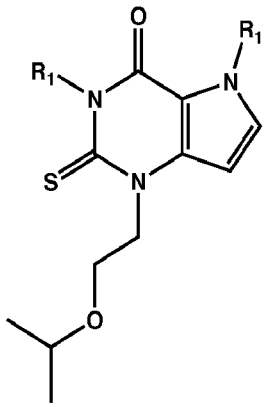
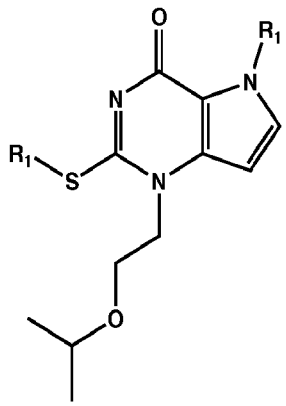
CLAIMS

What is claimed is:

1. A compound having Formula (I) or Formula (II):

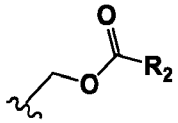


(I)



(II)

wherein, in Formulae (I) and (II):

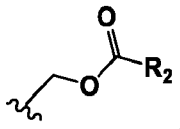
each R_1 is independently H, , $-CH_2OP(=O)(OH)_2$, AA_{1-3}, $C(=O)(CH_2)_{n1}X_1AA_{1-3}$, or C(=O)AA, provided that at least one R_1 is not H;

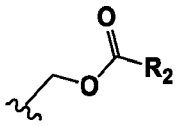
AA_{1-3} is a moiety consisting of 1 to 3 natural amino acids linked through a peptide bond, wherein the natural amino acids are the same or different,

n1 is an integer of 1 to 5,

X_1 is S, O, or NH, and

R_2 is $-[C(R_3)_2]_nR_4$, $-NR_3R_4$, or $-OR_4$, wherein each R_3 is independently hydrogen or C1-C10 alkyl wherein R_3 are optionally connected to form a ring, and R_4 is a substituted or unsubstituted C1-C20 alkyl group, a substituted or unsubstituted C2-C20 alkenyl group, a substituted or unsubstituted C2-C20 alkynyl group, a substituted or unsubstituted C1-C20 heteroalkyl group, a substituted or unsubstituted C2-C20 heteroalkenyl group, a substituted or unsubstituted C2-C20 heteroalkynyl group, a substituted or unsubstituted C3-C20 cycloalkyl group, a substituted or unsubstituted C3-C20 heterocycloalkyl group, a substituted or unsubstituted C6-C20 aryl group, or a substituted or unsubstituted C1-C20 heteroaryl group, and n is 0 or 1,

wherein, when each R_1 is  , R_2 are optionally connected to form a ring.

2. The compound according to Claim 2, wherein, in Formulae (I) and (II), each R_1 is  .

3. The compound according to Claim 1, wherein at least one R_3 is not hydrogen.

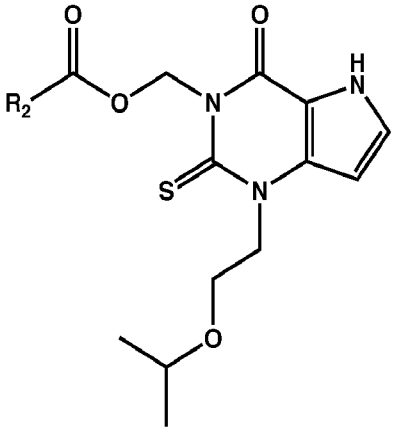
4. The compound according to Claim 2, wherein at least one R_3 is a methyl group.

5. The compound according to Claim 2, wherein each R_3 is not hydrogen.

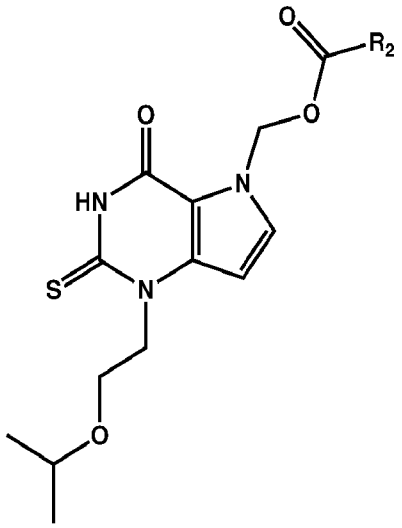
6. The compound according to Claim 2, wherein each R_3 is a methyl group.

7. The compound according to Claim 2, wherein R_4 is each independently a substituted or unsubstituted C1-C10 alkyl group, a substituted or unsubstituted C2-C10 alkenyl group, a substituted or unsubstituted C2-C10 alkynyl group, a substituted or unsubstituted C1-C10 heteroalkyl group, a substituted or unsubstituted C2-C10 heteroalkenyl group, a substituted or unsubstituted C2-C10 heteroalkynyl group, or a substituted or unsubstituted C6-C10 aryl group.

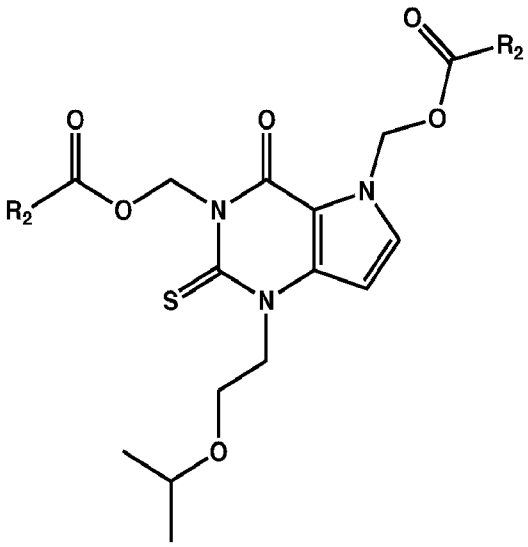
8. The compound according to Claim 1, wherein Formula (I) is represented by one of Formulae (Ia), (Ib), and (Ic), and wherein Formula (II) is represented by one of Formulae (IIa) and (IIb):



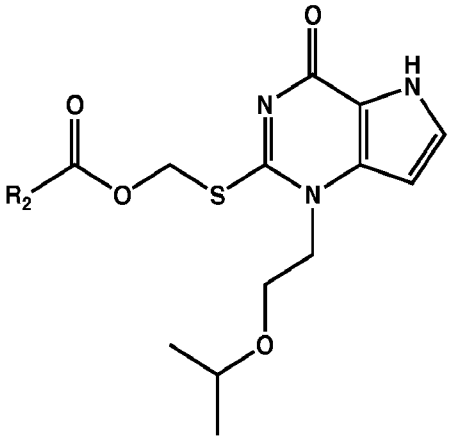
(Ia)

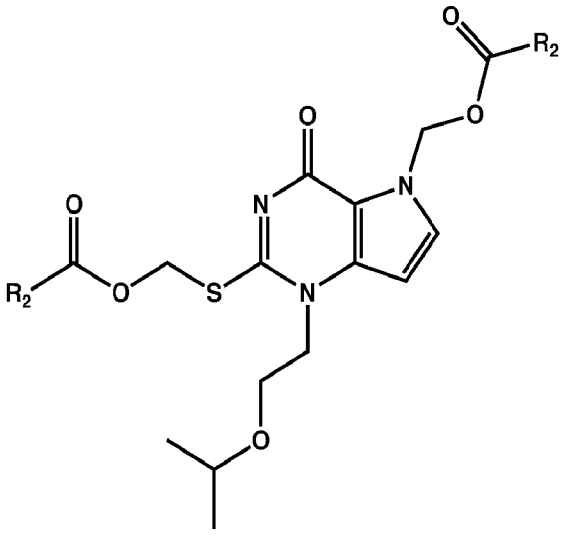


(Ib)



(Ic)



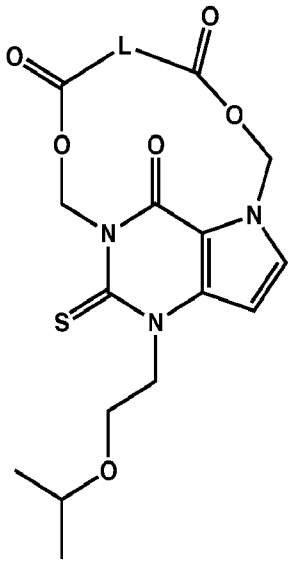


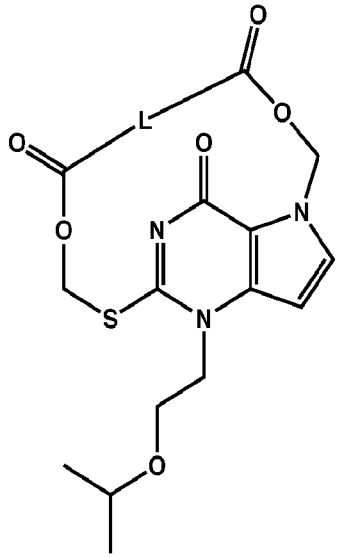
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(IIa) (IIb)

wherein, in Formulae (Ia), (Ib), (Ic), (IIa), and (IIb), R_2 is the same as that in Claim 1.

9. The compound according to Claim 8, wherein, in Formulae (Ic) and (IIb), R_2 are connected with a single bond to form a linking group L, as in Formulae (Id) and (IIc), respectively:

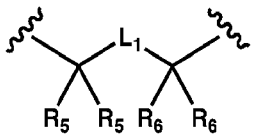




(Id) (IIc)

wherein, L is a substituted or unsubstituted C1-C10 alkylene group, a substituted or unsubstituted C2-C10 alkenylene group, a substituted or unsubstituted C2-C10 alkynylene group, a substituted or unsubstituted C1-C10 heteroalkylene group, a substituted or unsubstituted C2-C10 heteroalkenylene group, a substituted or unsubstituted C2-C10 heteroalkynylene group, a substituted or unsubstituted C3-C10 cycloalkylene group, a substituted or unsubstituted C3-C10 heterocycloalkylene group, a substituted or unsubstituted C6-C10 arylene group, or a substituted or unsubstituted C1-C10 heteroarylene group, or any combination thereof.

10. The compound according to Claim 11, wherein the linking group L is:



,

wherein

L_1 is a substituted or unsubstituted C1-C10 alkylene group, a substituted or unsubstituted C2-C10 alkenylene group, a substituted or unsubstituted C2-C10 alkynylene group, a substituted or

unsubstituted C1-C10 heteroalkylene group, a substituted or unsubstituted C2-C10 heteroalkenylene group, a substituted or unsubstituted C2-C10 heteroalkynylene group, a substituted or unsubstituted C3-C10 cycloalkylene group, a substituted or unsubstituted C3-C10 heterocycloalkylene group, a substituted or unsubstituted C6-C10 arylene group, or a substituted or unsubstituted C1-C10 heteroarylene group, and

R_5 and R_6 are each independently hydrogen or C1-C10 alkyl, wherein two R_5 and two R_6 are optionally connected to form a ring.

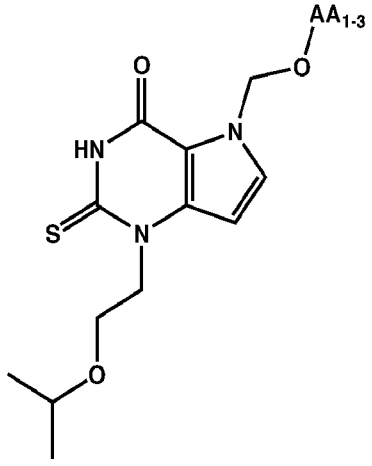
11. The compound according to Claim 10, wherein at least one R_5 is not hydrogen and at least one R_6 is not hydrogen.

12. The compound according to Claim 10, wherein at least one R_5 is a methyl group and at least one R_6 is a methyl group.

13. The compound according to Claim 10, wherein each R_5 is not hydrogen and each R_6 is not hydrogen.

14. The compound according to Claim 10, wherein each R_5 is a methyl group and each R_6 is a methyl group.

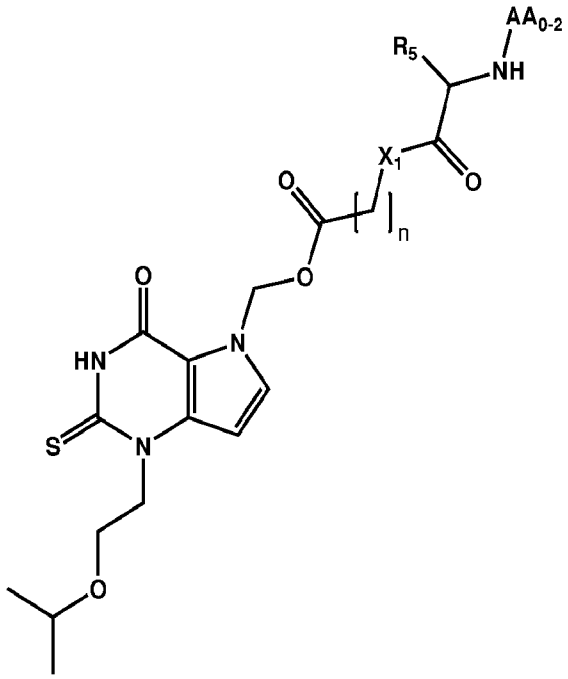
15. The compound according to Claim 1, wherein the compound is represented by Formula (III):



(III)

wherein, in Formula (V), AA_{1-3} is a moiety consisting of 1 to 3 natural amino acids linked through a peptide bond.

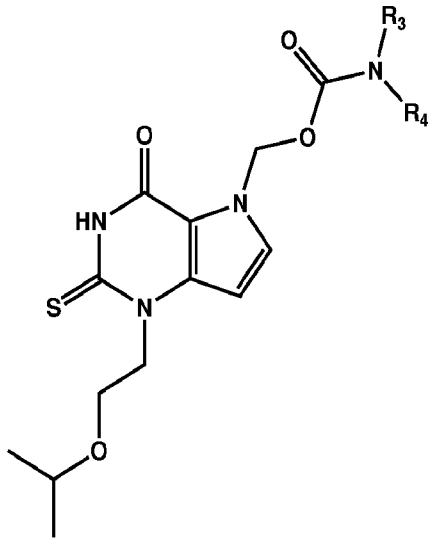
16. The compound according to Claim 1, wherein the compound is represented by Formula (IV):



(IV)

wherein, in Formula (IV), X_1 is S, O, or NH, R_5 is H or a side-chain group present in a natural amino acid, AA_{0-2} is H or a moiety consisting of 1 or 2 natural amino acids linked through a peptide bond, and n is an integer of 1 to 5.

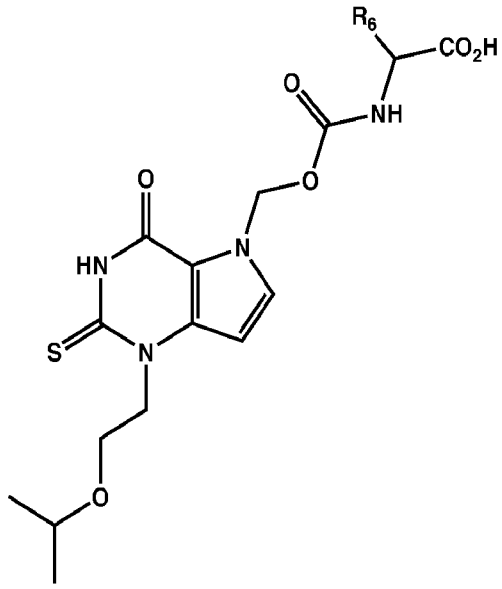
17. The compound according to Claim 1, wherein the compound is represented by Formula (V):



(V)

wherein, in Formula (V), R_3 and R_4 are each independently H, a substituted or unsubstituted C1-C10 alkyl group, a substituted or unsubstituted C2-C10 alkenyl group, a substituted or unsubstituted C2-C10 alkynyl group, a substituted or unsubstituted C1-C10 heteroalkyl group, a substituted or unsubstituted C2-C10 heteroalkenyl group, or a substituted or unsubstituted C2-C10 heteroalkynyl group.

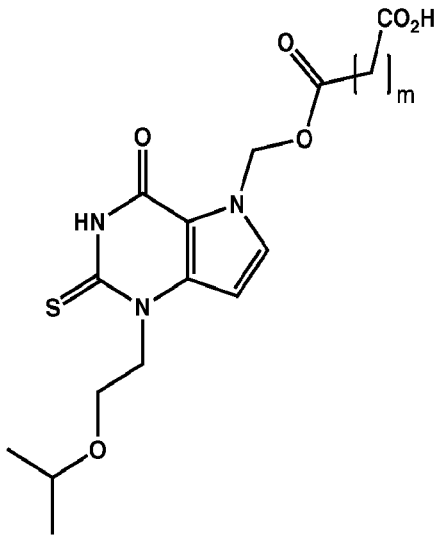
18. The compound according to Claim 1, wherein the compound is represented by Formula (VI):



(VI)

wherein, in Formula (VI), R_6 is H or a side-chain group present in a natural amino acid.

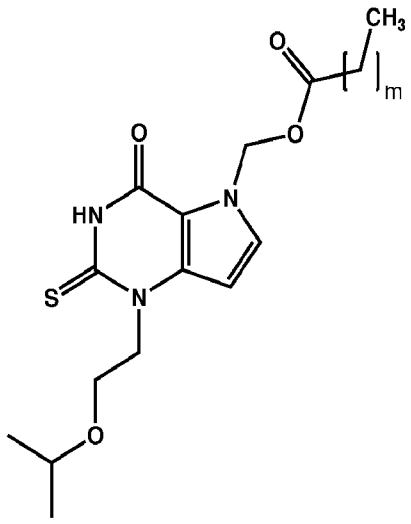
19. The compound according to Claim 1, wherein the compound is represented by Formula (VII):



(VII)

wherein, in Formula (VII), m is an integer of 1 to 25.

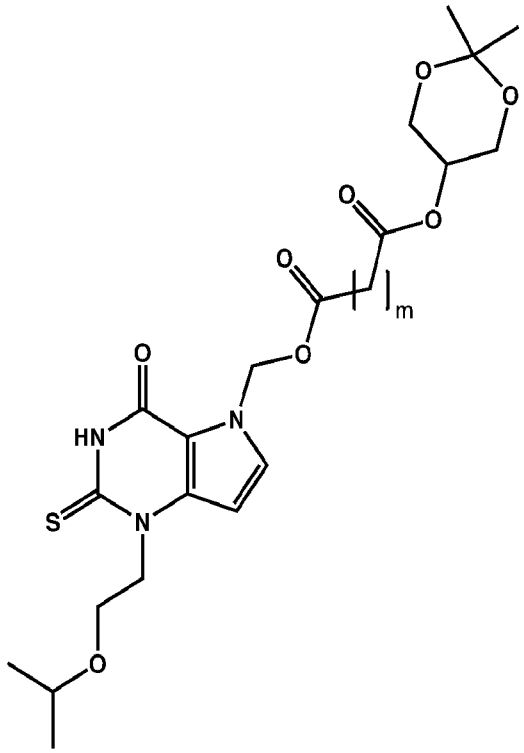
20. The compound according to Claim 1, wherein the compound is represented by Formula (VIII):



(VIII)

wherein, in Formula (VIII), m is an integer of 1 to 25.

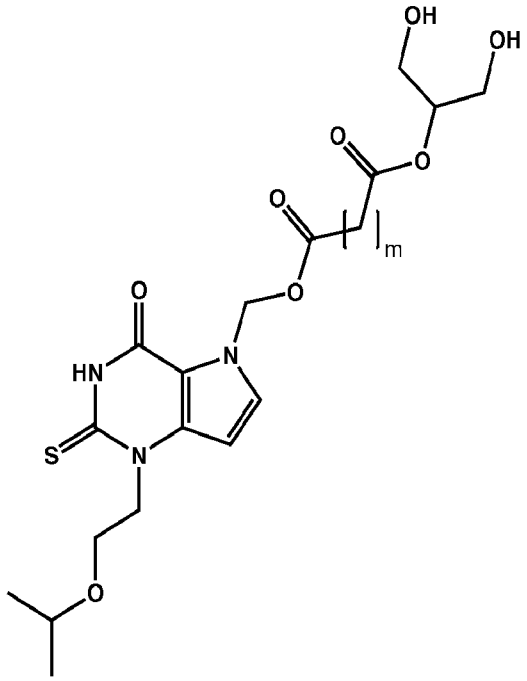
21. The compound according to Claim 1, wherein the compound is represented by Formula (IX):



(IX)

wherein, in Formula (IX), m is an integer of 1 to 25.

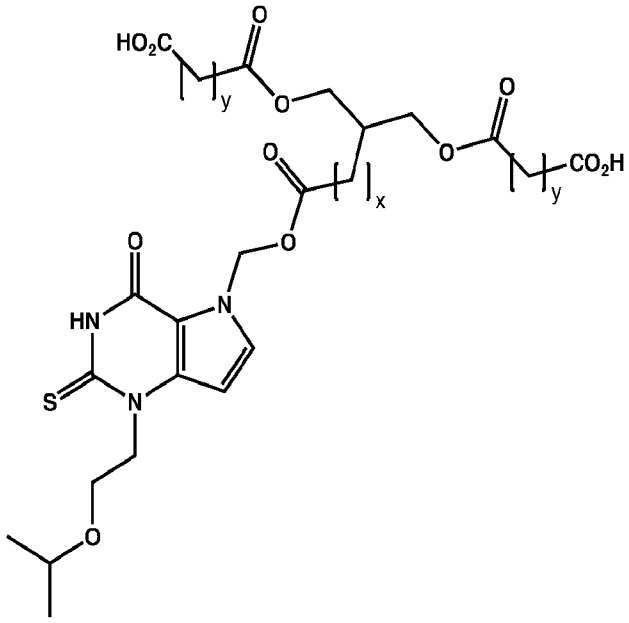
22. The compound according to Claim 1, wherein the compound is represented by Formula (X):



(X)

wherein, in Formula (X), m is an integer of 1 to 25.

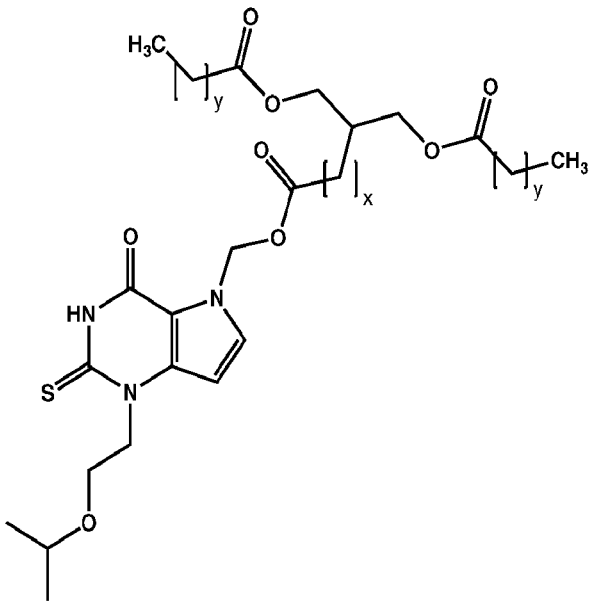
23. The compound according to Claim 1, wherein the compound is represented by Formula (XI):



(XI)

wherein, in Formula (XI), x and each y are independently an integer of 1 to 25.

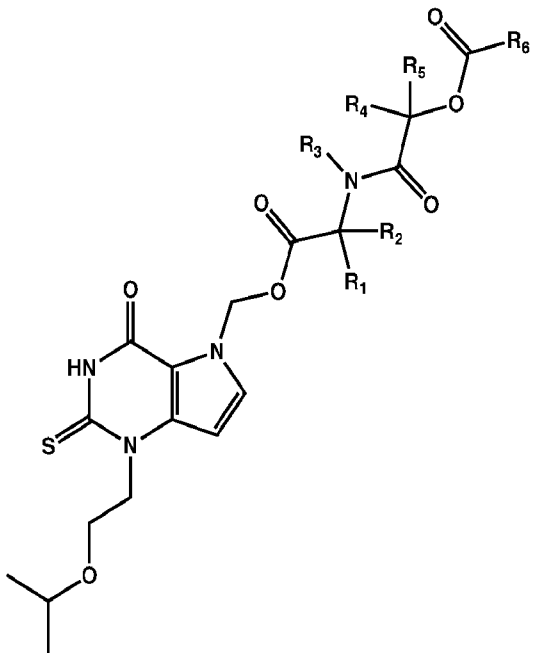
24. The compound according to Claim 1, wherein the compound is represented by Formula (XII):



(XII)

wherein, in Formula (XII), x and each y are independently an integer of 1 to 25.

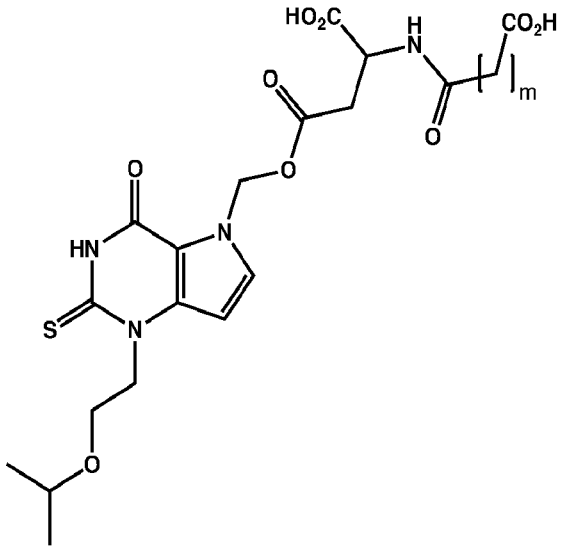
25. The compound according to Claim 1, wherein the compound is represented by Formula (XIII):



(XIII)

wherein, in Formula (XIII), R_1 to R_5 are each independently hydrogen or C1-C10 alkyl, and R_6 is hydrogen, C1-C10 alkyl, or C6-C10 aryl, wherein any of groups R_1 to R_5 are optionally connected to form a ring.

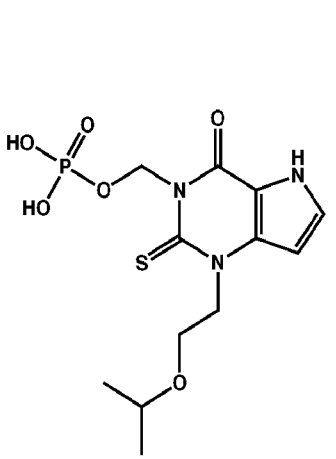
26. The compound according to Claim 1, wherein the compound is represented by Formula (XIV):

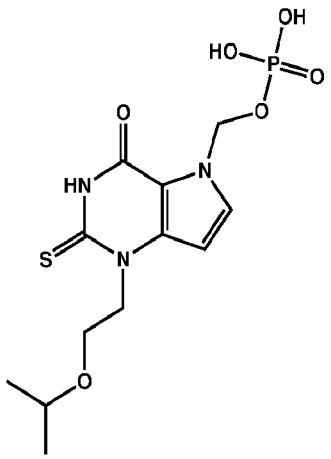


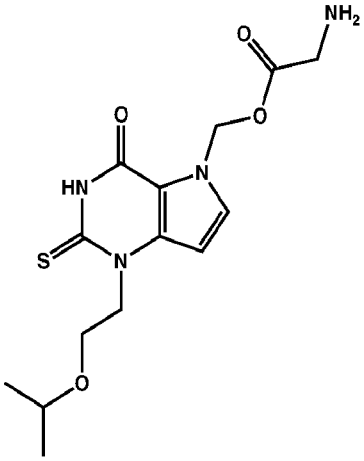
(XIV)

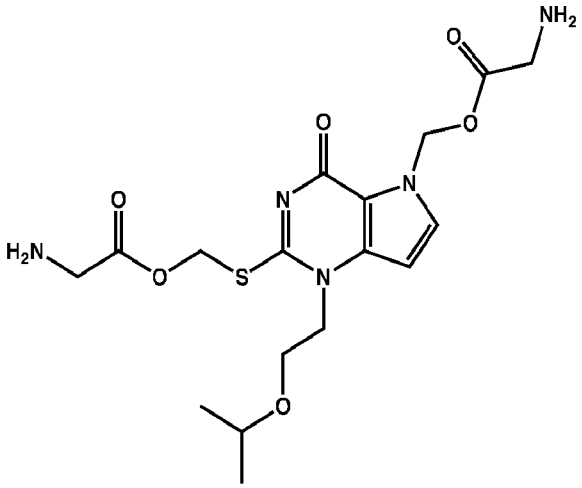
wherein, in Formula (XIV), m is an integer of 1 to 25.

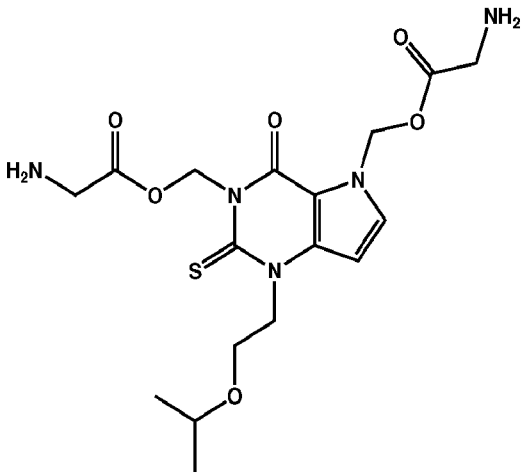
27. The compound according to Claim 1, wherein the compound is

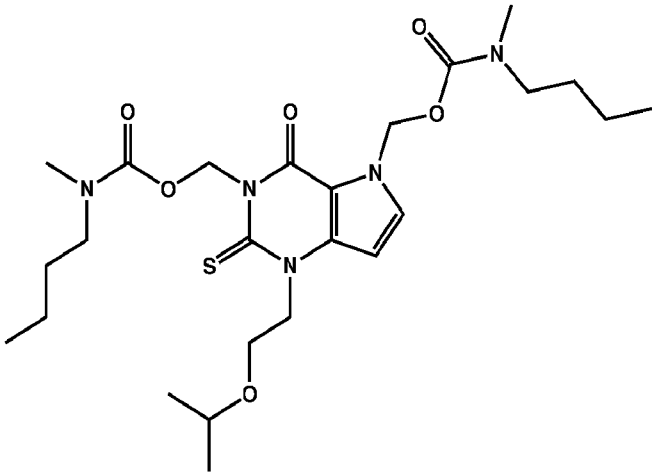


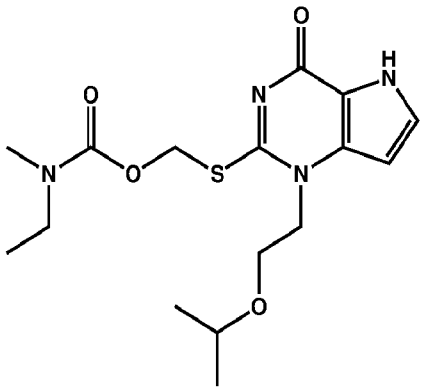


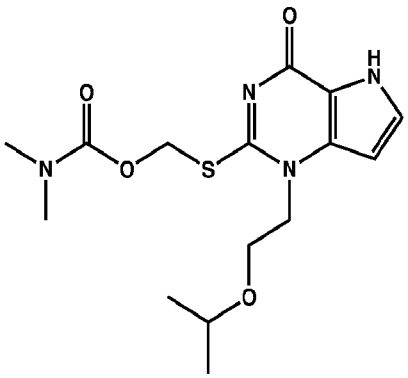


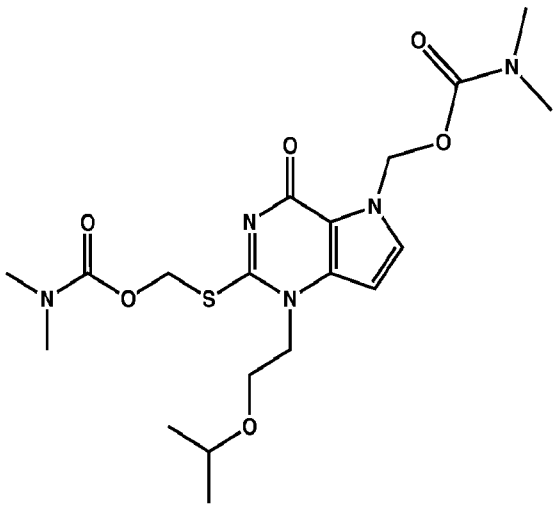


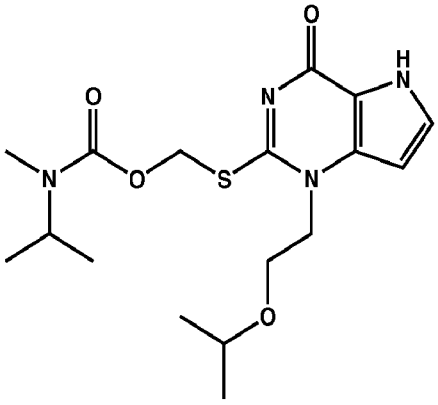


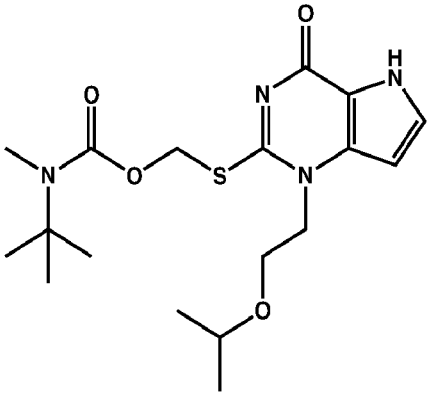


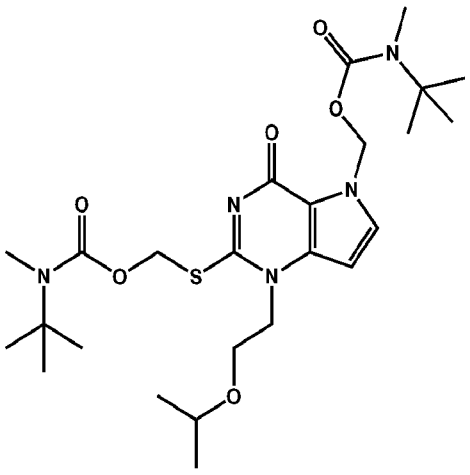


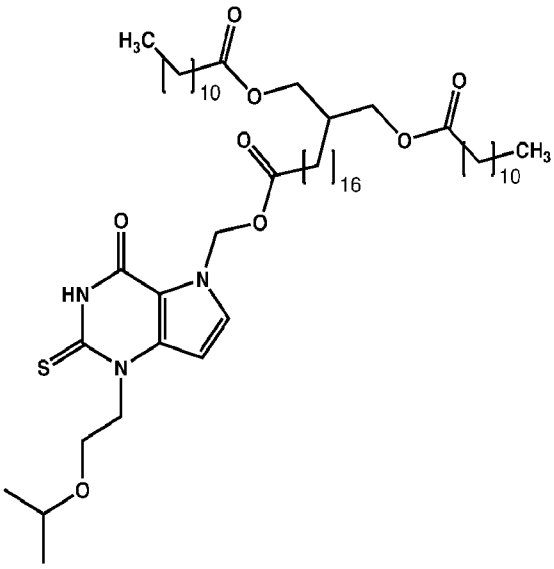


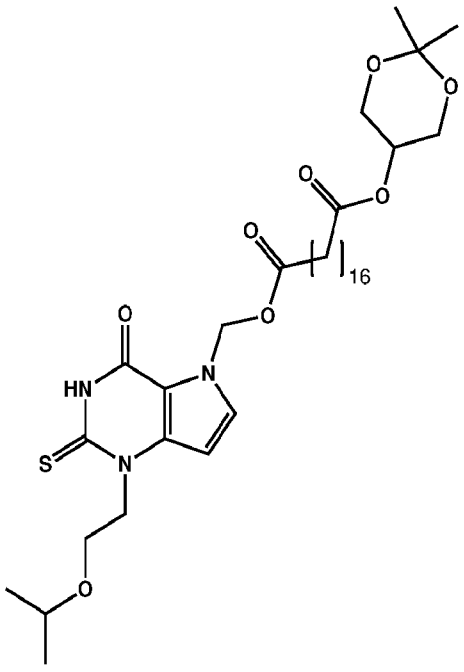


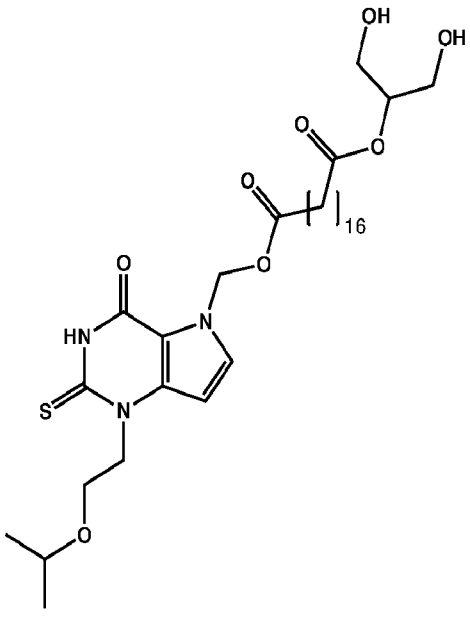












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28. A compound selected from Compounds 1 to 416 described in the present application.

29. A pharmaceutical composition comprising a therapeutically effective amount of a compound in accordance with any one of Claims 1-28.

30. The pharmaceutical composition of Claim 29 in the form of a tablet.

31. A ~~method of treating multiple system atrophy in a patient in need thereof, comprising administering to the patient a pharmaceutical composition comprising a therapeutically effective amount of a~~ compound in accordance with any one of Claims 1-28 for use in treating multiple system atrophy in a patient in need thereof.

32. A ~~method of treating amyotrophic lateral sclerosis in a patient in need thereof, comprising administering to the patient a pharmaceutical composition comprising a therapeutically effective amount of a~~ compound in accordance with any one of Claims 1-28 for use in treating amyotrophic lateral sclerosis in a patient in need thereof.

33. A ~~method of treating Huntington's disease in a patient in need thereof, comprising administering to the patient a pharmaceutical composition comprising a therapeutically effective amount of a~~ compound in accordance with any one of Claims 1-28 for use in treating Huntington's disease in a patient in need thereof.

34. A ~~method for neuroprotection, comprising administering to the patient a pharmaceutical composition comprising a therapeutically effective amount of a~~ compound in accordance with any one of Claims 1-28 for use in neuroprotection.

35. A kit for treating multiple system atrophy in a patient, the kit comprising:

(a) a pharmaceutical composition comprising a therapeutically effective amount of a compound in accordance with any one of Claims 1-28; and

(b) instructions for administering the pharmaceutical composition.

36. A kit for treating amyotrophic lateral sclerosis in a patient, the kit comprising:

(a) a pharmaceutical composition comprising a therapeutically effective amount of a compound in accordance with any one of Claims 1-28; and

(b) instructions for administering the pharmaceutical composition.

37. A kit for treating Huntington's disease in a patient, the kit comprising:

(a) a pharmaceutical composition comprising a therapeutically effective amount of a compound in accordance with any one of Claims 1-28; and

(b) instructions for administering the pharmaceutical composition.

38. A kit for neuroprotection, the kit comprising:

(a) a pharmaceutical composition comprising a therapeutically effective amount of a compound in accordance with any one of Claims 1-28; and

(b) instructions for administering the pharmaceutical composition.