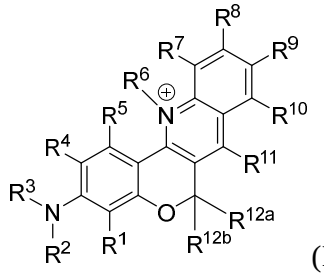
WHAT IS CLAIMED IS:

1. A compound of Formula (I), a salt or a mesomeric form thereof:



(I)

wherein each of R^1, R^4, R^5, R^7, R^8, R^9, R^{10}, R^{11}, R^{12a} and R^{12b} is independently H, C_1-C_6 alkyl, substituted C_1-C_6 alkyl, C_1-C_6 alkoxy, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, (C_1-C_6 alkoxy)C_1-C_6 alkyl, optionally substituted amino, amino(C_1-C_6 alkyl), halo, cyano, hydroxy, hydroxy(C_1-C_6 alkyl), nitro, sulfonyl, sulfo, sulfino, sulfonate, S-sulfonamido, or N-sulfonamido;

R^2 is C_1-C_6 substituted with alkyl carboxyl (–C(O)OH), carboxylate (–C(O)O^-) and –C(O)OR^{15}, wherein R^{15} is optionally substituted C_1-C_6 alkyl, optionally substituted C_6-C_{10} aryl, optionally substituted 5 to 10 membered heteroaryl, or optionally substituted C_3-C_7 cycloalkyl;

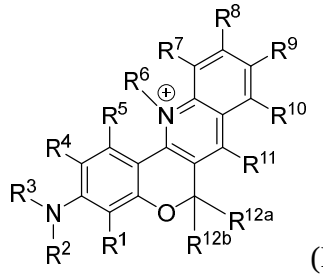
R^3 is H, C_1-C_6 alkyl, or substituted C_1-C_6 alkyl; and

R^6 is C_1-C_6 alkyl or substituted C_1-C_6 alkyl;

alternatively, R^3 and R^4 together with the atoms to which they are attached form an optionally substituted 5-10 membered heteroaryl or an optionally substituted 5-10 membered heterocyclyl;

alternatively, R^8 and R^9 together with the atoms to which they are attached form an optionally substituted C_6-C_{10} aryl, an optionally substituted 3-10 membered carbocyclyl, an optionally substituted 5-10 membered heteroaryl or an optionally substituted 3-10 membered heterocyclyl.

2. A compound of Formula (I), a salt or a mesomeric form thereof:



(I)

wherein each of R^1, R^4, R^5, R^7, R^8, R^9, R^{10}, R^{11}, R^{12a} and R^{12b} is independently H, C_1-C_6 alkyl, substituted C_1-C_6 alkyl, C_1-C_6 alkoxy, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, (C_1-C_6 alkoxy)C_1-C_6 alkyl, optionally substituted amino,

amino(C_1-C_6 alkyl), halo, cyano, hydroxy, hydroxy(C_1-C_6 alkyl), nitro, sulfonyl, sulfo, sulfino, sulfonate, S-sulfonamido, or N-sulfonamido;

R^2 is C_1-C_6 alkyl or C_1-C_6 alkyl substituted with one or more substituents selected from the group consisting of carboxyl (–C(O)OH), carboxylate (–C(O)O-), –C(O)OR^{15}, and –C(O)N$R^{16}R^{17}$, wherein R^{15} is optionally substituted C_1-C_6 alkyl, optionally substituted C_6-C_{10} aryl, optionally substituted 5 to 10 membered heteroaryl, or optionally substituted C_3-C_7 cycloalkyl, and wherein each of R^{16} and R^{17} is independently H, optionally substituted C_1-C_6 alkyl, optionally substituted C_6-C_{10} aryl, optionally substituted 5 to 10 membered heteroaryl, or optionally substituted C_3-C_7 cycloalkyl;

R^3 is H, C_1-C_6 alkyl, or substituted C_1-C_6 alkyl; and

R^6 is C_1-C_6 alkyl or substituted C_1-C_6 alkyl;

alternatively, R^3 and R^4 together with the atoms to which they are attached form an optionally substituted 5-10 membered heteroaryl or an optionally substituted 5-10 membered heterocyclyl;

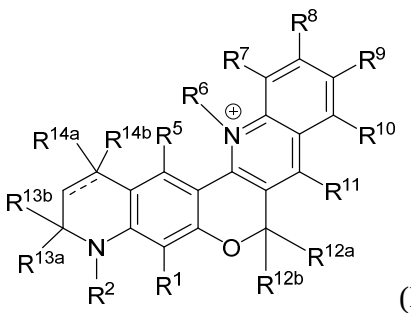
alternatively, R^8 and R^9 together with the atoms to which they are attached form an optionally substituted C_6-C_{10} aryl, an optionally substituted 3-10 membered carbocyclyl, an optionally substituted 5-10 membered heteroaryl or an optionally substituted 3-10 membered heterocyclyl;

provided that at least one of R^7, R^8, R^9 and R^{10} is C_1-C_6 alkyl substituted with carboxyl, carboxylate, -C(O)OR^{15}, and wherein each R^{16} and R^{17} is independently H or C_1-C_6 alkyl substituted with carboxyl, carboxylate; and

provided that when each of R^2 and R^3 is ethyl; R^6 is methyl; R^9 is a substituted C_1-C_6 alkyl comprising a carboxyl; and each of R^1, R^4, R^5, R^7, R^8, R^{10}, R^{11}, R^{12a} and R^{12b} is H.

3. The compound of claim 2, wherein each of R^2 and R^3 is independently C_1-C_6 alkyl.

4. A compound of Formula (Ia), a salt, or a mesomeric form thereof:



(Ia)

wherein each of R^1, R^4, R^5, R^7, R^8, R^9, R^{10}, R^{11}, R^{12a} and R^{12b} is independently H, C_1-C_6 alkyl, substituted C_1-C_6 alkyl, C_1-C_6 alkoxy, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6

haloalkyl, C_1-C_6 haloalkoxy, (C_1-C_6 alkoxy)C_1-C_6 alkyl, optionally substituted amino, amino(C_1-C_6 alkyl), halo, cyano, hydroxy, hydroxy(C_1-C_6 alkyl), nitro, sulfonyl, sulfo, sulfino, sulfonate, S-sulfonamido, or N-sulfonamido;

R^2 is C_1-C_6 substituted with alkyl carboxyl (–C(O)OH), carboxylate (–C(O)O^-) and –C(O)OR^{15}, wherein R^{15} is optionally substituted C_1-C_6 alkyl, optionally substituted C_6-C_{10} aryl, optionally substituted 5 to 10 membered heteroaryl, or optionally substituted C_3-C_7 cycloalkyl;

R^3 is H, C_1-C_6 alkyl, or substituted C_1-C_6 alkyl; and

R^6 is C_1-C_6 alkyl or substituted C_1-C_6 alkyl;

alternatively, R^3 and R^4 together with the atoms to which they are attached form an optionally substituted 5-10 membered heteroaryl or an optionally substituted 5-10 membered heterocyclyl;

alternatively, R^8 and R^9 together with the atoms to which they are attached form an optionally substituted C_6-C_{10} aryl, an optionally substituted 3-10 membered carbocyclyl, an optionally substituted 5-10 membered heteroaryl or an optionally substituted 3-10 membered heterocyclyl;

wherein each of R^{13a}, R^{13b}, R^{14a} and R^{14b} is independently H, C_1-C_6 alkyl, substituted C_1-C_6 alkyl, C_1-C_6 alkoxy, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, (C_1-C_6 alkoxy)C_1-C_6 alkyl, optionally substituted amino, amino(C_1-C_6 alkyl), halo, cyano, hydroxy, hydroxy(C_1-C_6 alkyl), nitro, sulfonyl, sulfo, sulfino, sulfonate, S-sulfonamido, or N-sulfonamido; and

wherein the bond represented by a solid and dashed line ------ is selected from the group consisting of a single bond and a double bond, provided that when ------ is a double bond, then R^{14b} is absent.

5. The compound of claim 4, wherein the bond represented by a solid and dashed line ------ is a double bond.

6. The compound of claim 5, wherein R^{14a} is H or C_1-C_6 alkyl.

7. The compound of claim 6, wherein R^{14a} is methyl.

8. The compound of claim 4, wherein the bond represented by a solid and dashed line ------ is a single bond.

9. The compound of claim 8, wherein R^{14a} is H and R^{14b} is C_1-C_6 alkyl.

10. The compound of claim 8, wherein each of R^{14a} and R^{14b} is H.

11. The compound of any one of claims 4 to 10, wherein each of R^{13a} and R^{13b} is H.

12. The compound of any one of claims 4 to 10, wherein each of R^{13a} and R^{13b} is C_1-C_6 alkyl.

13. The compound of claim 12, wherein each of R^{13a} and R^{13b} is methyl.

14. The compound of any one of claims 4 to 13, wherein R^2 is C_1-C_6 alkyl or substituted C_1-C_6 alkyl.

15. The compound of claim 14, wherein R^2 is C_1-C_6 alkyl substituted with carboxyl, and wherein each R^{16} and R^{17} is independently C_1-C_6 alkyl substituted with carboxyl, carboxylate, –C(O)OR^{15}, sulfo or sulfonate.

16. The compound of any one of claims 1 to 15, wherein R^1 is H.

17. The compound of any one of claims 1 and 4 to 13, wherein R^1 and R^2 are joined together with the atoms to which they are attached to form an optionally substituted 6 membered heterocyclyl.

18. The compound of claim 17, wherein the 6 membered heterocyclyl is substituted with one or more C_1-C_6 alkyl.

19. The compound of any one of claims 1 to 18, wherein each R^5 and R^{11} is H.

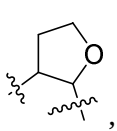
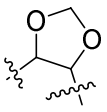
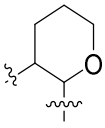
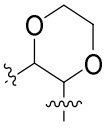
20. The compound of any one of claims 1 to 19, wherein R^6 is C_1-C_6 alkyl.

21. The compound of any one of claims 1 to 19, wherein R^6 is C_1-C_6 alkyl substituted with carboxyl or –C(O)$NR^{16}R^{17}$, and wherein each R^{16} and R^{17} is independently C_1-C_6 alkyl substituted with carboxyl, carboxylate, –C(O)OR^{15}, sulfo or sulfonate.

22. The compound of claim 1 or any one of claims 16 to 21 when dependent upon claim 1, wherein at least one of R^7, R^8, R^9 and R^{10} is independently C_1-C_6 alkyl or C_1-C_6 alkoxy.

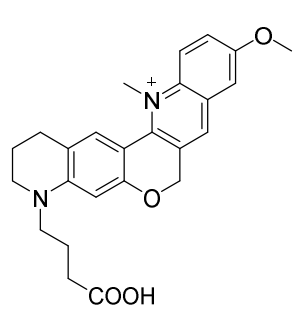
23. The compound of claim 1 or any one of claims 16 to 21 when dependent upon claim 1, wherein at least one of R^7, R^8, R^9 and R^{10} is C_1-C_6 alkyl substituted carboxyl, carboxylate, sulfo, sulfonate, –C(O)OR^{15} or –C(O)$NR^{16}R^{17}$, and wherein each R^{16} and R^{17} is independently H or C_1-C_6 alkyl substituted with carboxyl, carboxylate, –C(O)OR^{15}, sulfo or sulfonate.

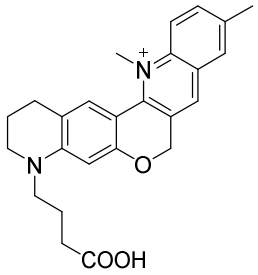
24. The compound of any one of claims 1 to 21, wherein R^8 and R^9 together with the atoms to which they are attached form an optionally substituted 5 or 6 membered heterocyclyl.

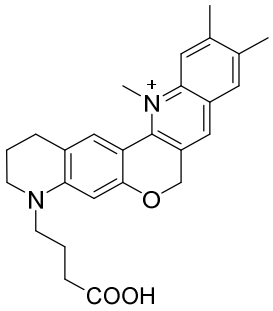
25. The compound of claim 24, wherein the optionally substituted 5 or 6 membered heterocyclyl is , ,  or .

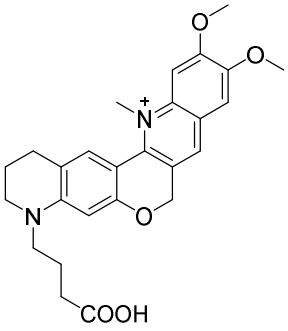
26. The compound of any one of claims 1 to 25, wherein each of R^{12a} and R^{12b} is H.

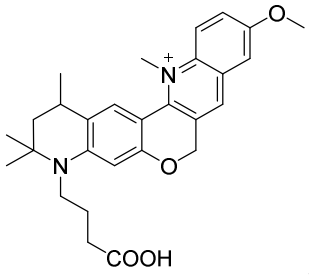
27. A compound selected from the group consisting of:

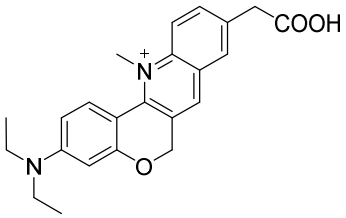


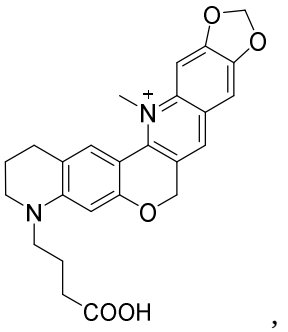
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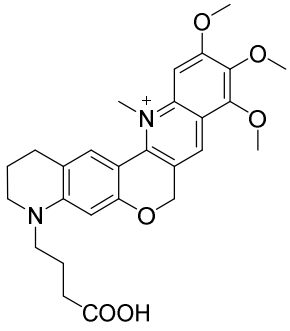
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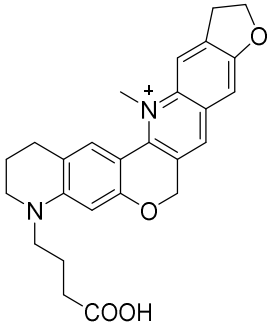
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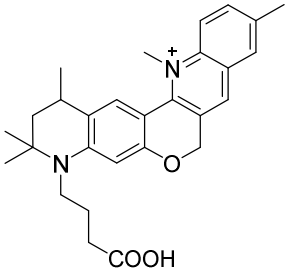
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, and


, salts and mesomeric forms thereof.

28. A nucleotide or oligonucleotide labeled with a compound according to any one of claims 1 to 27, wherein the compound is attached to the C5 position of a pyrimidine base or the C7 position of a 7-deaza purine base through a linker moiety.

29. The labeled nucleotide or oligonucleotide of claim 28, wherein the compound is attached the nucleotide or oligonucleotide via a carboxyl group of R^2 or R^6 of Formula (I).

30. The labeled nucleotide or oligonucleotide of claim 28, wherein the compound is attached the nucleotide or oligonucleotide via a carboxyl group of one of R^7, R^8, R^9 and R^{10} of Formula (I).

31. The labeled nucleotide or oligonucleotide of any one of claims 28 to 30, further comprising a 3' OH blocking group covalently attached to the ribose or deoxyribose sugar of the nucleotide.

32. The nucleotide or oligonucleotide of any one of claims 28 to 31, wherein the nucleotide or oligonucleotide is an oligonucleotide hybridized to at least a portion of a target polynucleotide.

33. The oligonucleotide of claim 32, wherein the target polynucleotide is immobilized on a solid support.

34. The oligonucleotide according to claim 33, wherein the solid support comprises an array of a plurality of immobilized target polynucleotides.

35. A kit comprising a first nucleotide labeled with a first compound according to any one of claims 28 to 31.

36. The kit of claim 35, further comprising a second nucleotide, wherein the second nucleotide is labeled with a second compound that is different from the first compound of the first labeled nucleotide.

37. The kit of claim 36, wherein the first labeled nucleotide and the second labeled nucleotide are excitable using a first light source wavelength.

38. The kit of claim 36 or 37, further comprising a third nucleotide, wherein the third nucleotide is labeled with a third compound that is different from the first and the second compounds, and wherein the first and third labeled nucleotides are excitable using a second light source wavelength.

39. The kit of claim 38, further comprising a fourth nucleotide, and wherein the fourth nucleotide is unlabeled (dark).

40. The kit of any one of claims 35 to 39, wherein each of the first labeled nucleotide, the second labeled nucleotide and the third labeled nucleotide has an emission spectrum that is detectable in a single detection channel.

41. The kit of any one of claims 35 to 40, further comprising a DNA polymerase and one or more buffer compositions.

42. A method of determining the sequence of a target polynucleotide, comprising:

(a) contacting a primer polynucleotide/target polynucleotide complex with one or more labeled nucleotides, wherein at least one of said labeled nucleotide is a nucleotide of any one of claims 28 to 31, and wherein the primer polynucleotide is complementary to at least a portion of the target polynucleotide;

(b) incorporating a labeled nucleotide into the primer polynucleotide to produce an extended primer polynucleotide; and

(c) performing one or more fluorescent measurements of the extended primer polynucleotide to determine the identity of the incorporated nucleotide.

43. The method of claim 42 wherein the primer polynucleotide/target polynucleotide complex is formed by contacting the target polynucleotide with a primer polynucleotide complementary to at least a portion of the target polynucleotide.

44. The method of claim 42 or 43, further comprising (d) removing the label and the 3′ blocking group from the nucleotide incorporated into the primer polynucleotide.

45. The method of claim 43, further comprising (e) washing the removed label and the 3′ blocking group away from the primer polynucleotide.

46. The method of claim 45, further comprising repeating steps (a) to (e) until a sequence of at least a portion of the template polynucleotide strand is determined.

47. The method of claim 46, wherein the steps (a) to (e) is repeated at least 50 times.

48. The method of any one of claims 42 to 47, wherein the label and the 3′ blocking group from the nucleotide incorporated into the primer polynucleotide are removed in a single chemical reaction.

49. The method of any one of claims 42 to 48, wherein the method is performed on an automated sequencing instrument, and wherein the automated sequencing instrument comprises two light sources operating at different wavelengths.