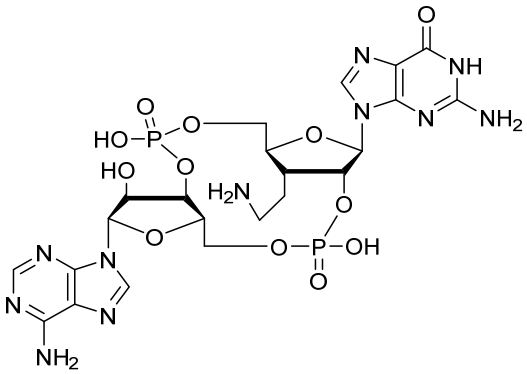
44. The compound of claim 30, wherein CDN is coupled to L via a carbamate group.

45. The compound of claim 44, wherein the compound has the following structure:



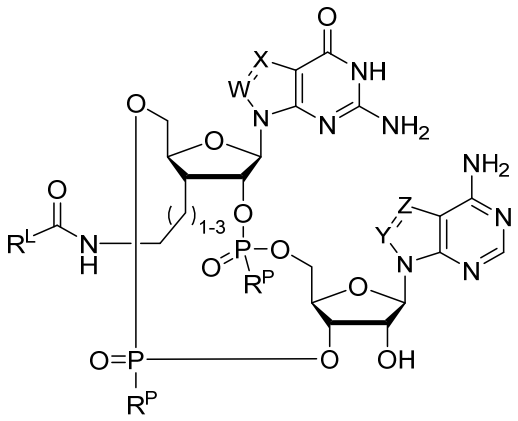
.

46. The compound of claim 44, wherein the CDN has the following structure:



or is a pharmaceutically acceptable salt thereof.

47. The compound of claim 30, wherein the compound has the structure of Formula IXa:

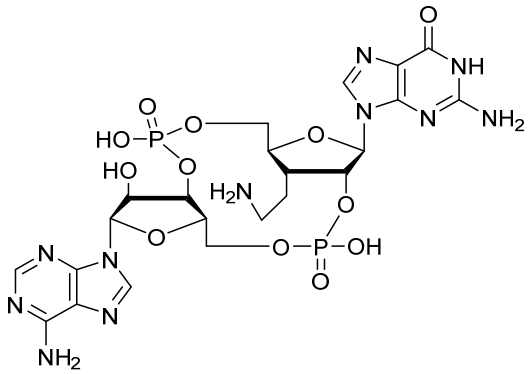


Formula IXa

wherein R^L represents the remainder of the linker L.

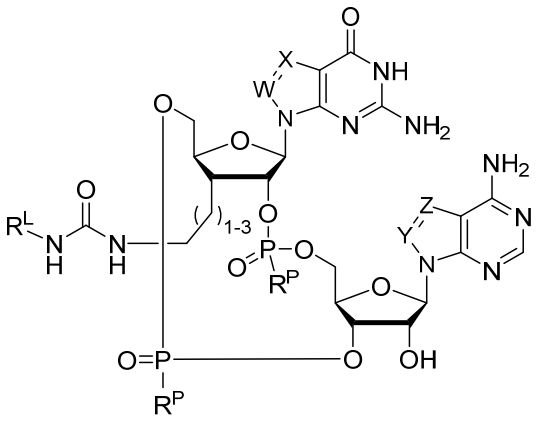
48. The compound of claim 30, wherein CDN is coupled to L via an amide group.

49. The compound of claim 48, wherein the CDN has the following structure:



or is a pharmaceutically acceptable salt thereof.

50. The compound of claim 30, wherein the compound has the structure of Formula IXc:

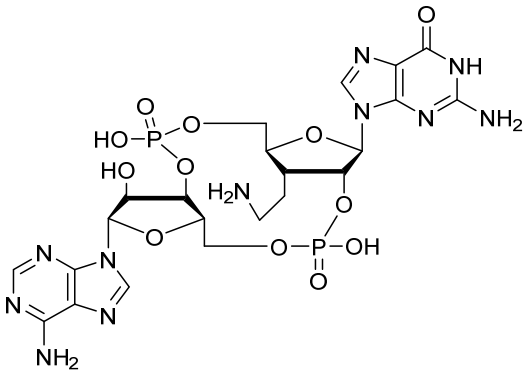


Formula IXc

wherein R^L represents the remainder of the linker L.

51. The compound of claim 30, wherein CDN is coupled to L via a urea group.

52. The compound of claim 51, wherein the CDN has the following structure:

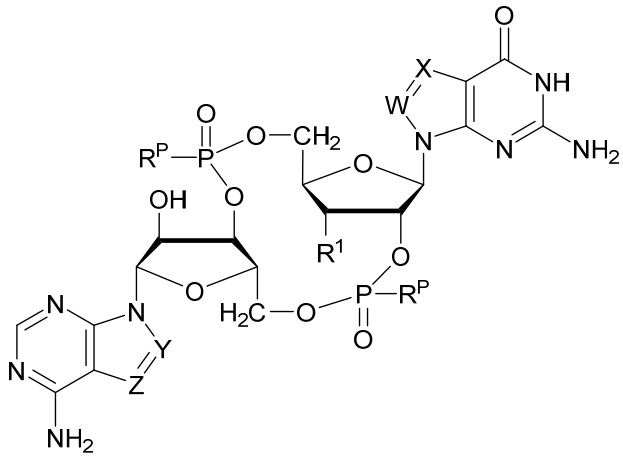


or is a pharmaceutically acceptable salt thereof.

53. A compound of the formula L-CDN, wherein

L is a linker that includes a site capable of coupling to a complementary site on an antibody or antigen-binding fragment;

CDN is a cyclic dinucleotide having the structure of Formula IIk:



Formula IIk

wherein

W, X, Y, and Z are independently CH or N;

R^1 is $C_{2\text{-}4}$alkyl substituted with an amino group;

R^p is, independently for each occurrence, hydroxyl or thiol;

or a pharmaceutically acceptable salt thereof; and

CDN is coupled to L at the amino group of R^1 via an amide, a carbamate, or a urea group.

54. The compound of claim 53, wherein R^1 is ethyl substituted with an amino group.