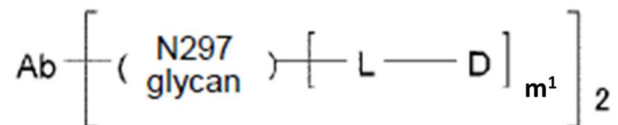


CLAIMS

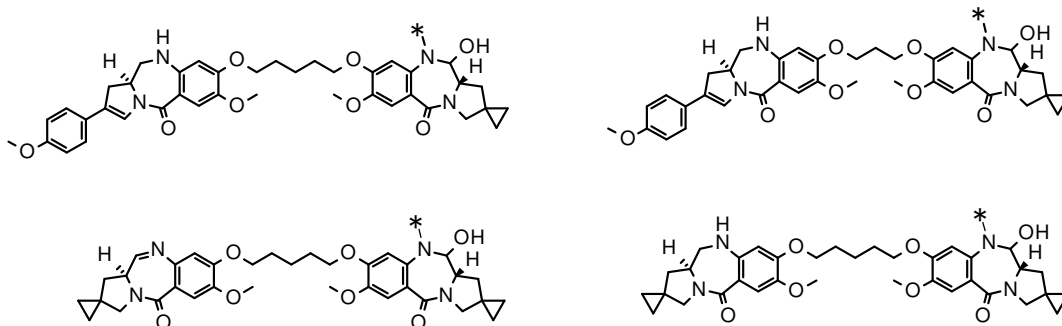
1. An antibody-drug conjugate represented by the following formula:



wherein

m^1 represents an integer of 1 to 2;

D represents a drug represented by one of the following formulas:



wherein the asterisk represents bonding to L;

L is a linker linking the N297 glycan of Ab and D;

N297 glycan optionally is remodeled;

Ab represents an anti-DLL3 antibody that specifically binds to DLL-3 or a functional fragment of the antibody.

2. The antibody drug conjugate according to claim 1, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein (a) the V_H comprises a V_H -CDR1 sequence, a V_H -CDR2 sequence, and a V_H -CDR3 sequence selected from the group consisting of
- (i) SEQ ID NO: 3, SEQ ID NO: 4, and SEQ ID NO: 5, respectively;
 - (ii) SEQ ID NO: 13, SEQ ID NO: 14, and SEQ ID NO: 15, respectively;
 - (iii) SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25, respectively; and
 - (iv) SEQ ID NO: 33, SEQ ID NO: 34, and SEQ ID NO: 35, respectively; and/or

(b) the V_L comprises a V_L-CDR1 sequence, a V_L-CDR2 sequence, and a V_L-CDR3 sequence selected from the group consisting of:

- (i) SEQ ID NO: 8, SEQ ID NO: 9, and SEQ ID NO: 10, respectively;
- (ii) SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20, respectively;
- (iii) SEQ ID NO: 28, SEQ ID NO: 29, and SEQ ID NO: 30, respectively; and
- (iv) SEQ ID NO: 38, SEQ ID NO: 39, and SEQ ID NO: 40, respectively.

3. The antibody drug conjugate according to claim 1 or 2, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein the combination of (a) the V_H comprising a V_H-CDR1 sequence, a V_H-CDR2 sequence, and a V_H-CDR3 sequence and (b) the V_L comprising a V_L-CDR1 sequence, a V_L-CDR2 sequence, and a V_L-CDR3 sequence is selected from the group consisting of:

- (i) (a) SEQ ID NO: 3, SEQ ID NO: 4, and SEQ ID NO: 5 and (b) SEQ ID NO: 8, SEQ ID NO: 9, and SEQ ID NO: 10, respectively;
- (ii) (a) SEQ ID NO: 13, SEQ ID NO: 14, and SEQ ID NO: 15 and (b) SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20, respectively;
- (iii) (a) SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25 and (b) SEQ ID NO: 28, SEQ ID NO: 29, and SEQ ID NO: 30, respectively; and
- (iv) (a) SEQ ID NO: 33, SEQ ID NO: 34, and SEQ ID NO: 35 and (b) SEQ ID NO: 38, SEQ ID NO: 39, and SEQ ID NO: 40, respectively.

4. The antibody drug conjugate according to any one of claims 1-3, wherein, the anti-DLL3 antibody comprises one or more of the following characteristics:

(a) a light chain immunoglobulin variable domain sequence that is at least 80%, at least 85%, at least 90%, at least 95%, or at least 99% identical to the light chain immunoglobulin variable domain sequence present in any one of SEQ ID NOs: 7, 17, 27, or 37, ; and/or

(b) a heavy chain immunoglobulin variable domain sequence that is at least 80%, at least 85%, at least 90%, at least 95%, or at least 99% identical to the heavy chain immunoglobulin variable domain sequence present in any one of SEQ ID NOs: 2, 12, 22, or 32

5. The antibody drug conjugate according to any one of claims 1-4, wherein, the anti-DLL3 antibody comprises one or more of the following characteristics:

(a) a light chain immunoglobulin variable domain sequence that is at least 80%, at least 85%, at least 90%, at least 95%, or at least 99% identical to the light chain immunoglobulin variable domain sequence present in any one of SEQ ID NOs: 17, 27 or 37; and

(b) a heavy chain immunoglobulin variable domain sequence that is at least 80%, at least 85%, at least 90%, at least 95%, or at least 99% identical to the heavy chain immunoglobulin variable domain sequence present in any one of SEQ ID NOs: 12, 22 or 32.

6. The antibody drug conjugate according to any one of 1-5, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein: (a) the V_H comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 12, SEQ ID NO: 22, and SEQ ID NO: 32; and/or (b) the V_L comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 7, SEQ ID NO: 17, SEQ ID NO: 27, and SEQ ID NO: 37.

7. The antibody drug conjugate according to any one of claims 1-6, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein: (a) the V_H comprises an amino acid sequence selected from SEQ ID NO: 12, SEQ ID NO: 22 or SEQ ID NO: 32, and (b) the V_L comprises an amino acid sequence selected from SEQ ID NO: 17, SEQ ID NO: 27 or SEQ ID NO: 37.

8. The antibody drug conjugate according to claim 6, wherein, the V_H amino acid sequence and the V_L amino acid sequence is selected from the group consisting of: SEQ ID NO: 2 and SEQ ID NO: 7 (7-I1-B), respectively; SEQ ID NO: 12 and SEQ ID NO: 17 (2-C8-A), respectively; SEQ ID NO: 22 and SEQ ID NO: 27 (10-O18-A), respectively; and SEQ ID NO: 32 and SEQ ID NO: 37 (6-G23-F), respectively.

9. The antibody-drug conjugate according to any one of claims 1-8, wherein the antibody-drug conjugate undergoes intracellular internalization when the anti-DLL3 antibody binds to a DLL3 polypeptide expressed on a cell surface (*e.g.*, a tumor cell surface).

10. The antibody-drug conjugate according to any one of claims 1-9, wherein the anti-DLL3 comprises a Fc domain of an isotype selected from the group consisting of IgG1 or the variant thereof, IgG2, IgG3, IgG4, IgA1, IgA2, IgM, IgD, and IgE.

11. The antibody-drug conjugate according to any one of claims 1-10, wherein the anti-DLL3 comprises a heavy chain constant region of SEQ ID NO: 42, 57 or 58.

12. The antibody-drug conjugate according to any one of claims 1-7, wherein the anti-DLL3 antibody is a monoclonal antibody, a chimeric antibody, a humanized antibody, a human antibody or a bispecific antibody.

13. The antibody-drug conjugate according to any one of claims 1-12, wherein the antibody comprises:

(a) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 59 to 61 and a light chain comprises amino acid sequence of SEQ ID NO: 62;

(b) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 63 to 65 and a light chain comprises amino acid sequence of SEQ ID NO: 66; or

(c) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 67 to 69 and a light chain comprises amino acid sequence of SEQ ID NO: 70.

14. The antibody-drug conjugate according to any one of claims 1-13, wherein the antibody comprises:
- (a) a heavy chain comprises amino acid sequence of SEQ ID NO: 61 and a light chain comprises amino acid sequence of SEQ ID NO: 62;
 - (b) a heavy chain comprises amino acid sequence of SEQ ID NO: 65 and a light chain comprises amino acid sequence of SEQ ID NO: 66; or
 - (c) a heavy chain comprises amino acid sequence of SEQ ID NO: 69 and a light chain comprises amino acid sequence of SEQ ID NO: 70.
15. The antibody drug conjugate according to claim 1, wherein the anti-DLL-3 antibody competes with the antibody according to claim 9 or Claim V for binding to DLL-3.
16. The antibody-drug conjugate according to any one of claims 1-15, wherein the anti-DLL3 antibody binds to an epitope on DLL3 that is a conformational epitope or a non-conformational epitope.
17. The antibody-drug conjugate according to any one of claims 1-16, wherein the anti-DLL3 antibody binds to a mammalian DLL3 polypeptide that has an amino acid sequence comprising amino acid residues 27-492 of SEQ ID NO: 50 or SEQ ID NO: 51.
18. The antibody-drug conjugate according to any one of claims 1-17, wherein the heavy chain or the light chain of the antibody has one or two or more modifications or sets of amino acid residues selected from the group consisting of N-linked glycosylation, O-linked glycosylation, N-terminal processing, C-terminal processing, deamidation, isomerization of aspartic acid, oxidation of methionine, addition of a methionine residue to the N-terminus, amidation of a proline residue, the substitutions of two leucine (L) residues to alanine (A) at position 234 and 235 (EU Numbering) of the heavy chain (LALA), a set of amino acid residues Glu (E) at positions 356 and Met (M) at position 358 (EU Numbering) of the heavy

chain, a set of Asp (D) at positions 356 and Leucine (L) at position 358 (EU Numbering) of the heavy chain or any combination thereof, conversion of N-terminal glutamine or N-terminal glutamic acid to pyroglutamic acid, and a deletion of one or two amino acids from the carboxyl terminus.

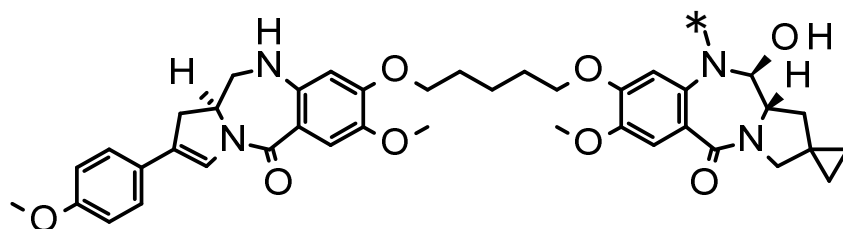
19. The antibody-drug conjugate according to claim 18, wherein one or two amino acids are deleted from the carboxyl terminus of a heavy chain thereof.

20. The antibody-drug conjugate according to claim 19, wherein one amino acid is deleted from each of the carboxyl termini of both of the heavy chains thereof.

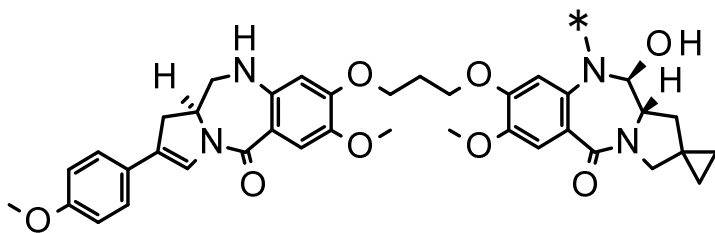
21. The antibody-drug conjugate according to any one of claims 18-20, wherein a proline residue at the carboxyl terminus of a heavy chain thereof is further amidated.

22. The antibody-drug conjugate according to any one of claims 1-21, wherein the anti-DLL3 antibody comprises a sugar chain modification that is regulated in order to enhance antibody-dependent cellular cytotoxic activity.

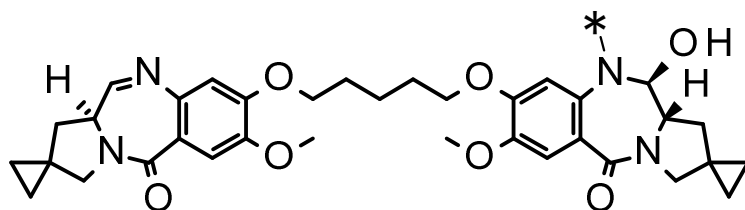
23. The antibody-drug conjugate according to any one of claims 1-22, wherein D is:



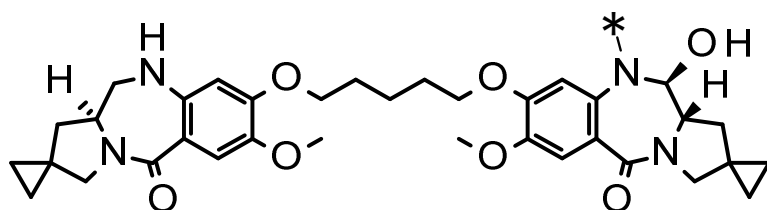
24. The antibody-drug conjugate according to any one of claims 1-22, wherein D is:



25. The antibody-drug conjugate according to any one of claims 1-22, wherein D is:



26. The antibody-drug conjugate according to any one of claims 1-22, wherein D is:



27. The antibody-drug conjugate according to any one of claims 23-26, wherein the -OH is at the position 11'.

28. The antibody-drug conjugate according to any one of claims 1-27, wherein L is represented by -Lb-La-Lp-NH-B-CH₂-O(C=O)-*, the asterisk representing bonding to D;

B represents a phenyl group or a heteroaryl group;

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

La represents any one selected from the group:

-C(=O)-(CH₂CH₂)ⁿ²-C(=O)-,

-C(=O)-(CH₂CH₂)ⁿ²-C(=O)-NH-(CH₂CH₂)ⁿ³-C(=O)-,

-C(=O)-(CH₂CH₂)ⁿ²-C(=O)-NH-(CH₂CH₂O)ⁿ³-CH₂-C(=O)-,

$-\text{C}(=\text{O})-(\text{CH}_2\text{CH}_2)\text{n}^2-\text{NH}-\text{C}(=\text{O})-(\text{CH}_2\text{CH}_2\text{O})\text{n}^3-\text{CH}_2\text{CH}_2-\text{C}(=\text{O})-$, and

$-(\text{CH}_2)\text{n}^4-\text{O}-\text{C}(=\text{O})-$;

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

Lb represents a spacer bonding La and a glycan or remodeled glycan of Ab.

29. The antibody-drug conjugate according to claim 28, wherein B is any one selected from a 1,4-phenyl group, a 2,5-pyridyl group, a 3,6-pyridyl group, a 2,5-pyrimidyl group, and a 2,5-thienyl group.

30. The antibody-drug conjugate according to claim 29, wherein B is a 1,4-phenyl group.

31. The antibody-drug conjugate according to any one of claims 28-30, wherein Lp is amino acid residues composed of two to seven amino acids.

32. The antibody-drug conjugate according to any one of claims 28-31, wherein Lp is amino acid residues consisting of amino acids selected from glycine, valine, alanine, phenylalanine, glutamic acid, isoleucine, proline, citrulline, leucine, serine, lysine, and aspartic acid.

33. The antibody-drug conjugate according to any one of claims 28-32, wherein Lp is selected from the following group: -GGVA- (SEQ ID NO: 85), -GG-(D-)VA-, -VA-, -GGFG- (SEQ ID NO: 86), -GGPI- (SEQ ID NO: 87), -GGVCit- (SEQ ID NO: 88), -GGVK- (SEQ ID NO: 89), -GG(D-)PI-, and -GGPL- (SEQ ID NO: 90).

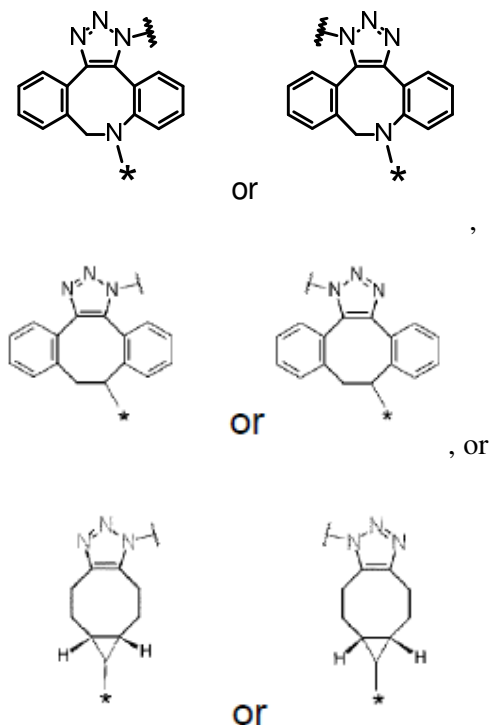
34. The antibody-drug conjugate according to any one of claims 28-33, wherein La is selected from the following group:

$-\text{C}(=\text{O})-\text{CH}_2\text{CH}_2-\text{C}(=\text{O})-$, $-\text{C}(=\text{O})-(\text{CH}_2\text{CH}_2)_2-\text{C}(=\text{O})-$,

$-\text{C}(=\text{O})-\text{CH}_2\text{CH}_2-\text{C}(=\text{O})-\text{NH}-(\text{CH}_2\text{CH}_2)_2-\text{C}(=\text{O})-$,

-C(=O)-CH₂CH₂-C(=O)-NH-(CH₂CH₂O)₂-CH₂-C(=O)-,
 -C(=O)-CH₂CH₂-NH-C(=O)-(CH₂CH₂O)₄-CH₂CH₂-C(=O)-,
 -CH₂-OC(=O)-, and -OC(=O)-.

35. The antibody-drug conjugate according to any one of claims 28-34, wherein Lb is represented by the following formula:



wherein, in each structural formula for Lb shown above,

each asterisk represents bonding to La, and each wavy line represents bonding to a glycan or remodeled glycan of Ab.

36. The antibody-drug conjugate according to any one of claims 28-35, wherein

L is represented by -Lb-La-Lp-NH-B-CH₂-O(C=O)-*, wherein

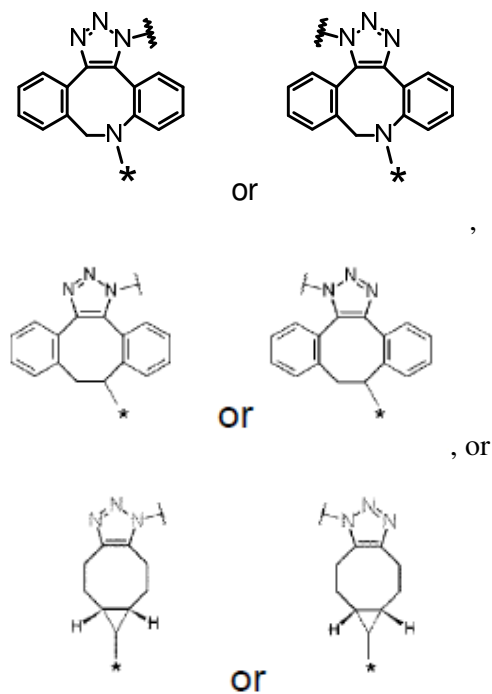
B is a 1,4-phenyl group;

Lp represents any one selected from the following group: -GGVA- (SEQ ID NO: 85), -GG-(D-)-VA-, -VA-, -GGFG- (SEQ ID NO: 86), -GGPI- (SEQ ID NO: 87), -GGVCit- (SEQ ID NO: 88), -GGVK- (SEQ ID NO: 89), and -GGPL- (SEQ ID NO: 90);

La represents any one selected from the following group:

-C(=O)-CH₂CH₂-C(=O)-, -C(=O)-(CH₂CH₂)₂-C(=O)-,
 -C(=O)-CH₂CH₂-C(=O)-NH-(CH₂CH₂)₂-C(=O)-,
 -C(=O)-CH₂CH₂-C(=O)-NH-(CH₂CH₂O)₂-CH₂-C(=O)-,
 -C(=O)-CH₂CH₂-NH-C(=O)-(CH₂CH₂O)₄-CH₂CH₂-C(=O)-,
 -CH₂-OC(=O)-, and -OC(=O)-; and

Lb is represented by the following formula:



wherein, in each structural formula for Lb shown above,

each asterisk represents bonding to La, and each wavy line represents bonding to a glycan or remodeled glycan of Ab.

37. The antibody-drug conjugate according to any one of claims 28-36, wherein

L is selected from the following group:

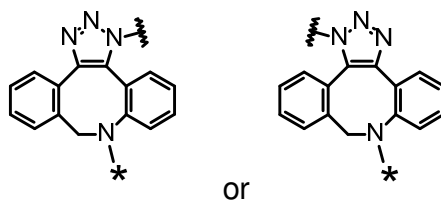
-Z¹-C(=O)-CH₂CH₂-C(=O)-GGVA-NH-B-CH₂-OC(=O)- ("GGVA" disclosed as SEQ ID NO: 85),

-Z¹-C(=O)-CH₂CH₂-C(=O)-GG-(D-)VA-NH-B-CH₂-OC(=O)-,

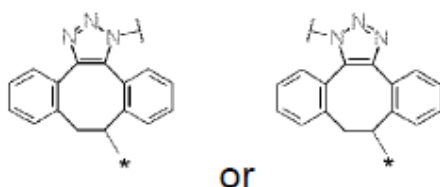
-Z¹-C(=O)-CH₂CH₂-C(=O)-VA-NH-B-CH₂-OC(=O)-,

$-Z^1-C(=O)-(CH_2CH_2)_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-GGPI-NH-B-CH_2-OC(=O)-$ ("GGPI" disclosed as SEQ ID NO: 87),
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-GGFG-NH-B-CH_2-OC(=O)-$ ("GGFG" disclosed as SEQ ID NO: 86),
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-GGVCit-NH-B-CH_2-OC(=O)-$ ("GGVCit" disclosed as SEQ ID NO: 88),
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-GGVK-NH-B-CH_2-OC(=O)-$ ("GGVK" disclosed as SEQ ID NO: 89),
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-GGPL-NH-B-CH_2-OC(=O)-$ ("GGPL" disclosed as SEQ ID NO: 90),
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-NH-(CH_2CH_2)_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,
 $-Z^1-C(=O)-CH_2CH_2-C(=O)-NH-(CH_2CH_2O)_2-CH_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,
 $-Z^1-C(=O)-CH_2CH_2-NH-C(=O)-(CH_2CH_2O)_4-CH_2CH_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,
 $-Z^2-OC(=O)-GGVA-NH-B-CH_2-OC(=O)-$ ("GGVA" disclosed as SEQ ID NO: 85),
 and
 $-Z^3-CH_2-OC(=O)-GGVA-NH-B-CH_2-OC(=O)-$ ("GGVA" disclosed as SEQ ID NO: 85), wherein

Z^1 represents the following structural formula:

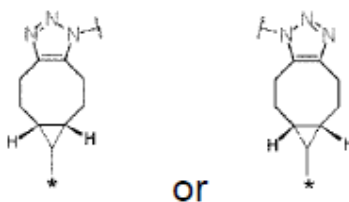


Z^2 represents the following structural formula:



, and

Z³ represents the following structural formula:



wherein, in each structural formula for Z¹, Z², and Z³,

each asterisk represents bonding to La, each wavy line represents bonding to a glycan or remodeled glycan of Ab; and

B represents a 1,4-phenyl group.

38. The antibody-drug conjugate according to claim 37, wherein

L is selected from the following group:

-Z¹-C(=O)-CH₂CH₂-C(=O)-GGVA-NH-B-CH₂-OC(=O)- ("GGVA" disclosed as SEQ ID NO: 85),

-Z¹-C(=O)-CH₂CH₂-C(=O)-VA-NH-B-CH₂-OC(=O)-,

-Z¹-C(=O)-(CH₂CH₂)₂-C(=O)-VA-NH-B-CH₂-OC(=O)-,

-Z¹-C(=O)-CH₂CH₂-C(=O)-GGVCit-NH-B-CH₂-OC(=O)- ("GGVCit" disclosed as SEQ ID NO: 88), -Z¹-C(=O)-CH₂CH₂-C(=O)-NH-(CH₂CH₂)₂-C(=O)-VA-NH-B-CH₂-OC(=O)-,

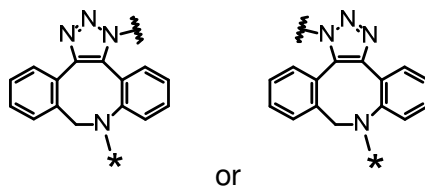
-Z¹-C(=O)-CH₂CH₂-C(=O)-NH-(CH₂CH₂O)₂-CH₂-C(=O)-VA-NH-B-CH₂-OC(=O)-,

and

-Z¹-C(=O)-CH₂CH₂-NH-C(=O)-(CH₂CH₂O)₄-CH₂CH₂-C(=O)-VA-NH-B-CH₂-

OC(=O)-, wherein

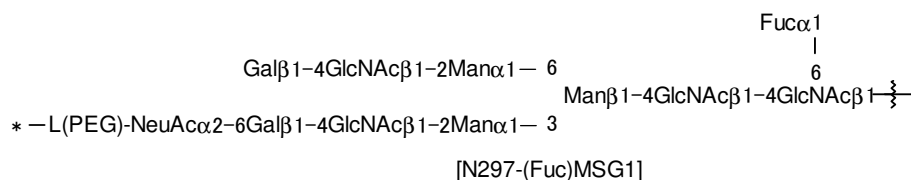
B is a 1,4-phenyl group, and Z¹ represents the following structural formula:



wherein, in the structural formula for Z¹,

each asterisk represents bonding to C(=O) neighboring to Z¹, and each wavy line represents bonding to a glycan or remodeled glycan of Ab.

39. The antibody-drug conjugate according to any one of claims 1-38, wherein the antibody is IgG.
40. The antibody-drug conjugate according to claim 39, wherein the antibody is IgG1 or the variant thereof, IgG2, or IgG4.
41. The antibody-drug conjugate according to any one of claims 1-40, wherein the antibody binds to a tumor cell, and is incorporated and internalizes in the tumor cell.
42. The antibody-drug conjugate according to claim 41, wherein the antibody further has antitumor effect.
43. The antibody-drug conjugate according to any one of claims 1-42, wherein the N297 glycan is a remodeled glycan.
44. The antibody-drug conjugate according to claim 43, wherein the N297 glycan is N297-(Fuc)MSG1, N297-(Fuc)MSG2, or a mixture thereof, or N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and N297-(Fuc)SG having structures represented by the following formulas:



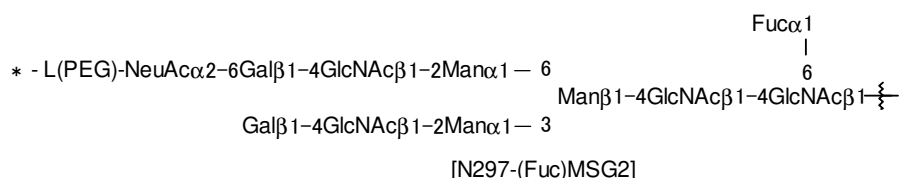
wherein

the wavy line represents bonding to Asn297 of the antibody;

L(PEG) represents $-(\text{CH}_2\text{CH}_2\text{-O})^{n^5}\text{-CH}_2\text{CH}_2\text{-NH-}$, wherein the amino group at the right end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in the 1-3 branched chain of β -Man in the N297 glycan;

the asterisk represents bonding to linker L; and

n^5 represents an integer of 2 to 10,



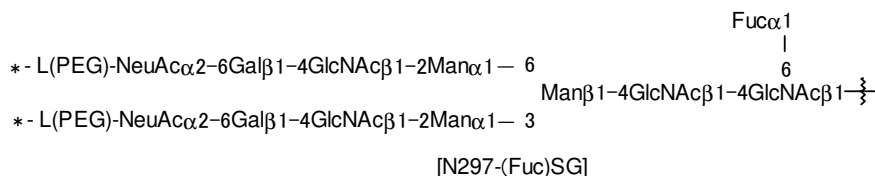
wherein

the wavy line represents bonding to Asn297 of the antibody;

L(PEG) represents $-(\text{CH}_2\text{CH}_2\text{-O})^{n^5}\text{-CH}_2\text{CH}_2\text{-NH-}$, wherein the amino group at the right end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in the 1-6 branched chain of β -Man in the N297 glycan;

the asterisk represents bonding to linker L; and

n^5 represents an integer of 2 to 10, and



wherein

the wavy line represents bonding to Asn297 of the antibody;

L(PEG) represents $-(\text{CH}_2\text{CH}_2\text{-O})^{n^5}\text{-CH}_2\text{CH}_2\text{-NH-}$, wherein the amino group at the right end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in each of the 1-3 and 1-6 branched chains of β -Man in the N297 glycan;

the asterisk represents bonding to linker L; and

n^5 represents an integer of 2 to 10.

45. The antibody-drug conjugate according to claim 44, wherein n^5 is an integer of 2 to 5.

46. The antibody-drug conjugate according to any one of claims 1-45, wherein

m^2 represents an integer of 1 or 2;

L is selected from the following group:

$-Z^1-C(=O)-CH_2CH_2-C(=O)-GGVA-NH-B-CH_2-OC(=O)-$ ("GGVA" disclosed as SEQ ID NO: 85),

$-Z^1-C(=O)-CH_2CH_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,

$-Z^1-C(=O)-(CH_2CH_2)_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,

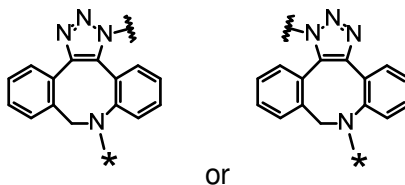
$-Z^1-C(=O)-CH_2CH_2-C(=O)-GGVCit-NH-B-CH_2-OC(=O)-$ ("GGVCit" disclosed as SEQ ID NO: 88),

$-Z^1-C(=O)-CH_2CH_2-C(=O)-NH-(CH_2CH_2)_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,

$-Z^1-C(=O)-CH_2CH_2-C(=O)-NH-(CH_2CH_2O)_2-CH_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$,

and $-Z^1-C(=O)-CH_2CH_2-NH-C(=O)-(CH_2CH_2O)_4-CH_2CH_2-C(=O)-VA-NH-B-CH_2-OC(=O)-$, wherein

B is a 1,4-phenyl group, and Z^1 represents the following structural formula:

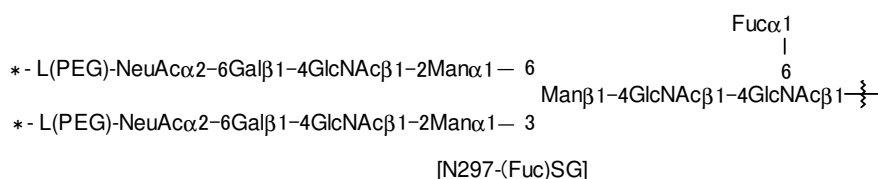
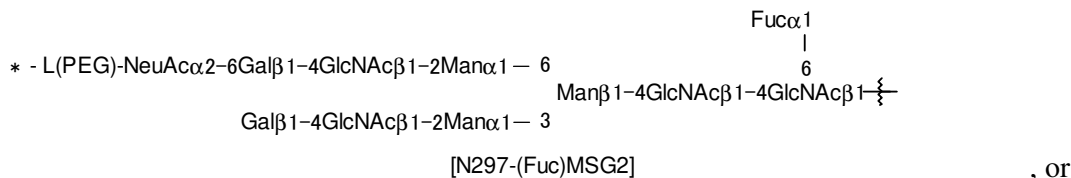
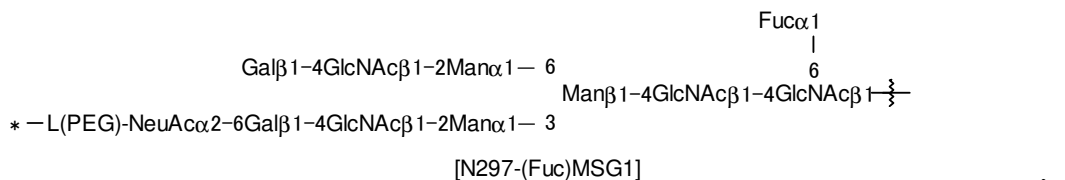


wherein, in the structural formulas for Z^1 ,

each asterisk represents bonding to $C(=O)$ neighboring to Z^1 , and each wavy line represents bonding to the N297 glycan of Ab;

Ab represents an IgG antibody;

the N297 glycan of Ab represents any one of N297-(Fuc)MSG1, N297-(Fuc)MSG2, and a mixture thereof, and N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and N297-(Fuc)SG having structures represented by the following formulas:



wherein

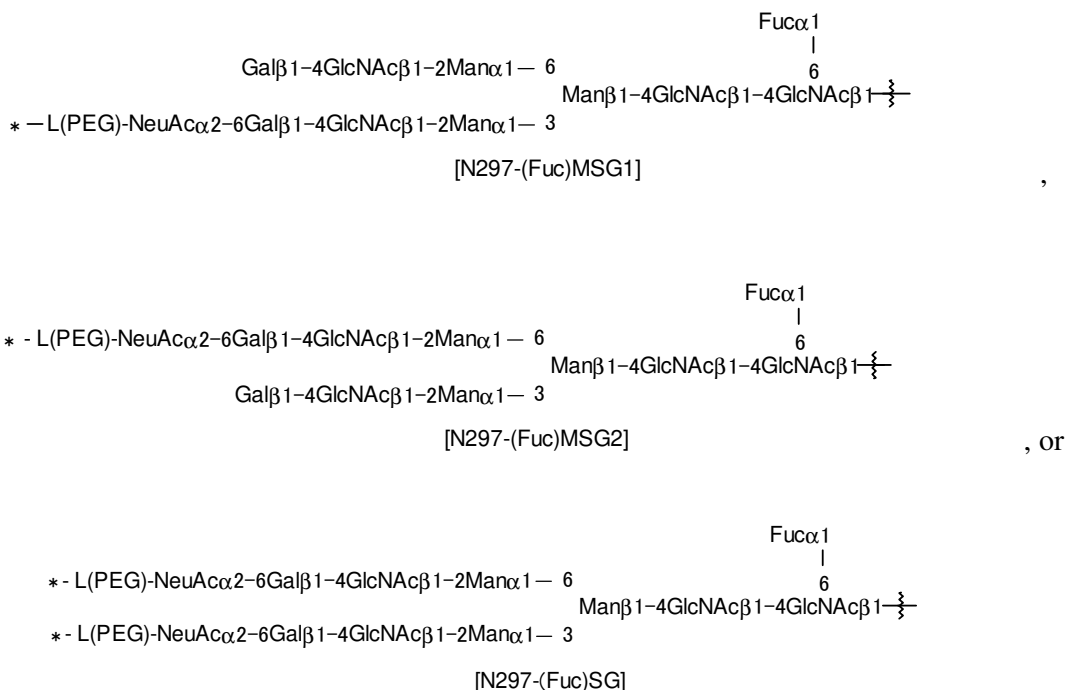
each wavy line represents bonding to Asn297 of the antibody,

L(PEG) in the N297 glycan represents $-\text{NH}-\text{CH}_2\text{CH}_2-(\text{O}-\text{CH}_2\text{CH}_2)_n^5-$, wherein

n^5 represents an integer of 2 to 5, the amino group at the left end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in each or either one of the 1-3 and 1-6 branched chains of β -Man in the N297 glycan, and each asterisk represents bonding to a nitrogen atom at the 1- or 3-position of the triazole ring of Z^1 in linker L.

47. An antibody-drug conjugate selected from the following group:

Ab represents an anti-DLL3 IgG antibody or a functional fragment of the antibody;
the N297 glycan of Ab represents any one of N297-(Fuc)MSG1, N297-(Fuc)MSG2,
and a mixture thereof, and N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and
N297-(Fuc)SG having structures represented by the following formulas:



wherein

each wavy line represents bonding to Asn297 of the antibody,
L(PEG) in the N297 glycan represents -NH-CH₂CH₂-(O-CH₂CH₂)₃-, wherein
the amino group at the left end is bound via an amide bond to carboxylic acid at the 2-
position of a sialic acid at the non-reducing terminal in each or either one of the 1-3 and 1-6
branched chains of β -Man in the N297 glycan, and each asterisk represents bonding to a
nitrogen atom at the 1- or 3-position of the triazole ring in the corresponding structural
formula.

48. The antibody drug conjugate according to claim 47, wherein the antibody comprising
a heavy chain constant region of human IgG1 or the variant thereof, human IgG2, or human
IgG4.

49. The antibody-drug conjugate according to claim 47 or 48, wherein the antibody comprises a heavy chain constant region of SEQ ID NO: 42, 57 or 58.

50. The antibody drug conjugate according to any one of claims 46-49, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein (a) the V_H comprises a V_H -CDR1 sequence, a V_H -CDR2 sequence, and a V_H -CDR3 sequence selected from the group consisting of

- (i) SEQ ID NO: 3, SEQ ID NO: 4, and SEQ ID NO: 5, respectively;
- (ii) SEQ ID NO: 13, SEQ ID NO: 14, and SEQ ID NO: 15, respectively;
- (iii) SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25, respectively; and
- (iv) SEQ ID NO: 33, SEQ ID NO: 34, and SEQ ID NO: 35, respectively; and/or

(b) the V_L comprises a V_L -CDR1 sequence, a V_L -CDR2 sequence, and a V_L -CDR3 sequence selected from the group consisting of:

- (i) SEQ ID NO: 8, SEQ ID NO: 9, and SEQ ID NO: 10, respectively;
- (ii) SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20, respectively;
- (iii) SEQ ID NO: 28, SEQ ID NO: 29, and SEQ ID NO: 30, respectively; and
- (iv) SEQ ID NO: 38, SEQ ID NO: 39, and SEQ ID NO: 40, respectively.

51. The antibody drug conjugate according to claim 50, wherein the anti-DLL3 antibody comprises a heavy chain immunoglobulin variable domain (V_H) and a light chain immunoglobulin variable domain (V_L), wherein the combination of (a) the V_H comprising a V_H -CDR1 sequence, a V_H -CDR2 sequence, and a V_H -CDR3 sequence and (b) the V_L comprising a V_L -CDR1 sequence, a V_L -CDR2 sequence, and a V_L -CDR3 sequence is selected from the group consisting of:

- (i) (a) SEQ ID NO: 3, SEQ ID NO: 4, and SEQ ID NO: 5 and (b) SEQ ID NO: 8, SEQ ID NO: 9, and SEQ ID NO: 10, respectively;

- (ii) (a) SEQ ID NO: 13, SEQ ID NO: 14, and SEQ ID NO: 15 and (b) SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20, respectively;
- (iii) (a) SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25 and (b) SEQ ID NO: 28, SEQ ID NO: 29, and SEQ ID NO: 30, respectively; and
- (iv) (a) SEQ ID NO: 33, SEQ ID NO: 34, and SEQ ID NO: 35 and (b) SEQ ID NO: 38, SEQ ID NO: 39, and SEQ ID NO: 40, respectively.

52. The antibody-drug conjugate according to any one of claims 47-51, wherein the antibody is an antibody comprising a light chain and a heavy chain in any one combination selected from the group consisting of the following combinations (1) to (4), or a functional fragment of the antibody:

- (1) a light chain comprising a variable domain sequence of SEQ ID NO: 7 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 2,
- (2) a light chain comprising a variable domain sequence of SEQ ID NO: 17 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 12,
- (3) a light chain comprising a variable domain sequence of SEQ ID NO: 27 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 22, and
- (4) a light chain comprising a variable domain sequence of SEQ ID NO: 37 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 32.

53. The antibody-drug conjugate according to claim 52, wherein the antibody is an antibody comprising a light chain comprising a variable domain sequence of SEQ ID NO: 17 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 12.

54. The antibody-drug conjugate according to claim 52, wherein the antibody is an antibody comprising a light chain comprising a variable domain sequence of SEQ ID NO: 27 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 22.

55. The antibody-drug conjugate according to claim 52, wherein the antibody is an antibody comprising a light chain comprising a variable domain sequence of SEQ ID NO: 37 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 32.

56. The antibody-drug conjugate according to claim 52, wherein the antibody is an antibody comprising a light chain comprising a variable domain sequence of SEQ ID NO: 7 and a heavy chain comprising a variable domain sequence of SEQ ID NO: 2.

57. The antibody-drug conjugate according to any one of claims 47-56, wherein the antibody comprises:

(a) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 59 to 61 and a light chain comprises amino acid sequence of SEQ ID NO: 62;

(b) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 63 to 65 and a light chain comprises amino acid sequence of SEQ ID NO: 66; or

(c) a heavy chain comprises amino acid sequence of any one of SEQ ID NOs: 67 to 69 and a light chain comprises amino acid sequence of SEQ ID NO: 70.

58. The antibody-drug conjugate according to any one of claims 47-57, wherein the antibody comprises:

(a) a heavy chain comprises amino acid sequence of SEQ ID NO: 61 and a light chain comprises amino acid sequence of SEQ ID NO: 62;

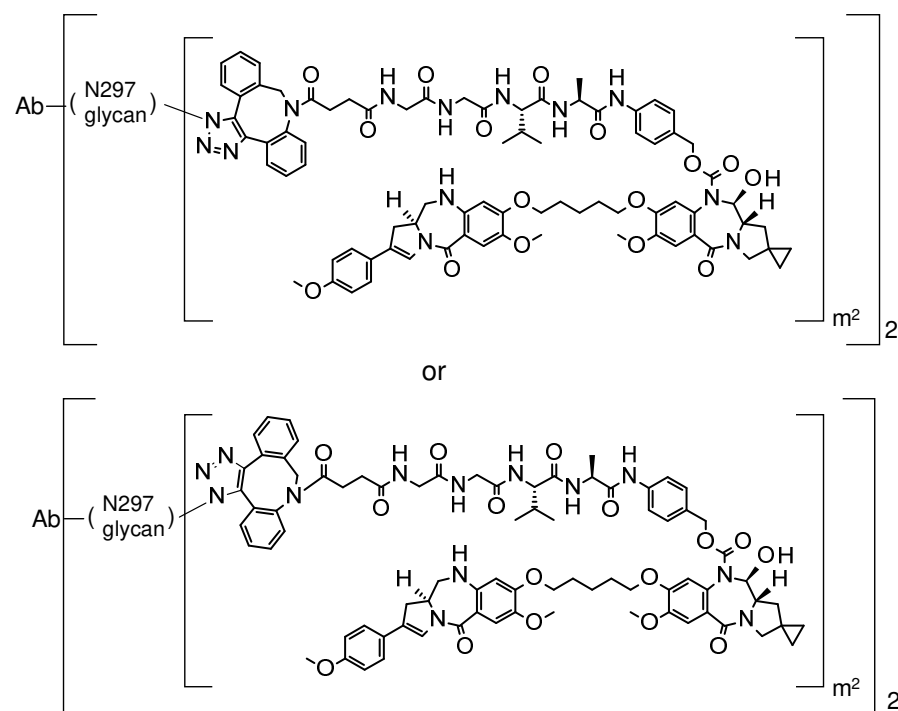
(b) a heavy chain comprises amino acid sequence of SEQ ID NO: 65 and a light chain comprises amino acid sequence of SEQ ID NO: 66; or

(c) a heavy chain comprises amino acid sequence of SEQ ID NO: 69 and a light chain comprises amino acid sequence of SEQ ID NO: 70.

59. The antibody-drug conjugate according to any one of claims 47-58, wherein the heavy chain or the light chain has one or two or more modifications or sets of amino acid residues

selected from the group consisting of N-linked glycosylation, O-linked glycosylation, N-terminal processing, C-terminal processing, deamidation, isomerization of aspartic acid, oxidation of methionine, addition of a methionine residue to the N-terminus, amidation of a proline residue, the substitutions of two leucine (L) residues to alanine (A) at position 234 and 235 (according to EU index) of the heavy chain (LALA), a set of amino acid residues Glu (E) at positions 356 and Met (M) at position 358 (according to EU index) of the heavy chain, a set of Asp (D) at positions 356 and Leucine (L) at position 358 (according to EU index) of the heavy chain or any combination thereof, conversion of N-terminal glutamine or N-terminal glutamic acid to pyroglutamic acid, and a deletion of one or two amino acids from the carboxyl terminus.

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

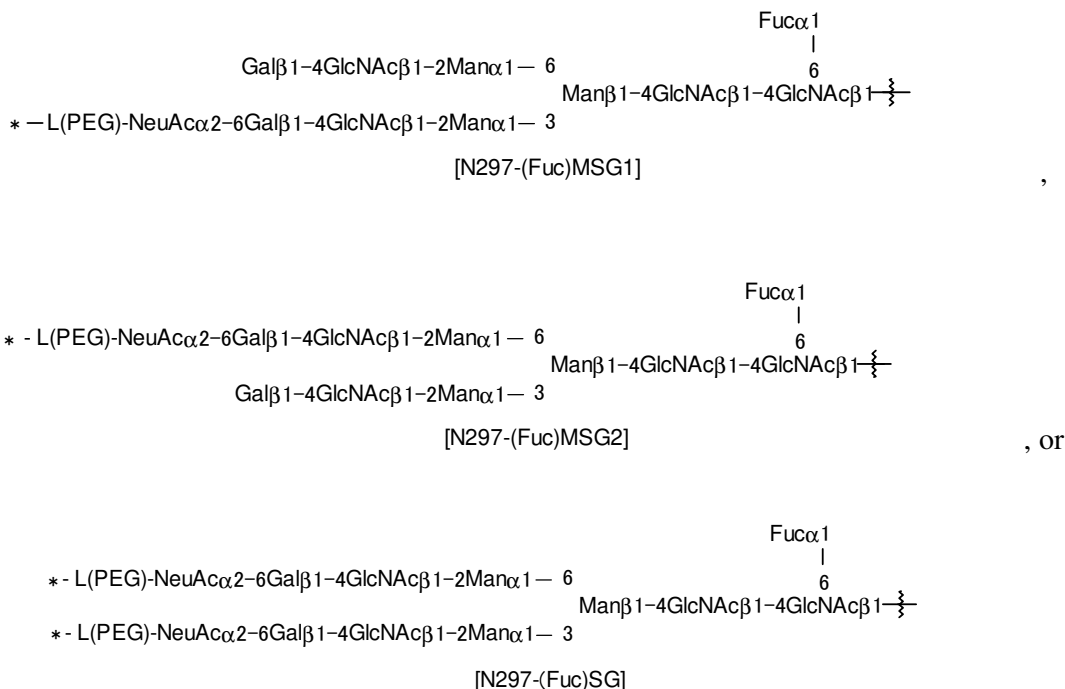


wherein,

m^2 represents an integer of 1 or 2;

Ab represents an anti-DLL3 IgG antibody which comprises a heavy chain of an amino acid sequence of SEQ ID NO: 61 and a light chain of an amino acid sequence of SEQ ID NO: 62;

the N297 glycan of Ab represents any one of N297-(Fuc)MSG1, N297-(Fuc)MSG2, and a mixture thereof, and N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and N297-(Fuc)SG having structures represented by the following formulas:



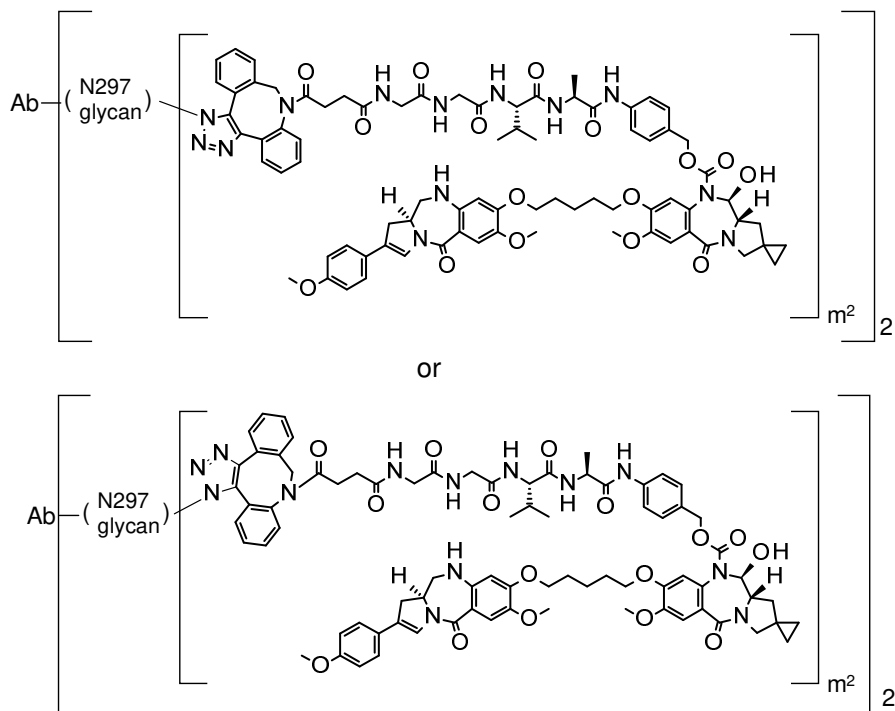
wherein

each wavy line represents bonding to Asn297 of the antibody,

L(PEG) in the N297 glycan represents -NH-CH₂CH₂-(O-CH₂CH₂)₃-, wherein

the amino group at the left end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in each or either one of the 1-3 and 1-6 branched chains of β -Man in the N297 glycan, and each asterisk represents bonding to a nitrogen atom at the 1- or 3-position of the triazole ring in the corresponding structural formula.

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

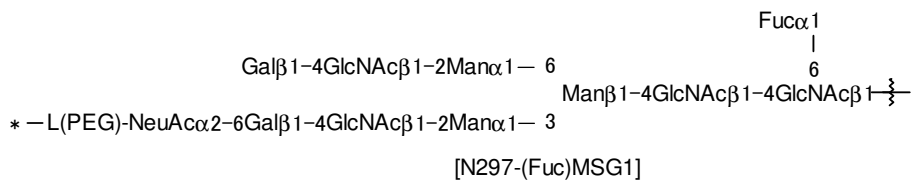


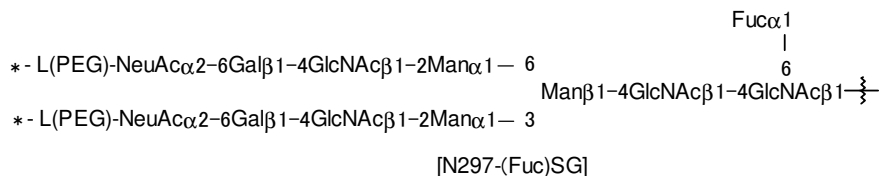
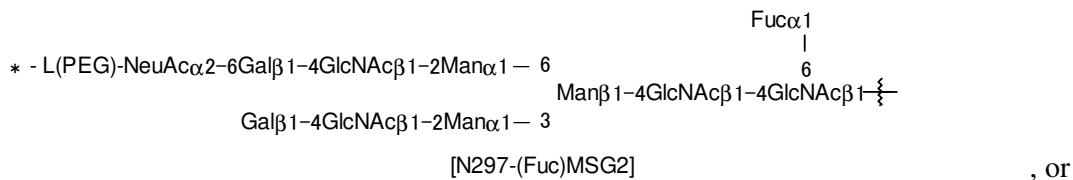
wherein,

m^2 represents an integer of 1 or 2;

Ab represents an anti-DLL3 IgG antibody which comprises a heavy chain of an amino acid sequence of SEQ ID NO: 65 and a light chain of an amino acid sequence of SEQ ID NO: 66;

the N297 glycan of Ab represents any one of N297-(Fuc)MSG1, N297-(Fuc)MSG2, and a mixture thereof, and N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and N297-(Fuc)SG having structures represented by the following formulas:





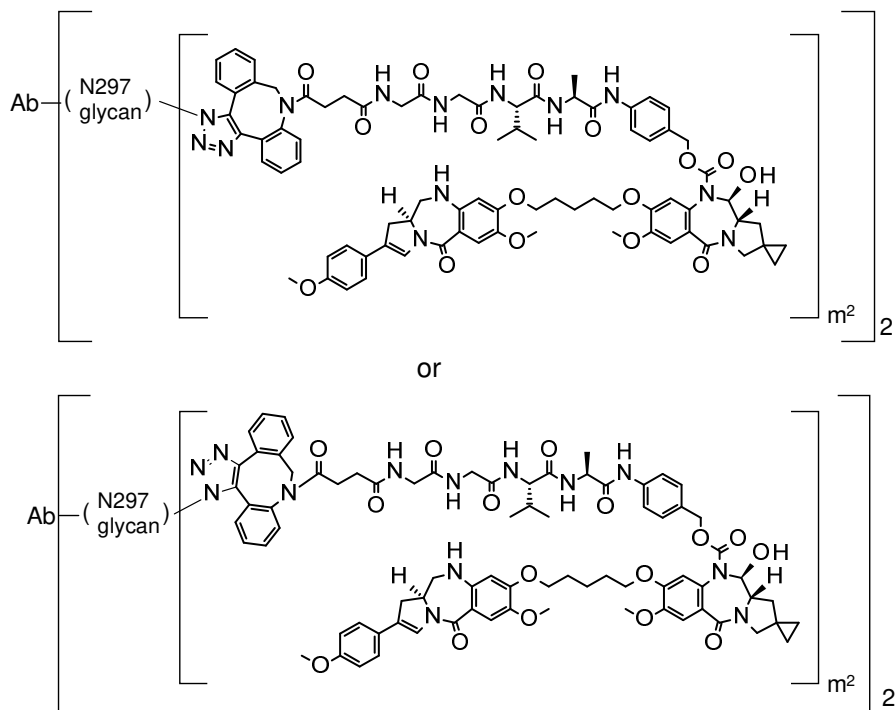
wherein

each wavy line represents bonding to Asn297 of the antibody,

L(PEG) in the N297 glycan represents -NH-CH₂CH₂-(O-CH₂CH₂)₃-, wherein

the amino group at the left end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in each or either one of the 1-3 and 1-6 branched chains of β -Man in the N297 glycan, and each asterisk represents bonding to a nitrogen atom at the 1- or 3-position of the triazole ring in the corresponding structural formula.

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

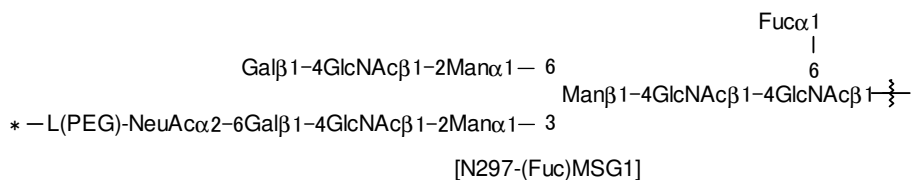


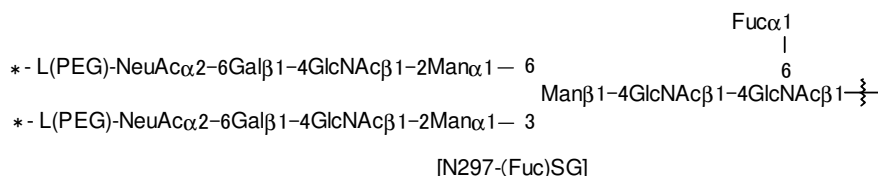
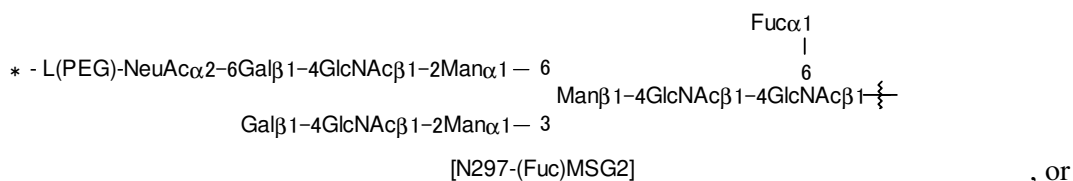
wherein,

m^2 represents an integer of 1 or 2;

Ab represents an anti-DLL3 IgG antibody which comprises a heavy chain of an amino acid sequence of SEQ ID NO: 69 and a light chain of an amino acid sequence of SEQ ID NO: 70;

the N297 glycan of Ab represents any one of N297-(Fuc)MSG1, N297-(Fuc)MSG2, and a mixture thereof, and N297-(Fuc)SG, with N297-(Fuc)MSG1, N297-(Fuc)MSG2, and N297-(Fuc)SG having structures represented by the following formulas:





wherein

each wavy line represents bonding to Asn297 of the antibody,

L(PEG) in the N297 glycan represents -NH-CH₂CH₂-(O-CH₂CH₂)₃-, wherein

the amino group at the left end is bound via an amide bond to carboxylic acid at the 2-position of a sialic acid at the non-reducing terminal in each or either one of the 1-3 and 1-6 branched chains of β-Man in the N297 glycan, and each asterisk represents bonding to a nitrogen atom at the 1- or 3-position of the triazole ring in the corresponding structural formula.

63. A pharmaceutical composition comprising the antibody-drug conjugate according to any one of claims 1-62, a salt thereof, or a hydrate of the conjugate or the salt.

64. The pharmaceutical composition according to claim 63, which is an antitumor drug.

65. The pharmaceutical composition according to claim 63 or 64, for use in treating a tumor, wherein the tumor is a tumor expressing DLL3.

66. The pharmaceutical composition according to claim 64 or 65, wherein the tumor is small cell lung cancer (SCLC), large cell neuroendocrine carcinoma (LCNEC), neuroendocrine tumors of various tissues including kidney, genitourinary tract (bladder, prostate, ovary, cervix, and endometrium), gastrointestinal tract (stomach, colon), thyroid

(medullary thyroid cancer), pancreas and lung, gliomas or pseudo neuroendocrine tumors (pNETs).

67. A method for producing a glycan-remodeled antibody, the method comprising the steps of:

i) culturing the host cell comprising a nucleic acid encoding an anti-DLL3 antibody and collecting a targeted antibody from the culture obtained;

ii) treating the antibody obtained in step i) with hydrolase to produce a (Fuc α 1,6)GlcNAc-antibody; and

iii)-1 reacting a glycan donor molecule and the (Fuc α 1,6)GlcNAc-antibody in the presence of transglycosidase, the glycan donor molecule obtained by introducing a PEG linker having an azide group to the carbonyl group of carboxylic acid at the 2-position of a sialic acid in MSG (9) or SG (10) and oxazolinating the reducing terminal, or

iii)-2 reacting the (Fuc α 1,6)GlcNAc-antibody and a glycan donor molecule in the presence of transglycosidase, the glycan donor molecule obtained by introducing a PEG linker having an azide group to the carbonyl group of carboxylic acid at the 2-position of a sialic acid in (MSG-)Asn or (SG-)Asn with an α -amino group optionally protected and to the carbonyl group of carboxylic acid in the Asn, causing action of hydrolase, and then oxazolinating the reducing terminal or

iii)-3 reacting the (Fuc α 1,6)GlcNAc-antibody and a glycan donor molecule in the presence of two glycosyltransferases, wherein the glycan donor molecule is (SG-)Asn or (MSG-)Asn with an azide group introduced in sialic acid thereof.

68. The method according to claim 67, further comprising the step of purifying the (Fuc α 1,6)GlcNAc-antibody through purification of a reaction solution in step ii) with a hydroxyapatite column.

69. A method for producing the antibody-drug conjugate form according to any one of claims 1-62, the method comprising the steps of:

i) producing a glycan-remodeled antibody by using the method according to claim 56 or 57; and

ii) reacting a drug-linker having DBCO and an azide group in a glycan of the glycan-remodeled antibody made in step i).

70. A glycan-remodeled antibody obtained by using the method according to claim 67 or 68.

71. An antibody-drug conjugate obtained by using the method according to claim 69.

72. Use of an antibody-drug conjugate according to any one of claims 1 to 62, a salt of the antibody-drug conjugate, or a hydrate of the antibody-drug conjugate or the salt, in the manufacture of a medicament for treating a tumor, wherein said medicament is to be administered to an individual with a tumor.

73. Use of a pharmaceutical composition comprising at least one component selected from the antibody-drug conjugate according to any one of claims 1 to 62, a salt thereof, and a hydrate of the conjugate or the salt, and at least one antitumor drug, in the manufacture of a medicament for treating a tumor, wherein said medicament is to be administered to an individual, simultaneously, separately, or continuously.

74. The use according to claim 72 or 73, wherein the tumor is a tumor expressing DLL3.

75. The use according to any one of claims 72-74, wherein the tumor is small cell lung cancer (SCLC), large cell neuroendocrine carcinoma (LCNEC), neuroendocrine tumors of various tissues including kidney, genitourinary tract (bladder, prostate, ovary, cervix, and

endometrium), gastrointestinal tract (stomach, colon), thyroid (medullary thyroid cancer), pancreas and lung, gliomas or pseudo neuroendocrine tumors (pNETs).

76. An antibody-drug conjugate according to any one of claims 1 to 62, a salt of the antibody-drug conjugate, or a hydrate of the antibody-drug conjugate or the salt, for use in therapy.

77. A pharmaceutical composition comprising at least one component selected from the antibody-drug conjugate according to any one of claims 1 to 62, a salt thereof, and a hydrate of the conjugate or the salt, and at least one antitumor drug, for use in therapy.