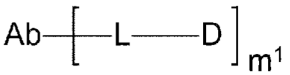
CLAIMS

1. An antibody-drug conjugate represented by the following formula (II):

[Formula 1]



(II)

wherein m^1 ranges from 1 to 10;

Ab represents an antibody or a functional fragment of the antibody, wherein the antibody optionally has a remodeled glycan,

wherein the antibody is any antibody selected from the group consisting of an anti-CD70 antibody, an anti-TROP2 antibody, and an anti-EGFR antibody, wherein

(i) the anti-CD70 antibody is an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 1 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 2 or an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 3 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 4;

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 112 of SEQ ID NO: 1 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 2 or an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 3 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 4; or

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 35, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 36, and CDRL3 consisting of an amino acid

sequence set forth in SEQ ID NO: 37 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 38, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 39, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 40 or an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 41, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 42, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 43 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 44, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 45, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 46;

(ii) the anti-TROP2 antibody is an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 5 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 6 or an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 7 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 8;

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 5 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 6 or an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 7 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 8; or

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 47, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 48, and CDRL3 consisting of an amino acid

sequence set forth in SEQ ID NO: 49 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 50, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 51, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 52 or an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 53, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 54, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 55 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 56, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 57, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 58;

(iii) the anti-EGFR antibody is an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 9 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 10 or an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 11 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 12;

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 9 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 119 of SEQ ID NO: 10 or an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 11 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 116 of SEQ ID NO: 12; or

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 59, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 60, and CDRL3 consisting of an amino acid

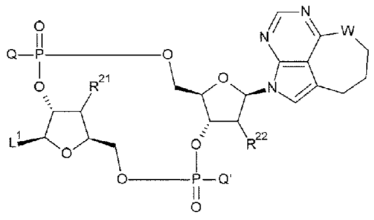
sequence set forth in SEQ ID NO: 61 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 62, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 63, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 64 or an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 65, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 66, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 67 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 68, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 69, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 70;

L represents a linker linking Ab and D, wherein

Ab may directly bond to L from an amino acid residue of Ab or may bond to L through the glycan or remodeled glycan of Ab;

D represents a compound represented by the following formula (I):

[Formula 2]



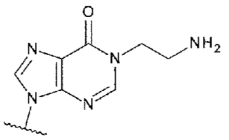
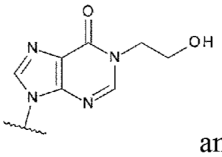
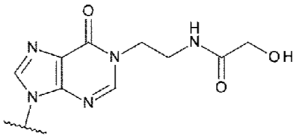
(I)

wherein

L bonds to any $-NH_2$ or a hydroxy group included in L^1,

L^1 represents any one group of the following three formulas:

[Formula 3]



and


wherein the wavy line represents a position of substitution,

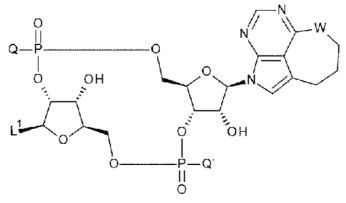
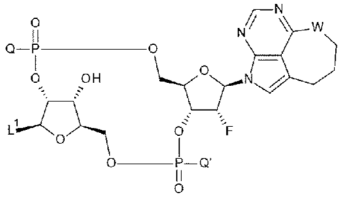
Q and Q' each independently represent a hydroxy group or a thiol group,

R^{21} and R^{22} each independently represent a hydroxy group or a fluorine atom, and

W represents -NH- or a sulfur atom.

2. The antibody-drug conjugate according to claim 1, wherein D is represented by any one of the following two formulas:

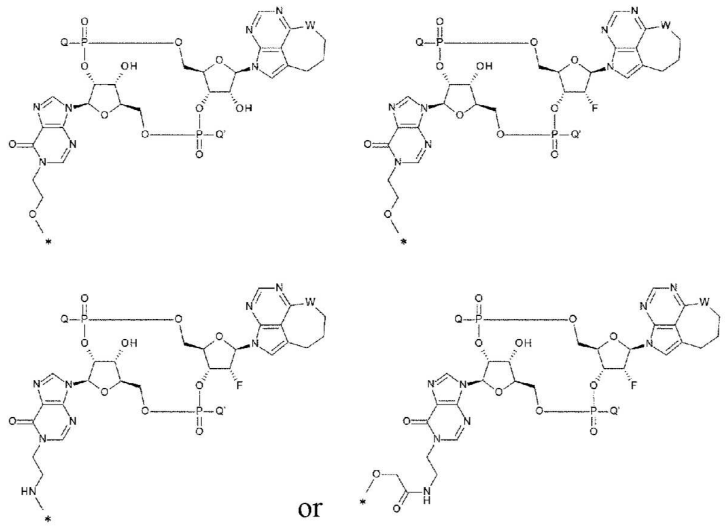
[Formula 4]


or


wherein L^1, Q, Q', and W are as defined above.

3. The antibody-drug conjugate according to claim 1 or 2, wherein D is represented by any one of the following four formulas:

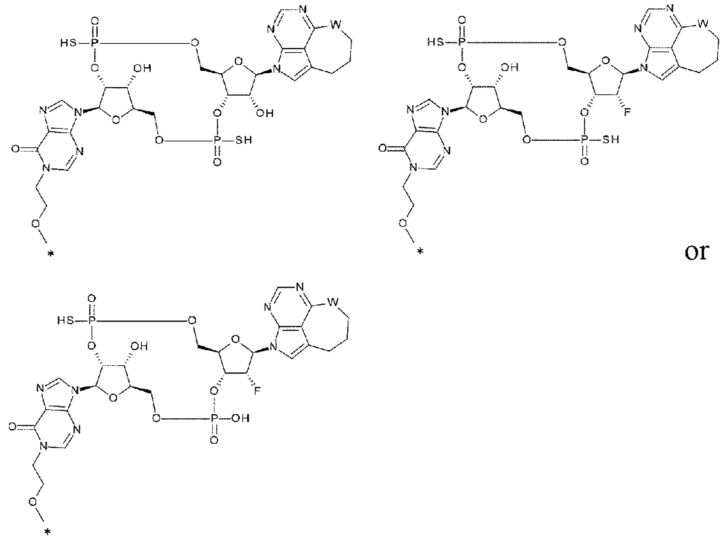
[Formula 5]



wherein the asterisk represents bonding to L, and Q, Q', and W are as defined above.

4. The antibody-drug conjugate according to any one of claims 1 to 3, wherein D is represented by any one of the following three formulas:

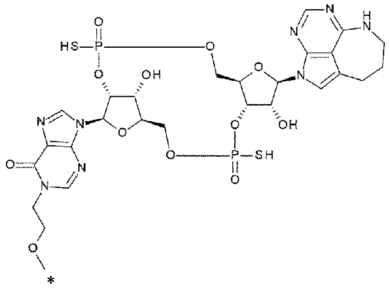
[Formula 6]

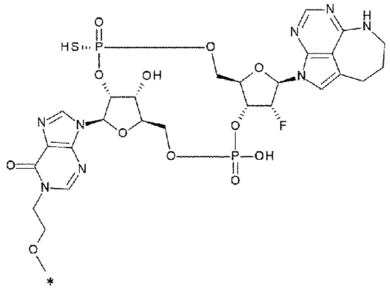


wherein the asterisk represents bonding to L, and W is as defined above.

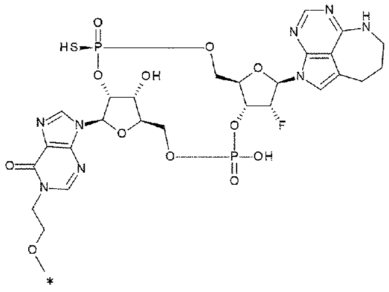
5. The antibody-drug conjugate according to any one of claims 1 to 4, wherein D is represented by any one of the following three formulas:

[Formula 7]





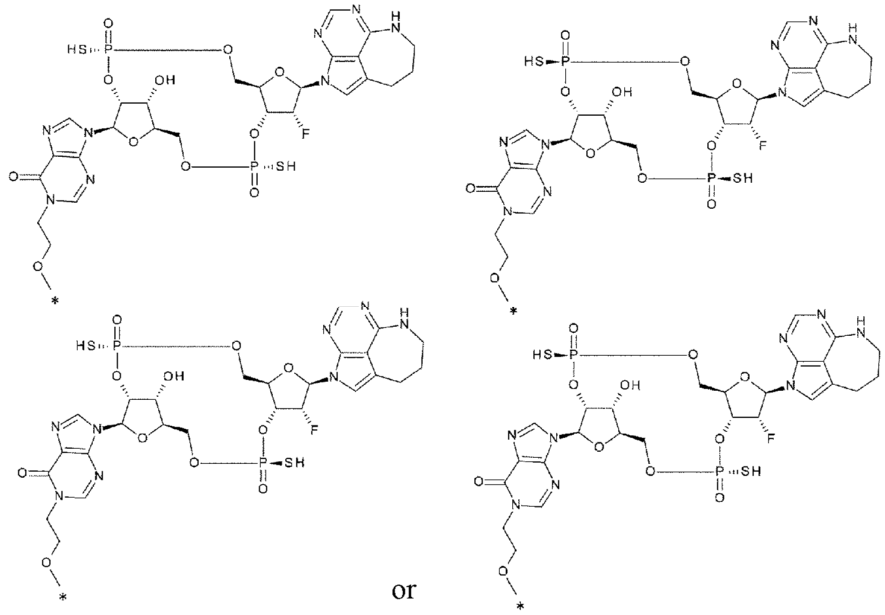
or



wherein the asterisk represents bonding to L.

6. The antibody-drug conjugate according to any one of claims 1 to 4, wherein D is represented by any one of the following four formulas:

[Formula 8]

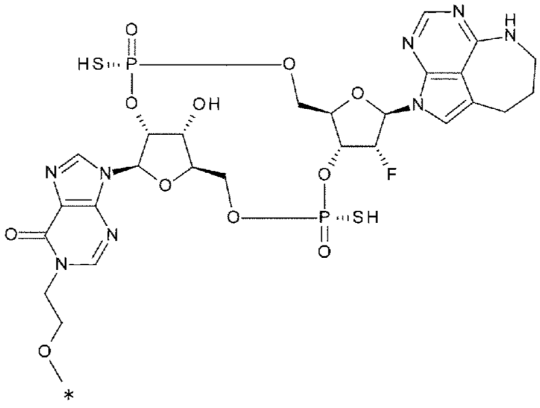


or

wherein the asterisk represents bonding to L.

7. The antibody-drug conjugate according to any one of claims 1 to 4 and 6, wherein D is represented by the following formula:

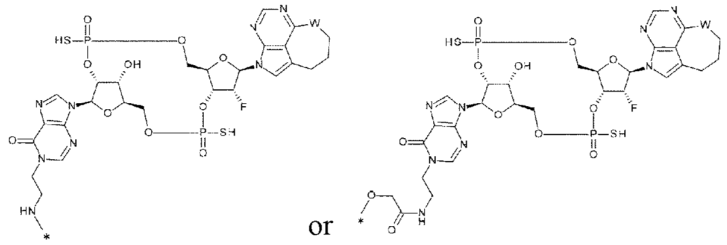
[Formula 9]



wherein the asterisk represents bonding to L.

8. The antibody-drug conjugate according to any one of claims 1 to 3, wherein D is represented by any one of the following two formulas:

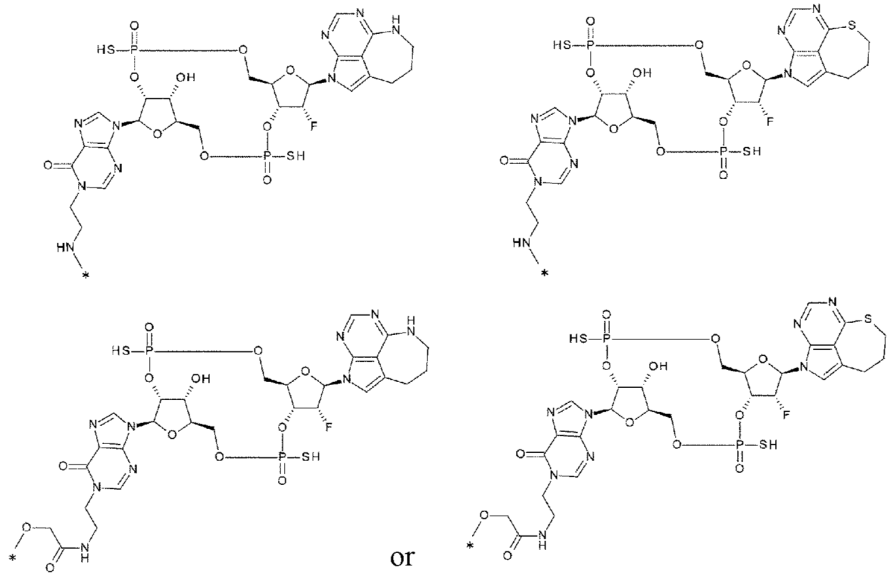
[Formula 10]



wherein the asterisk represents bonding to L, and W is as defined above.

9. The antibody-drug conjugate according to any one of claims 1 to 3 and 8, wherein D is represented by any one of the following four formulas:

[Formula 11]



wherein the asterisk represents bonding to L.

10. The antibody-drug conjugate according to any one of claims 1 to 9, wherein the linker L is represented by -Lb-La-Lp-Lc-*,

wherein the asterisk represents bonding to the drug D;

Lp represents a linker consisting of an amino acid sequence cleavable in a target cell or is absent;

La represents any one selected from the group consisting of the following:

-C(=O)-$(CH_2CH_2)n^2$-C(=O)-,

-C(=O)-$(CH_2CH_2)n^2$-CH_2-C(=O)-,

-C(=O)-$(CH_2CH_2)n^2$-C(=O)-NH-$(CH_2CH_2)n^3$-C(=O)-,

-C(=O)-$(CH_2CH_2)n^2$-C(=O)-NH-$(CH_2CH_2)n^3$-CH_2-C(=O)-,

-C(=O)-$(CH_2CH_2)n^2$-C(=O)-NH-$(CH_2CH_2O)n^3$-CH_2-C(=O)-,

-$(CH_2)n^4$-O-C(=O)-, and

-$(CH_2)n^9$-C(=O)-,

where n^2 represents an integer of 1 to 3, n^3 represents an integer of 1 to 5, n^4 represents an integer of 0 to 2, and n^9 represents an integer of 2 to 7;

Lb represents a spacer for bonding La to the glycan or remodeled glycan of Ab or a spacer for bonding La to a cysteine residue of Ab; and

Lc represents -NH-CH_2-, -NH-phenyl-CH_2-O(C=O)-, or -NH-heteroaryl-CH_2-O(C=O)-, or is absent.

11. The antibody-drug conjugate according to claim 10, wherein Lc is -NH-CH_2-.

12. The antibody-drug conjugate according to claim 10 or 11, wherein Lp is any one of -GGFG-, -GGPI-, -GGVA-, -GGFM-, -GGVCit-, -GGFCit-, -GGICit-, -GGPL-, -GGAQ-, or -GGPP-.

13. The antibody-drug conjugate according to claim 12, wherein Lp is -GGFG- or -GGPI-.

14. The antibody-drug conjugate according to any one of claims 10 to 13, wherein La represents any one selected from the group consisting of the following:

-C(=O)-CH_2CH_2-C(=O)-,

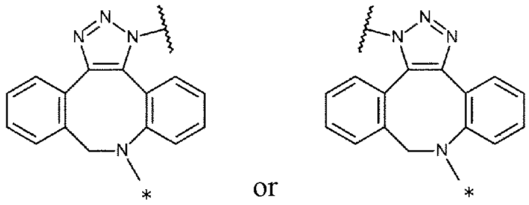
-C(=O)-CH_2CH_2-C(=O)-NH-$(CH_2CH_2O)_3$-CH_2-C(=O)-,

-C(=O)-CH_2CH_2-C(=O)-NH-$(CH_2CH_2O)_4$-CH_2-C(=O)-, and

-$(CH_2)_5$-C(=O)-.

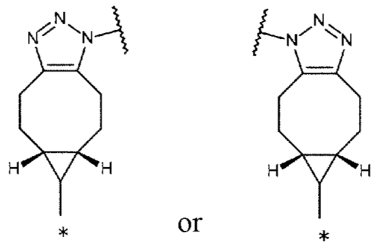
15. The antibody-drug conjugate according to any one of claims 10 to 14, wherein Lb is represented by any one of the following formulas:

[Formula 12]



or

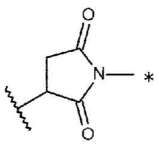
[Formula 13]



wherein, in the structural formula of Lb shown above, the asterisk represents bonding to La, and the wavy line represents bonding to the glycan or remodeled glycan of Ab.

16. The antibody-drug conjugate according to any one of claims 10 to 14, wherein Lb represents -(succinimid-3-yl-N)-, wherein -(succinimid-3-yl-N)- is represented by the following structural formula:

[Formula 14]



wherein the asterisk represents bonding to La, and the wavy line represents bonding to a side chain of a cysteine residue of the antibody by forming a thioether.

17. The antibody-drug conjugate according to any one of claims 10 to 15, wherein the linker L is represented by -Lb-La-Lp-Lc-*

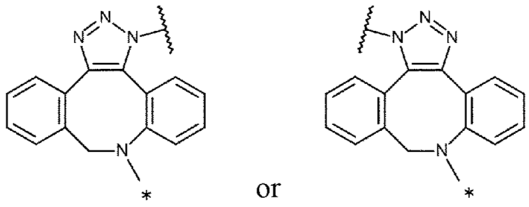
wherein the asterisk represents bonding to the drug D;

Lp is -GGFG- or -GGPI-;

La represents -C(=O)-CH_2CH_2-C(=O)-;

Lb represents the following formula:

[Formula 15]



wherein, in the structural formula of Lb shown above, the asterisk represents bonding to La, and the wavy line represents bonding to the glycan or remodeled glycan of Ab; and

Lc represents -NH-CH_2-.

18. The antibody-drug conjugate according to any one of claims 1 to 17, wherein the average number of the conjugated drug molecules per antibody molecule in the antibody-drug conjugate ranges from 1 to 10.

19. The antibody-drug conjugate according to claim 18, wherein the average number of the conjugated drug molecules per antibody molecule in the antibody-drug conjugate ranges from 1 to 5.

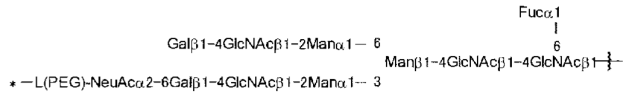
20. The antibody-drug conjugate according to claim 19, wherein the average number of the conjugated drug molecules per antibody molecule in the antibody-drug conjugate ranges from 3 to 5.

21. The antibody-drug conjugate according to any one of claims 1 to 20, wherein the antibody bonds via a glycan bonding to Asn297 of the antibody (N297 glycan) to L.

22. The antibody-drug conjugate according to claim 21, wherein the N297 glycan is a remodeled glycan.

23. The antibody-drug conjugate according to claim 21 or 22, wherein the N297 glycan is N297-(Fuc)MSG1 or N297-(Fuc)SG having a structure represented by the following formula:

[Formula 16]



[N297-(Fuc)MSG1]

wherein the wavy line represents bonding to Asn297 of the antibody,

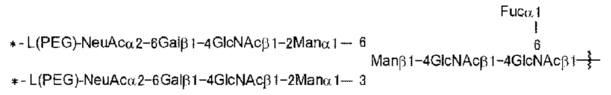
L(PEG) represents -$(CH_2$-$CH_2O)n^5$-CH_2-CH_2-NH-,

wherein the amino group at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal of a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 is an integer of 2 to 5;

[Formula 17]



[N297-(Fuc)SG]

wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents -$(CH_2$-$CH_2O)n^5$-CH_2-CH_2-NH-,

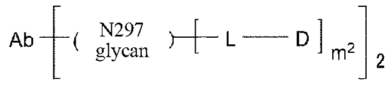
wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 is an integer of 2 to 5.

24. The antibody-drug conjugate according to any one of claims 21 to 23, wherein the antibody-drug conjugate is represented by the following formula:

[Formula 18]



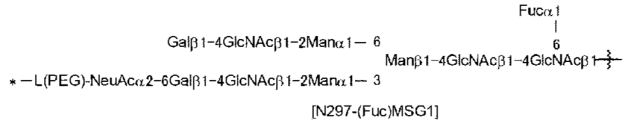
wherein m^2 represents an integer of 1 or 2,

L is a linker linking N297 glycan of Ab and D, as defined previously,

Ab represents an anti-CD70 antibody, an anti-TROP2 antibody, or an anti-EGFR antibody, or a functional fragment thereof,

N297 glycan of Ab is represented by N297-(Fuc)MSG1 or N297-(Fuc)SG having a structure represented by the following formula:

[Formula 19]



[N297-(Fuc)MSG1]

wherein the wavy line represents bonding to Asn297 of the antibody,

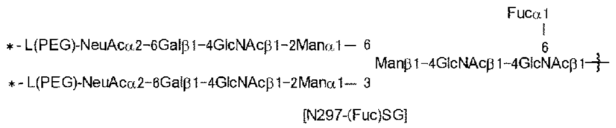
L(PEG) represents $-(CH_2-CH_2O)n^5-CH_2-CH_2-NH-$,

wherein the amino group at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal of a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 represents an integer of 2 to 5;

[Formula 20]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

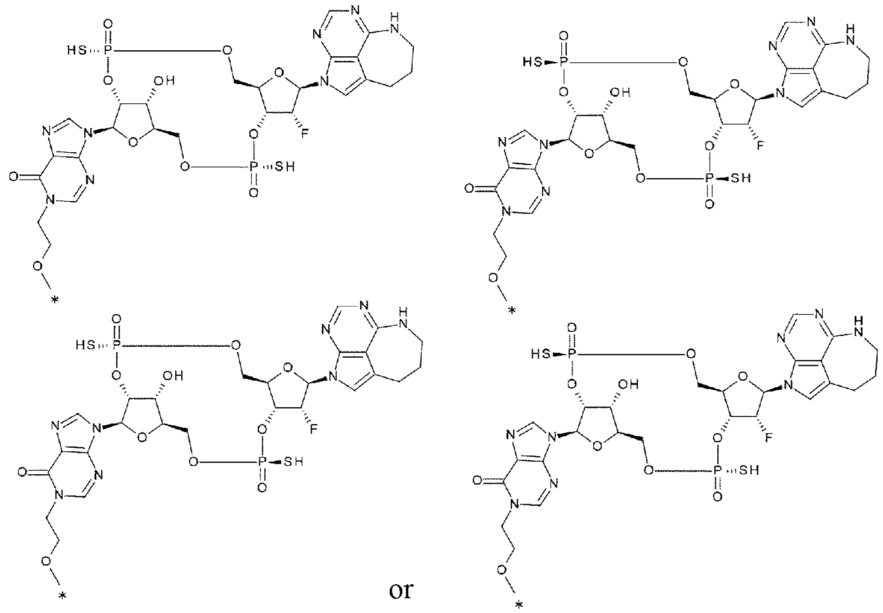
wherein the amino group at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 represents an integer of 2 to 5,

D is represented by any one of the following four formulas:

[Formula 21]

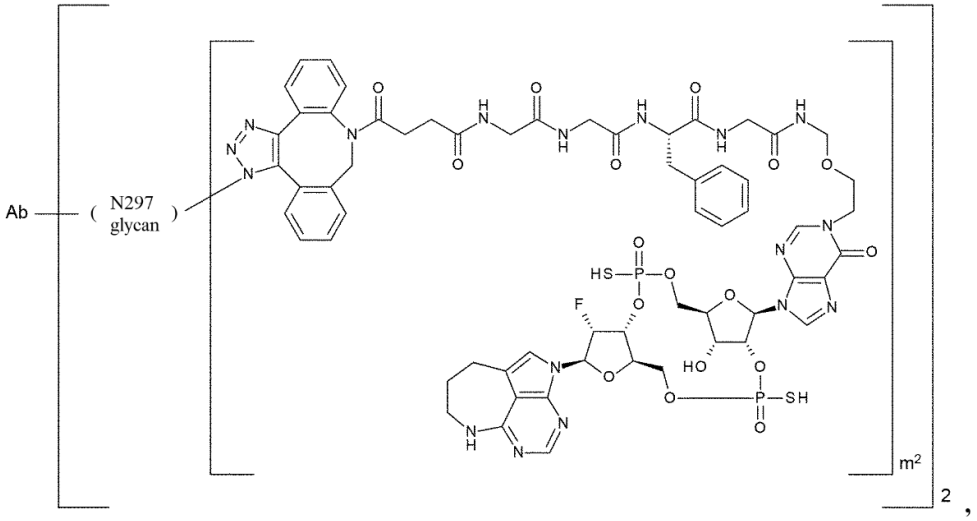


or

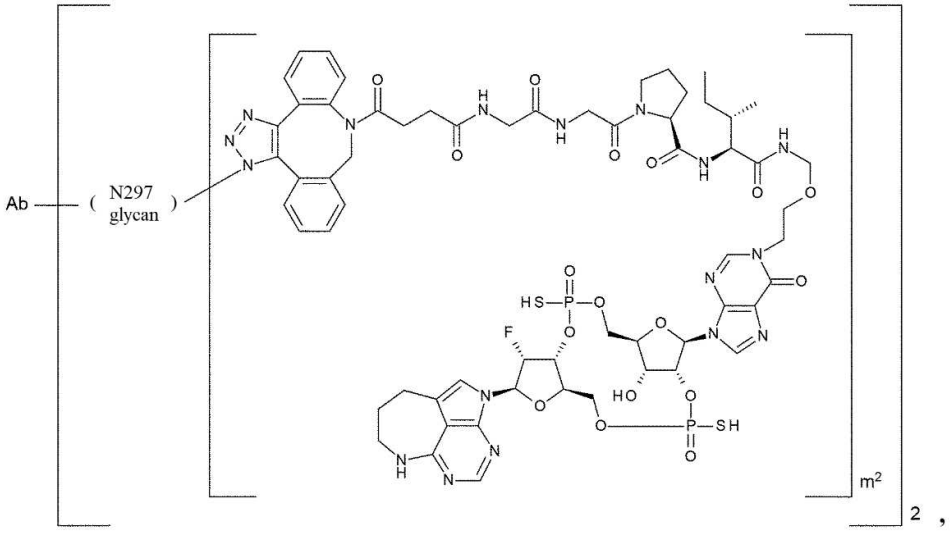
wherein the asterisk represents bonding to L.

25. The antibody-drug conjugate according to claim 24, wherein the antibody-drug conjugate is represented by the following formula selected from

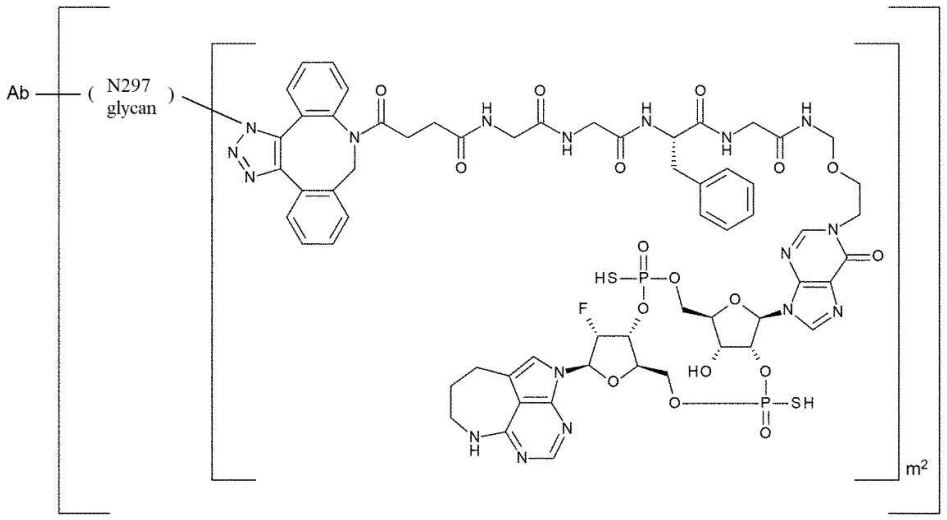
[Formula 22]



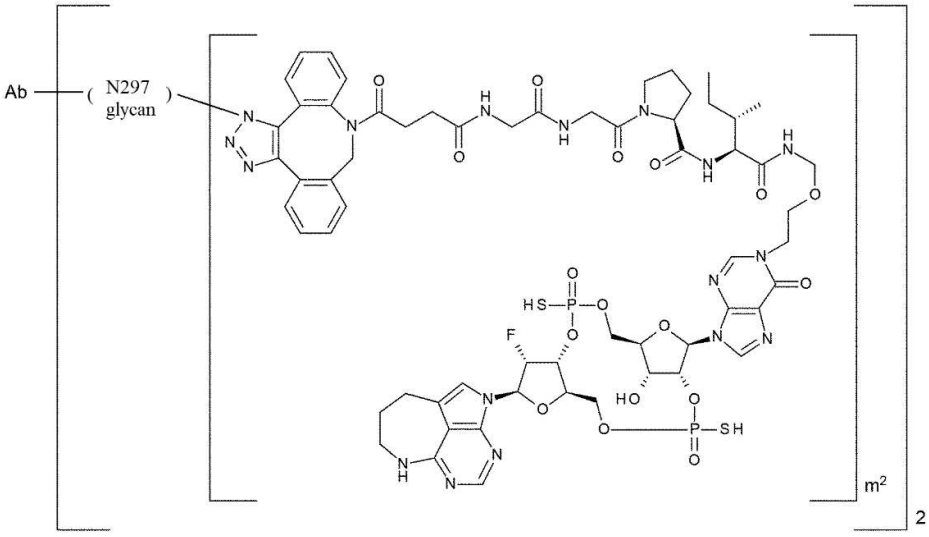
,



,



or

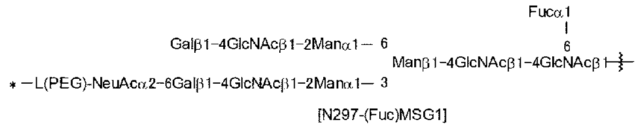


wherein, in each the structural formula shown above, m^2 is an integer of 1 or 2,

Ab represents an anti-CD70 antibody, an anti-TROP2 antibody, or an anti-EGFR antibody, or a functional fragment thereof,

N297 glycan of Ab is represented by any one of N297-(Fuc)MSG1 or N297-(Fuc)SG having a structure represented by the following formula:

[Formula 23]



wherein the wavy line represents bonding to Asn297 of the antibody,

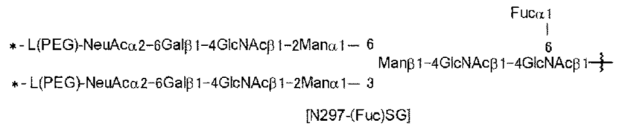
L(PEG) represents -(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-,

wherein the amino group at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal of a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 represents an integer of 2 to 5; or

[Formula 24]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents -(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-,

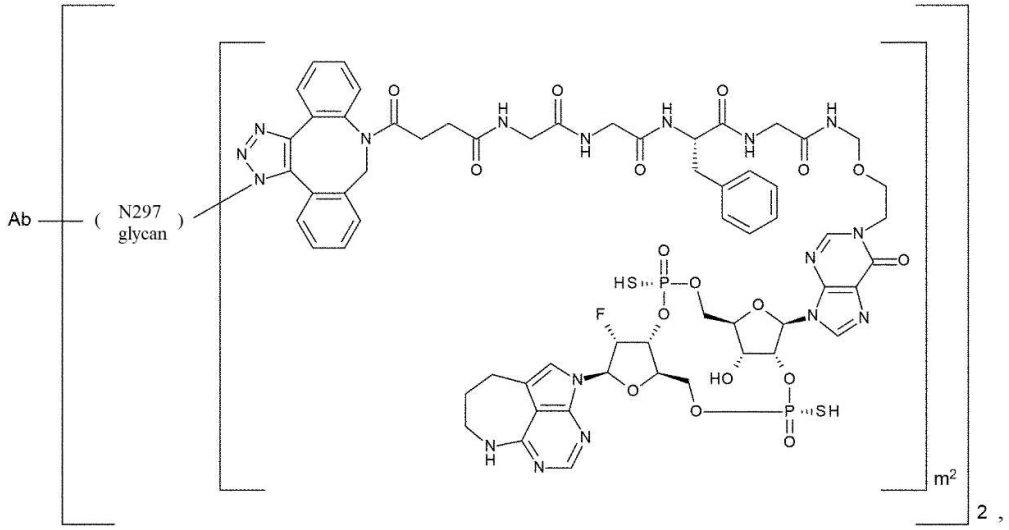
wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

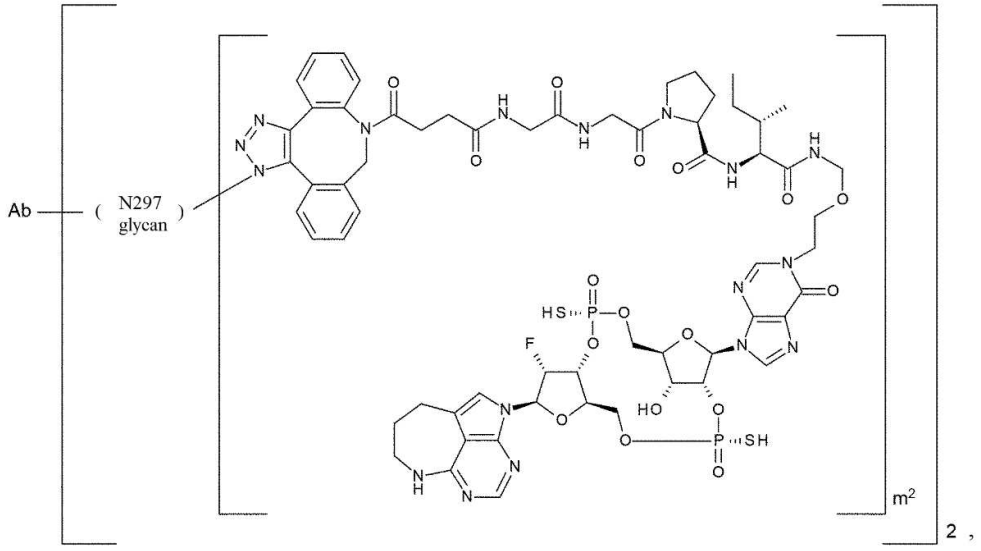
the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

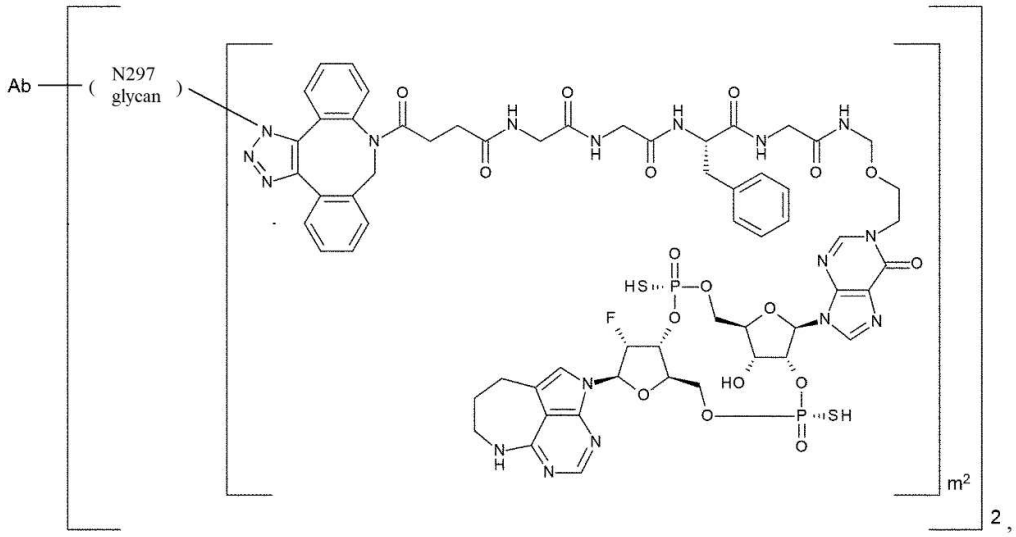
n^5 represents an integer of 2 to 5.

26. The antibody-drug conjugate according to claim 25, wherein the antibody-drug conjugate is represented by the following formula selected from

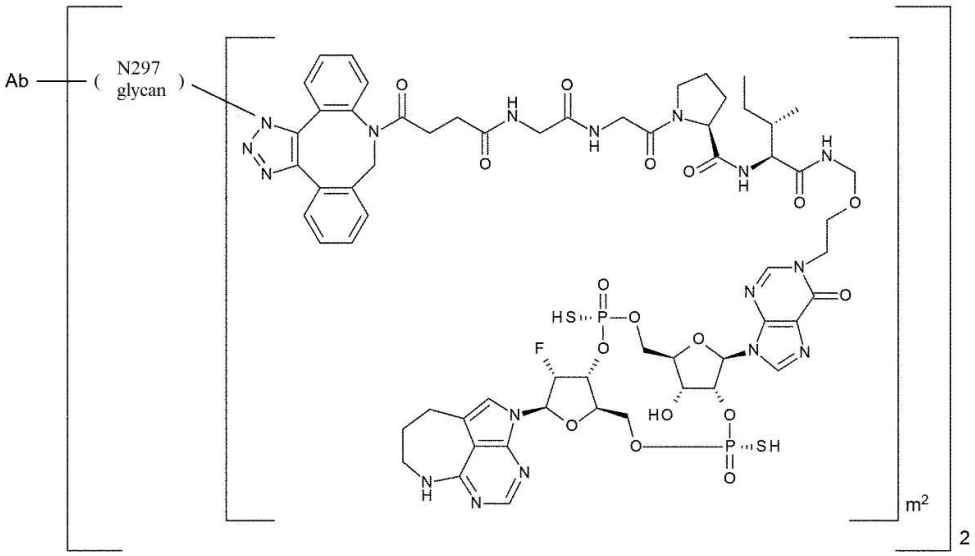
[Formula 25]


Ab
N297
glycan
m2
2


Ab
N297
glycan
m2
2



or

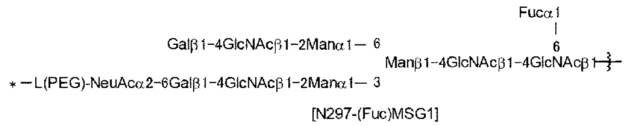


wherein, in each the structural formula shown above, m^2 is an integer of 1 or 2,

Ab represents an anti-CD70 antibody, an anti-TROP2 antibody, or an anti-EGFR antibody, or a functional fragment thereof,

N297 glycan of Ab is represented by any one of N297-(Fuc)MSG1 or N297-(Fuc)SG having a structure represented by the following formula:

[Formula 26]



wherein the wavy line represents bonding to Asn297 of the antibody,

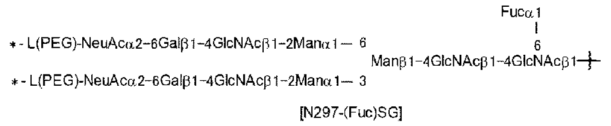
L(PEG) represents -$(CH_2$-CH_2-O)n^5-CH_2-CH_2-NH-,

wherein the amino group at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal of a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

n^5 represents an integer of 2 to 5; or

[Formula 27]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents -$(CH_2$-CH_2-O)n^5-CH_2-CH_2-NH-,

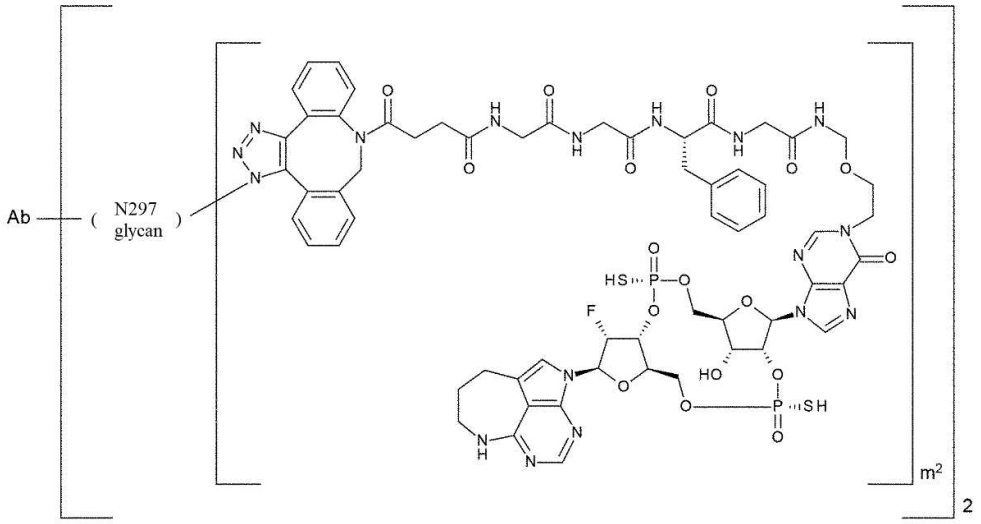
wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on 1,2,3-triazole ring of Lb in the linker L, and

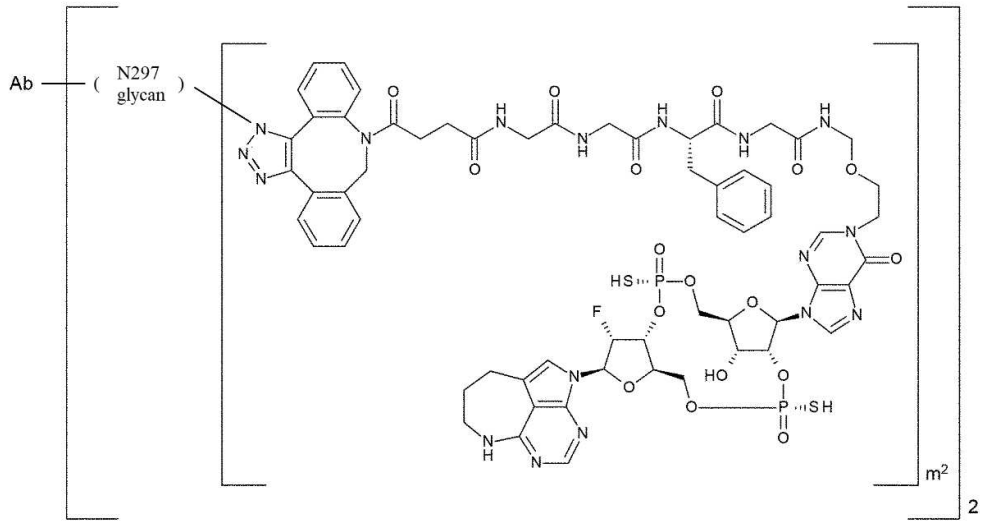
n^5 represents an integer of 2 to 5.

27. An antibody-drug conjugate represented by the following formula:

[Formula 28]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 1 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 2,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 3 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 4,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 5 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 6,

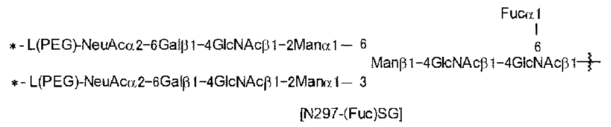
an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 7 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 8,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 9 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 10, and

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 11 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 12,

wherein N297 glycan of Ab is represented by the following formula:

[Formula 29]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan

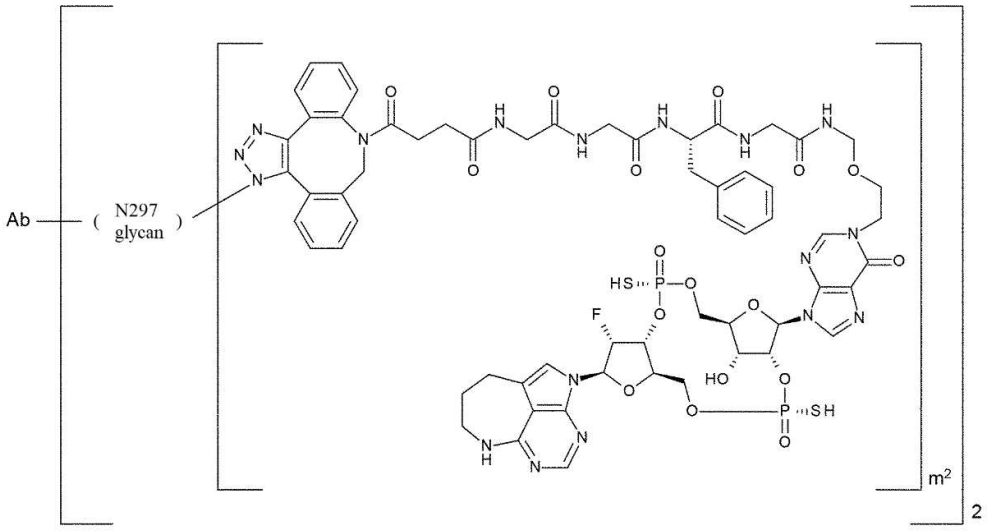
the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

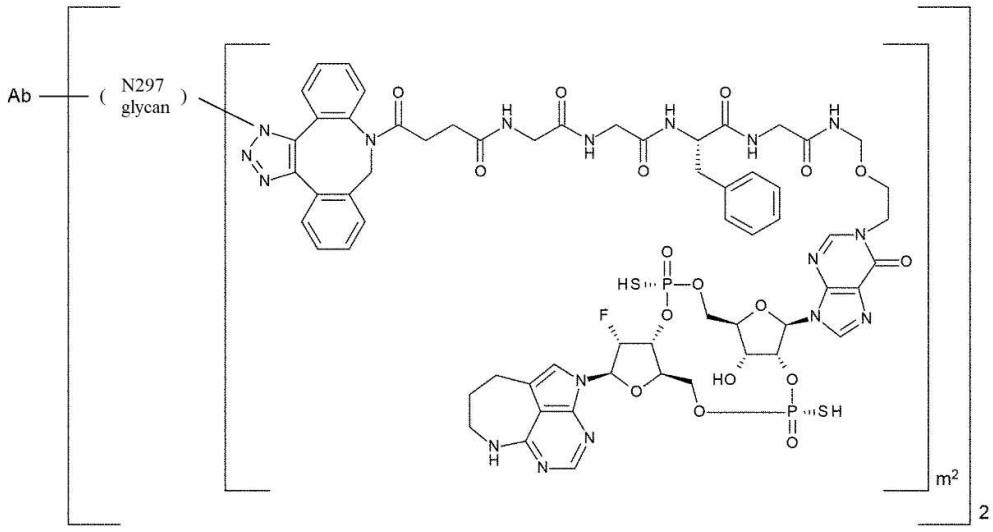
m^2 is 2.

28. An antibody-drug conjugate represented by the following formula:

[Formula 30]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 112 of SEQ ID NO: 1 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 2,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 3 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 4,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 5 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 6,

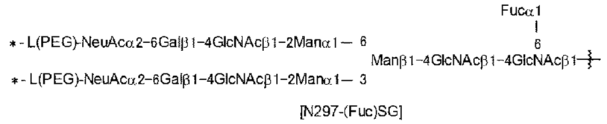
an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 7 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 8,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 9 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 119 of SEQ ID NO: 10, and

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 11 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 116 of SEQ ID NO: 12,

wherein N297 glycan of Ab is represented by the following formula:

[Formula 31]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

m^2 is 2.

29. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 112 of SEQ ID NO: 1 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 2.

30. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 3 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 4.

31. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 5 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 6.

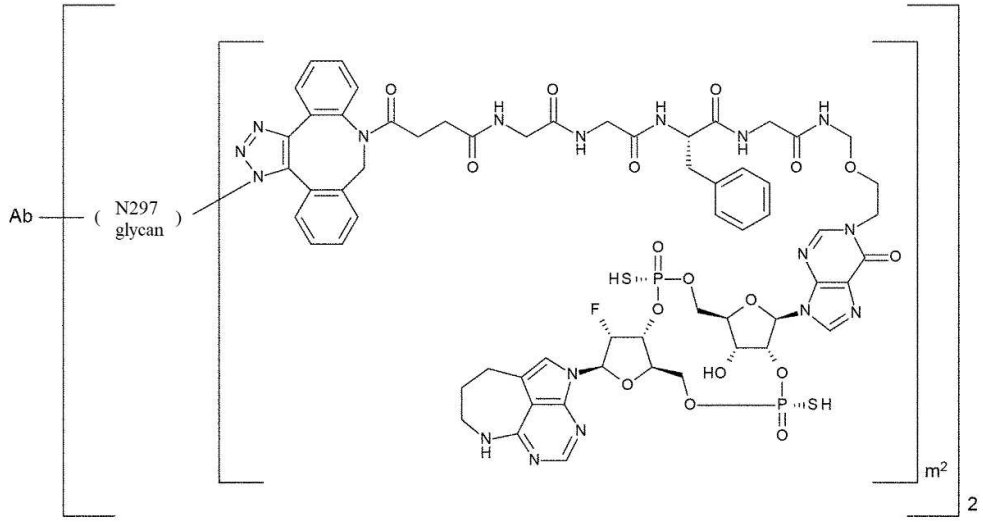
32. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 7 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 8.

33. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 9 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 119 of SEQ ID NO: 10.

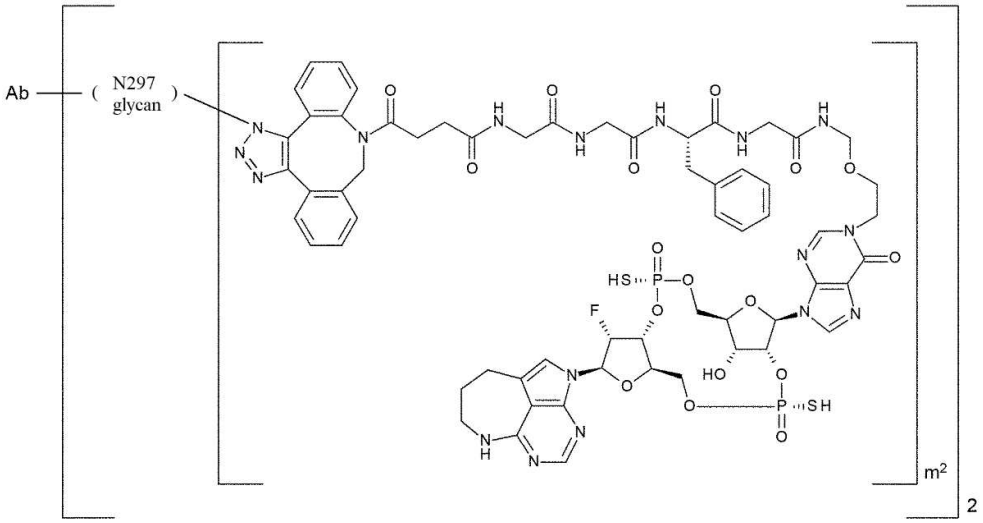
34. The antibody-drug conjugate according to claim 28, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 11 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 116 of SEQ ID NO: 12.

35. An antibody-drug conjugate represented by the following formula:

[Formula 32]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 35, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 36, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 37 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 38, CDRH2 consisting

of an amino acid sequence set forth in SEQ ID NO: 39, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 40,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 41, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 42, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 43 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 44, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 45, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 46,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 47, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 48, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 49 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 50, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 51, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 52,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 53, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 54, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 55 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 56, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 57, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 58,

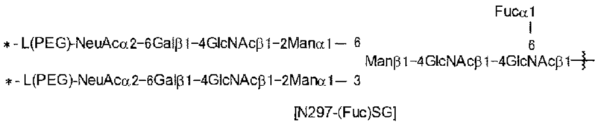
an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 59, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 60, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 61 and a heavy chain comprising CDRH1

consisting of an amino acid sequence set forth in SEQ ID NO: 62, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 63, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 64, and

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 65, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 66, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 67 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 68, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 69, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 70,

wherein N297 glycan of Ab is represented by the following formula:

[Formula 33]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on each of 1-3 and 1-6 branched chains of β-Man in the N297 glycan,

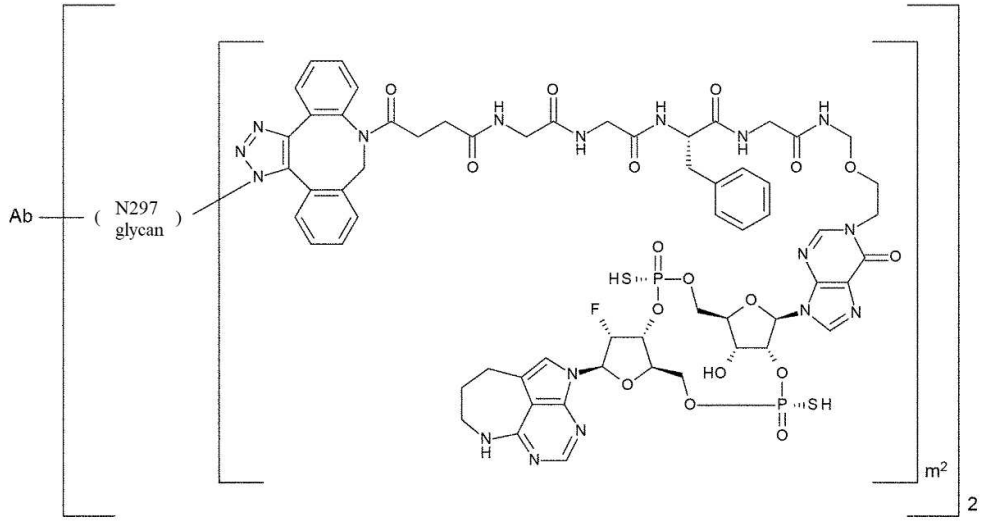
the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

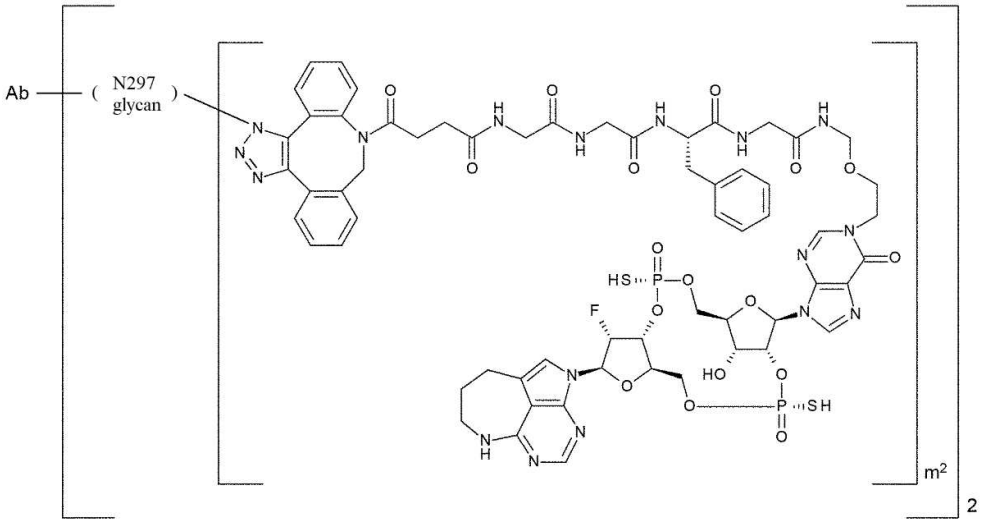
m^2 is 2.

36. An antibody-drug conjugate represented by the following formula:

[Formula 34]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 1 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 2,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 3 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 4,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 5 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 6,

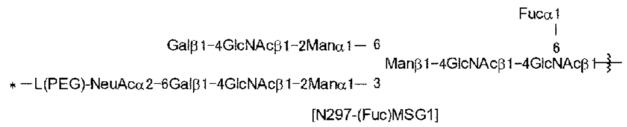
an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 7 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 8,

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 9 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 10, and

an antibody comprising a light chain consisting of an amino acid sequence set forth in SEQ ID NO: 11 and a heavy chain consisting of an amino acid sequence set forth in SEQ ID NO: 12,

wherein N297 glycan of Ab is represented by the following formula:

[Formula 35]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on a 1-3 branched chain of β-Man in the N297 glycan,

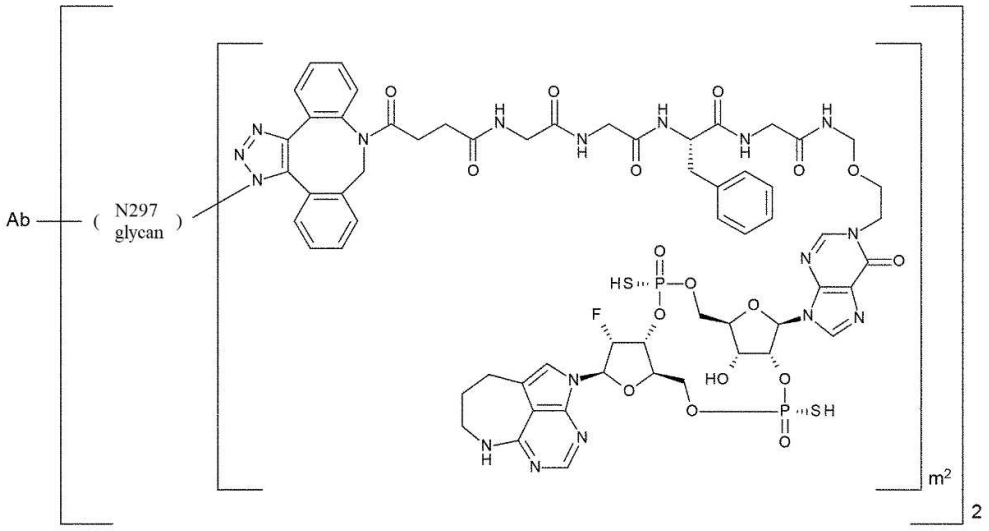
the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

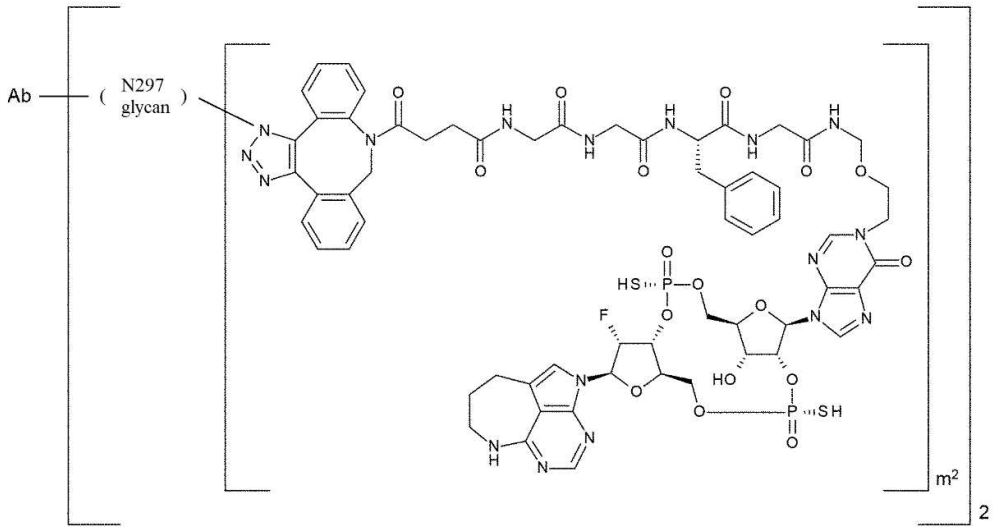
m^2 is 1.

37. An antibody-drug conjugate represented by the following formula:

[Formula 36]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 112 of SEQ ID NO: 1 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 2,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 3 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 4,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 5 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 6,

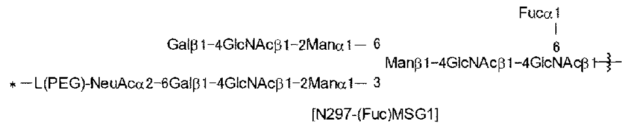
an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 7 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 8,

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 9 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 119 of SEQ ID NO: 10, and

an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 11 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 116 of SEQ ID NO: 12, wherein

N297 glycan of Ab is represented by the following formula:

[Formula 37]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

m^2 is 1.

38. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 112 of SEQ ID NO: 1 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 2.

39. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 3 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 118 of SEQ ID NO: 4.

40. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 5 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 6.

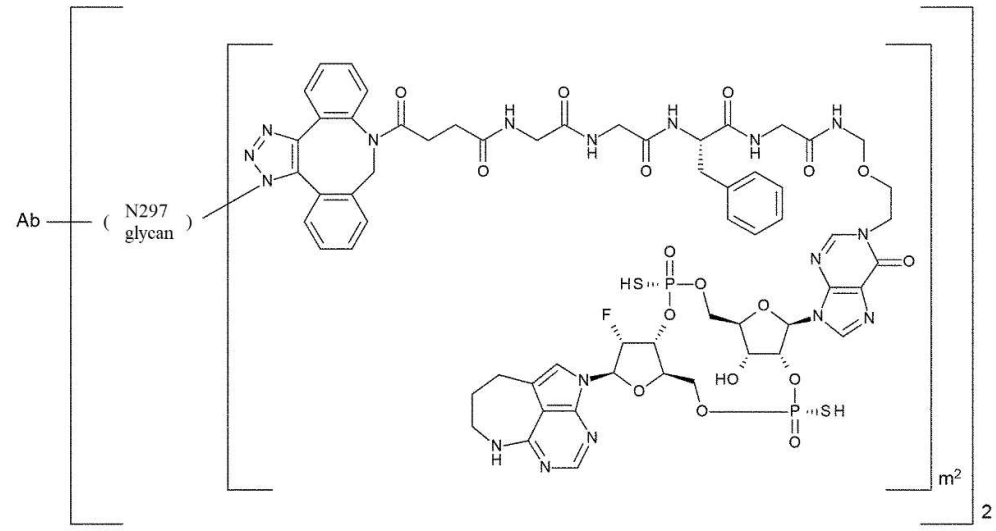
41. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 7 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 121 of SEQ ID NO: 8.

42. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 9 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 119 of SEQ ID NO: 10.

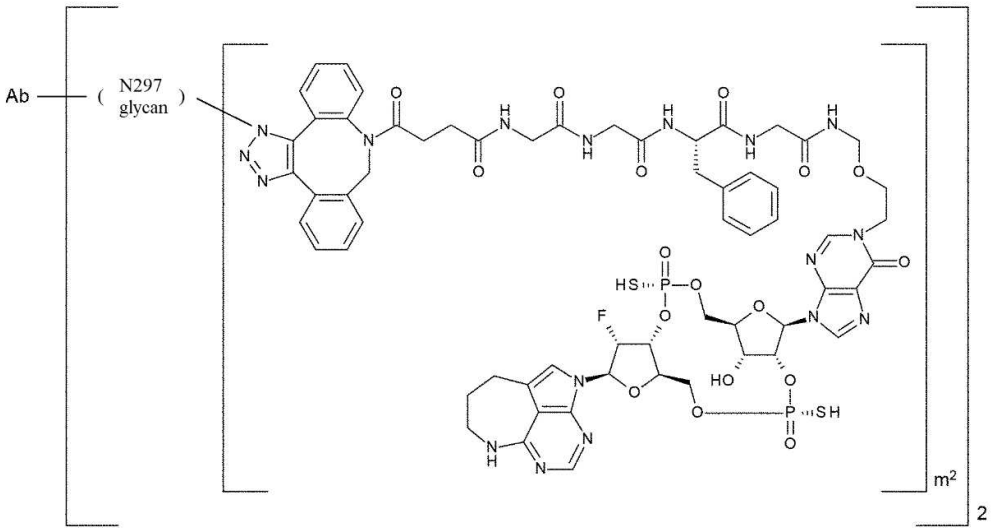
43. The antibody-drug conjugate according to claim 37, wherein the antibody is an antibody comprising a light chain comprising a light chain variable region consisting of amino acid residues 1 to 108 of SEQ ID NO: 11 and a heavy chain comprising a heavy chain variable region consisting of amino acid residues 1 to 116 of SEQ ID NO: 12.

44. An antibody-drug conjugate represented by the following formula:

[Formula 38]



or



wherein Ab represents any one selected from the group consisting of the following:

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 35, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 36, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 37 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 38, CDRH2 consisting

of an amino acid sequence set forth in SEQ ID NO: 39, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 40,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 41, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 42, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 43 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 44, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 45, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 46,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 47, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 48, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 49 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 50, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 51, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 52,

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 53, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 54, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 55 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 56, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 57, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 58,

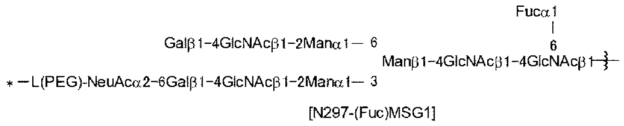
an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 59, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 60, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 61 and a heavy chain comprising CDRH1

consisting of an amino acid sequence set forth in SEQ ID NO: 62, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 63, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 64, and

an antibody comprising a light chain comprising CDRL1 consisting of an amino acid sequence set forth in SEQ ID NO: 65, CDRL2 consisting of an amino acid sequence set forth in SEQ ID NO: 66, and CDRL3 consisting of an amino acid sequence set forth in SEQ ID NO: 67 and a heavy chain comprising CDRH1 consisting of an amino acid sequence set forth in SEQ ID NO: 68, CDRH2 consisting of an amino acid sequence set forth in SEQ ID NO: 69, and CDRH3 consisting of an amino acid sequence set forth in SEQ ID NO: 70,

wherein N297 glycan of Ab is represented by the following formula:

[Formula 39]



wherein the wavy line represents bonding to Asn297 of the antibody,

L(PEG) represents $-(CH_2-CH_2-O)n^5-CH_2-CH_2-NH-$,

wherein the amino groups at the right end of the L(PEG) is bound via an amide bond to a carboxyl group at the 2-position on a sialic acid at the non-reducing terminal on a 1-3 branched chain of β-Man in the N297 glycan,

the asterisk represents bonding to a nitrogen atom at 1- or 3-position on the 1,2,3-triazole ring,

n^5 is 3, and

m^2 is 1.

45. The antibody-drug conjugate according to any one of claims 1 to 44, wherein one or two amino acids are deleted at a heavy chain carboxyl terminus.

46. The antibody-drug conjugate according to any one of claims 1 to 45, wherein the antibody or an antigen-binding fragment of the antibody is a protein produced in appropriate host cells by using an antibody gene which is modified by genetic engineering.

47. A STING agonist comprising the antibody-drug conjugate according to any one of claims 1 to 46.

48. A pharmaceutical composition comprising the antibody-drug conjugate according to any one of claims 1 to 46.

49. An anti-tumor agent comprising the antibody-drug conjugate according to any one of claims 1 to 46.

50. The anti-tumor agent according to claim 49, wherein the tumor is lung cancer, kidney cancer, urothelial cancer, colorectal cancer, prostate cancer, glioblastoma multiforme, ovarian cancer, pancreatic cancer, breast cancer, melanoma, liver cancer, bladder cancer, gastric cancer, esophageal cancer, endometrial cancer, testicular cancer, cervical cancer, placental choriocarcinoma, brain tumor, head and neck cancer, thyroid cancer, mesothelioma, gastrointestinal stromal tumor (GIST), gallbladder cancer, bile duct cancer, adrenal cancer, squamous-cell carcinoma, pharyngeal cancer, tongue cancer, auditory organ cancer, thymus cancer, small intestine cancer, leukemia, malignant lymphoma, plasmacytoma, myeloma, or sarcoma.

51. The anti-tumor agent according to claim 49 or 50, wherein the tumor is lung cancer, kidney cancer, urothelial cancer, colorectal cancer, prostate cancer, glioblastoma multiforme, ovarian cancer, pancreatic cancer, breast cancer, melanoma, liver cancer, bladder cancer, gastric cancer, esophageal cancer, endometrial cancer, cervical cancer, brain tumor, head and neck cancer, thyroid cancer, mesothelioma, gastrointestinal stromal tumor (GIST), gallbladder cancer, bile

duct cancer, squamous-cell carcinoma, pharyngeal cancer, tongue cancer, thymus cancer, or small intestine cancer.

52. The antibody-drug conjugate according to any one of claims 1 to 46, the STING agonist according to claim 47, the pharmaceutical composition according to claim 48, or the anti-tumor agent according to claim 49 to 51, for use in the treatment of cancer.

53. The antibody-drug conjugate, the STING agonist, the pharmaceutical composition or the anti-tumor agent according to claim 52, wherein the cancer is lung cancer, kidney cancer, urothelial cancer, colorectal cancer, prostate cancer, glioblastoma multiforme, ovarian cancer, pancreatic cancer, breast cancer, melanoma, liver cancer, bladder cancer, gastric cancer, esophageal cancer, endometrial cancer, testicular cancer, cervical cancer, placental choriocarcinoma, brain tumor, head and neck cancer, thyroid cancer, mesothelioma, gastrointestinal stromal tumor (GIST), gall bladder cancer, bile duct cancer, adrenal cancer, squamous-cell carcinoma, pharyngeal cancer, tongue cancer, auditory organ cancer, thymus cancer, small intestine cancer, leukemia, malignant lymphoma, plasmacytoma, myeloma, or sarcoma.

54. The antibody-drug conjugate, the STING agonist, the pharmaceutical composition or the anti-tumor agent according to claim 42 or 53, wherein the cancer is lung cancer, kidney cancer, urothelial cancer, colorectal cancer, prostate cancer, glioblastoma multiforme, ovarian cancer, pancreatic cancer, breast cancer, melanoma, liver cancer, bladder cancer, gastric cancer, esophageal cancer, endometrial cancer, cervical cancer, brain tumor, head and neck cancer, thyroid cancer, mesothelioma, gastrointestinal stromal tumor (GIST), gallbladder cancer, bile duct cancer, squamous-cell carcinoma, pharyngeal cancer, tongue cancer, thymus cancer, or small intestine cancer.

55. The antibody-drug conjugate according to any one of claims 1 to 26, wherein the antibody or an antigen-binding fragment of the antibody is an anti-CD70 antibody or an antigen-binding fragment of the antibody and the antibody-drug conjugate exerts an antibody target-dependent anti-tumor effect in BALB/c-nu mouse subcutaneously transplanted with Caki-1 cells, a human kidney cancer cell line.

56. The antibody-drug conjugate according to any one of claims 36 to 44, wherein the antibody-drug conjugate exerts a more potent anti-tumor effect than the antibody included in the antibody-drug conjugate in an animal of the following (i) or (ii):

(i) BALB/c mouse subcutaneously transplanted with CT26.WT (CRL2638), a mouse colorectal cancer cell line transfected with, a gene encoding a human-mouse chimeric antigen, in which an epitope site on the antigen of the antibody included in the antibody-drug conjugate is replaced by a human type counterpart,;

(ii) BALB/c-nu mouse subcutaneously transplanted with A-498 (HTB-44) cells, a human kidney cancer cell line.