Claims

1. An anti-158P1D7 antibody or antigen binding fragment thereof, wherein the antibody or antigen binding fragment thereof comprises a heavy chain variable region comprising an amino acid sequence at least 80% homologous to the heavy chain variable region amino acid sequence set forth in SEQ ID NO:7 and a light chain variable region comprising an amino acid sequence at least 80% homologous to the light chain variable region amino acid sequence set forth in SEQ ID NO:8,

wherein the heavy chain complementarity determining region 1 (CDR-H1), CDR-H2, and CDR-H3 of the antibody or antigen binding fragment thereof are identical to the amino acid sequences of the respective CDR-H1, CDR-H2, and CDR-H3 in the heavy chain variable region sequence set forth in SEQ ID NO: 7 and the light chain complementarity determining region 1 (CDR-L1), CDR-L2, and CDR-L3 of the antibody or antigen binding fragment thereof are identical to the amino acid sequence of the respective CDR-L1, CDR-L2, and CDR-L3 in the light chain variable region sequence set forth in SEQ ID NO: 8, and

wherein the CDR-H1, CDR-H2, CDR-H3, CDR-L1, CDR-L2, and CDR-L3 are determined by Kabat numbering scheme.

2. The anti-158P1D7 antibody or antigen binding fragment thereof of claim 1, wherein the antibody or fragment thereof comprises a heavy chain variable region comprising an amino acid sequence at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or 99% homologous to the heavy chain variable region amino acid sequence set forth in SEQ ID NO:7 and a light chain variable region comprising an amino acid sequence at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or 99% homologous to the light chain variable region amino acid sequence set forth in SEQ ID NO:8.

3. The antigen binding fragment thereof of claim 1, wherein the antigen binding fragment is an Fab, F(ab')2, Fv, or scFv fragment.

4. The anti-158P1D7 antibody or antigen binding fragment thereof of claim 1, wherein the antibody or antigen binding fragment thereof is a fully human antibody or antigen binding fragment thereof.

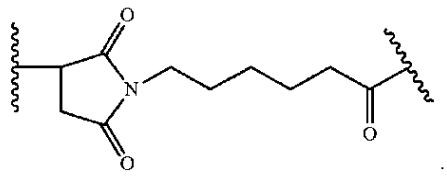
5. The anti-158P1D7 antibody or antigen binding fragment thereof of claim 1, wherein the antibody or antigen binding fragment thereof is recombinantly produced.

6. An antibody drug conjugate comprising the anti-158P1D7 antibody or antigen binding fragment of claim 1 conjugated to monomethyl auristatin E (MMAE) via a linker.

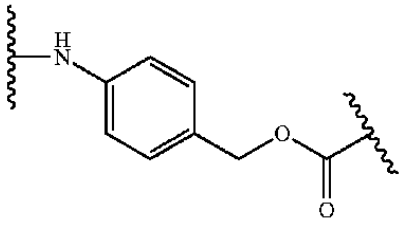
7. The antibody drug conjugate of claim 6, wherein the linker comprises valine-citrulline.

8. The antibody drug conjugate of claim 6, wherein the linker has the formula: –Aa–Ww–Yy–; wherein –A– is a stretcher unit, a is 0 or 1; –W– is an amino acid unit, w is an integer ranging from 0 to 12; and –Y– is a spacer unit, y is 0, 1, or 2.

9. The antibody drug conjugate of claim 8, wherein the stretcher unit has the structure of Formula I below; the amino acid unit is Val-Cit; and the spacer unit is a PAB group having the structure of Formula II below;



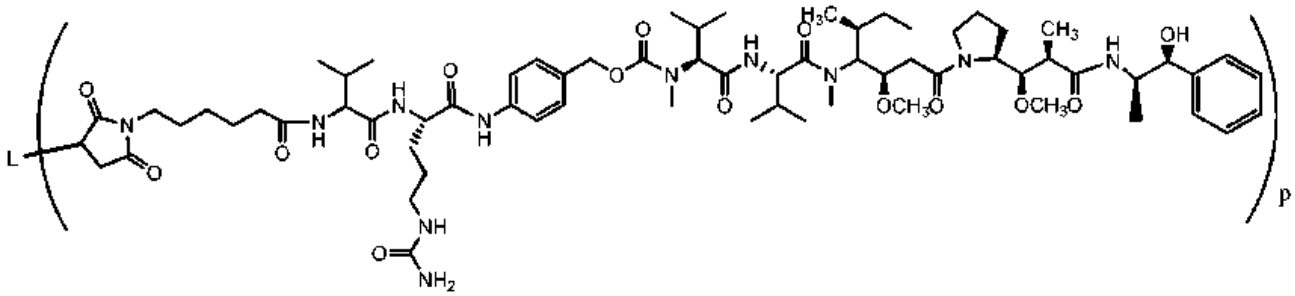
Formula I;



Formula II.

10. The antibody drug conjugate of claim 9, wherein the stretcher unit forms a bond with a sulfur atom of the antibody or antigen binding fragment thereof; and wherein the spacer unit is linked to MMAE via a carbamate group.

11. The antibody drug conjugate of claim 6, wherein the antibody drug conjugate has the following structure:



wherein L- represents the antibody or antigen binding fragment thereof and p ranges from 1 to 10.

12. The antibody drug conjugate of claim 11, wherein p ranges from 2 to 5.

13. A pharmaceutical composition comprising a therapeutically effective amount of the antibody drug conjugate of claim 11 and a pharmaceutically acceptable excipient.

~~14. A method of treating cancer in a subject, comprising administering to said subject a therapeutically effective amount of the antibody drug conjugate of claim 11, wherein the cancer expresses 158P1D7.~~

~~15. The method of claim 14, wherein the subject is a human subject.~~

~~16. The method of claim 14, comprising administering about 1 to about 5 mg/kg of the antibody drug conjugate to the subject.~~

~~17. The method of claim 14, wherein the cancer is selected from the group consisting of glioblastoma, lung cancer, bladder cancer, and breast cancer.~~

~~18. The method of claim 14, wherein the cancer is bladder cancer.~~

14~~19~~. A host cell selected from the group consisting of the following (a) and (b),

(a) a host cell transformed with a vector comprising a polynucleotide comprising a sequence encoding the heavy chain variable region of the antibody or antigen binding fragment as defined in claim 1 and a polynucleotide comprising a sequence encoding the light chain variable region of the antibody or antigen binding fragment as defined in claim 1; and

(b) a host cell transformed with a vector comprising a polynucleotide comprising a sequence encoding the heavy chain variable region of the antibody or antigen binding fragment as defined in claim 1 and a vector comprising a polynucleotide comprising a sequence encoding the light chain variable region of the antibody or antigen binding fragment as defined in claim 1.

15~~20~~. A method of producing an antibody or antigen binding fragment thereof that binds to 158P1D7, wherein the method comprises:

a) culturing the host cell of claim 14~~19~~ under conditions suitable for expression of the polynucleotide encoding the antibody or antigen binding fragment thereof; and

b) isolating the antibody or antigen binding fragment thereof.

16~~21~~. A method of producing an antibody drug conjugate comprising an antibody or antigen binding fragment thereof that binds to 158P1D7, wherein the method comprises:

a) culturing the host cell of claim 14~~19~~ under conditions suitable for expression of the polynucleotide encoding the antibody or antigen binding fragment thereof;

b) isolating the antibody or antigen binding fragment thereof; and

c) conjugating 1 to 20 units of MMAE to the antibody or antigen binding fragment thereof, wherein each unit of MMAE is conjugated via a linker.

17~~22~~. An antibody or antigen binding fragment thereof produced by the method of claim 15~~20~~.

18~~23~~. An antibody drug conjugate produced by the method of claim 16~~21~~.

19. A therapeutically effective amount of the antibody drug conjugate of any one of clams 6 to 12 and 18, for use as a medicament.

20. Use of a therapeutically effective amount of the antibody drug conjugate of any one of claims 6 to 12 and 18, in the manufacture of a medicament for the treatment of cancer in a subject, wherein the cancer expresses 158P1D7.

21. The use of claim 20, wherein the subject is a human subject.

22. The use of claim 20, wherein about 1 to about 5 mg/kg of the antibody drug conjugate is to be administered to the subject.

23. The use of claim 20, wherein the cancer is selected from the group consisting of glioblastoma, lung cancer, bladder cancer, and breast cancer.

24. The use of claim 20, wherein the cancer is bladder cancer.