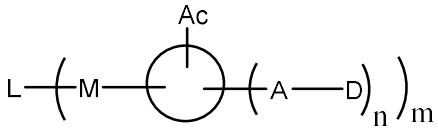
Claims

1. An antibody-drug conjugate or its pharmaceutically acceptable salt thereof as shown in Formula I:



I

wherein:

the circle represents a scaffold, wherein the scaffold comprises a C1-8 alkylene group, a C1-8 heteroalkylene group, a C6-10 arylidene group, or a C4-10 heteroarylidene group;

L comprises an antibody or an antibody fragment thereof;

M comprises a succinimide group or a hydrolytically ring-opened succinimide group;

Ac is connected to the scaffold through an amino group, wherein Ac comprises an acidic unit that serves to stabilize the antibody-drug conjugate, and wherein Ac comprises a fragment consisting of at least one amino group and at least one acidic group or an oligopeptide group consisting of a plurality of amino acid units;

D comprises a drug unit;

A comprises a linker;

m is an integer selected from 1 to 20; and n is 1 or 2.

2. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 1, wherein said antibody corresponds to an antibody for a cell surface receptor or tumor-associated antigen.

3. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 1 or 2, wherein the acidic unit of Ac is selected from a group consisting of carboxylic acid, phosphoric acid, phosphite, and sulfonic acid groups.

4. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in any one of claims 1 to 3, wherein Ac comprises an acidic amino acid group or an acidic oligopeptide group.

5. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 4, wherein said oligopeptide group comprises 2 to 5 natural amino acid units, 2 to 5 unnatural amino acid units, or 2 to 5 natural and unnatural amino acid units.

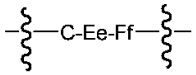
6. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in any one of claims 1 to 5, wherein the heteroalkylene group comprises one or more heteroatoms selected from a group consisting of O, S, N or P atoms; wherein the arylidene group is selected from a group consisting of phenyl, naphthyl or diphenyl; wherein the heteroarylidene group is selected from a group consisting of pyridyl, pyridazinyl, pyrazinyl, pyrimidinyl, indolyl, quinolinyl, isoquinolinyl, isothiazolyl, pyrazolyl, indazolyl, pteridyl, imidazolyl, triazolyl, tetrazolyl, oxazolyl, isoxazolyl, thiadiazolyl, pyrrole, thiazolyl, furanyl and thiophene.

7. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in any one of claims 1 to 6, wherein A comprises a cleavable linker or a non-cleavable linker.

8. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in any one of claims 1 to 7, wherein said drug unit D comprises a cytotoxic drug, a drug for treating autoimmune disease, or an anti-inflammatory drug.

9. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 8, wherein the drug unit D is selected from a group consisting of maitansine drugs, australin drugs, benzodipyrrole drugs, pyrrolozodiazole drugs, amantin and camptothecine compounds, their pharmaceutically acceptable salts or derivatives thereof.

10. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 7, wherein A has a structure as shown in the following formula:



wherein C represents an extensible unit at the end, E represents a cleavable unit, F represents a spacer unit, subscripts e and f each is independently 0 or 1, the wavy line on the left represents a connection site to the scaffold and the wavy line on the right represents a connection site to the drug unit.

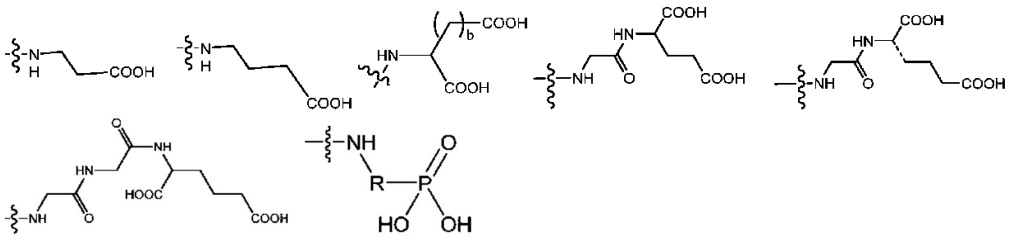
11. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 10, wherein E is configured to be cleaved off from the drug unit D or the spacer unit F by a tumor-associated protease or under an acidic pH.

12. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 10, wherein F is selected from a group consisting of p-aminobenzyl alcohol, ethylenediamine units, and their derivatives thereof.

13. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 6, wherein the scaffold comprises C_{1-8} alkylene or C_{1-8} heteroalkylene.

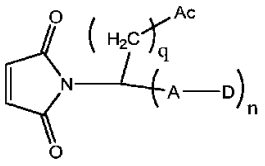
14. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 13, wherein scaffold comprises a C_{1-3} alkylene.

15. The antibody-drug conjugate or its pharmaceutically acceptable salt thereof as described in claim 1, wherein Ac is selected a group consisting of (D/L) glycine, (D/L) alanine, (D/L) leucine, (D/L) isoleucine, (D/L) valine, (D/L) phenylalanine, (D/L) proline, (D/L) tryptophan, (D/L) serine, (D/L) tyrosine, (D/L) cysteine, (D/L) methionine, (D/L) asparagine, (D/L) glutamine, (D/L) threonine, (D/L) aspartic acid, (D/L) glutamic acid, or the following structural formulas:



where a wavy line represents a linkage site to the scaffold and R represents any structure between an amino group and a phosphate group.

16. A junction-drug linkage having the following structure:



wherein Ac is connected to the hydrocarbyl group through an amino group, and wherein Ac comprises a fragment consisting of at least one amino group and at least one acidic group or an oligopeptide consisting of a plurality of amino acid units;

D comprises a drug unit;
A comprises a linker;
q is an integer ranging from 1 to 8, and n is 1 or 2.

17. Use of the antibody-drug conjugate or pharmaceutically acceptable salt thereof as described in any one of claims 1 through 15, in the preparation of a medicament for the treatment of cancer, wherein said antibody of the antibody-drug conjugate corresponds to an antibody for a tumor-associated antigen expressed by the cancer, and wherein said drug unit D comprises a cytotoxic drug.

18. Use of the antibody-drug conjugate or pharmaceutically acceptable salt thereof as described in any one of claims 1 through 15, in the preparation of a medicament for the treatment of immune disease, wherein said antibody of the antibody-drug conjugate corresponds to an antibody for a cell surface receptor expressed by a cell associated with the immune disease, and wherein said drug unit D comprises a drug for treating autoimmune disease.

19. Use of the antibody-drug conjugate or pharmaceutically acceptable salt thereof as described in any one of claims 1 through 15, in the preparation of a medicament for the treatment of inflammation, wherein said antibody of the antibody-drug conjugate corresponds to an antibody for a cell surface receptor expressed by a cell associated with the inflammation, and wherein said drug unit D comprises an anti-inflammatory drug.