Summary

[0004]

The present disclosure provides an antibody that binds to fibrin and a pharmaceutical composition containing the antibody. The present disclosure particularly provides a humanized antibody that binds to fibrin and a pharmaceutical composition containing the antibody.

[0004a] In one aspect, the disclosure provides an antibody that binds to insoluble fibrin or an antigen-binding fragment thereof, comprising

(1) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:1, heavy chain CDR2 having an amino acid sequence set forth in SEQ ID NO:2 and heavy chain CDR3 having an amino acid sequence set forth in SEQ ID NO:3, and

a light chain variable region comprising light chain CDR1 having an amino acid sequence set forth in SEQ ID NO:4, light chain CDR2 having an amino acid sequence set forth in SEQ ID NO:5 and Light chain CDR3 having an amino acid sequence set forth in SEQ ID NO:6; or

(2) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:9, heavy chain CDR2 having an amino acid sequence set forth in SEQ ID NO:10 and heavy chain CDR3 having an amino acid sequence set forth in SEQ ID NO:11, and

a light chain variable region comprising light chain CDR1 having an amino acid sequence set forth in SEQ ID NO:12, light chain CDR2 having an amino acid sequence set forth in SEQ ID NO:13 and light chain CDR3 having an amino acid sequence set forth in SEQ ID NO:14.

[0004b] In another aspect, the disclosure provides an antibody-drug conjugate comprising the antibody or an antigen-binding fragment thereof according to the disclosure.

[0004c] In another aspect, the disclosure provides a pharmaceutical composition comprising the antibody-drug conjugate according to the disclosure.

[0004d] In another aspect, the disclosure provides a pharmaceutical composition according to the disclosure, for use in therapy.

[0004e] In another aspect, the disclosure provides a pharmaceutical composition, comprising an anti-cancer agent comprising the antibody or an antigen-binding fragment thereof according to the disclosure, for use in therapy.

[0004f] In another aspect, the disclosure provides a use of the pharmaceutical composition according to the disclosure in the manufacture of a medicament for treating a cancer.

[0004f] In another aspect, the disclosure provides a use of the pharmaceutical composition comprising the antibody or an antigen-binding fragment thereof according to the

disclosure, in the manufacture of a medicament for treating a cancer.

[0004g] In another aspect, the disclosure provides a *in-vivo* diagnostic agent comprising the antibody or an antigen-binding fragment thereof according to the disclosure.

[0005]

According to the present disclosure, the following disclosures are provided.

[1] An antibody that binds to insoluble fibrin or an antigen-binding fragment thereof, comprising

(1) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:1, heavy chain CDR2 having an amino acid sequence set forth in SEQ ID NO:2 and heavy chain CDR3 having an amino acid sequence set forth in SEQ ID NO:3, and

a light chain variable region comprising light chain CDR1 having an amino acid sequence set forth in SEQ ID NO:4, light chain CDR2 having an amino acid sequence set forth in SEQ ID NO:5 and Light chain CDR3 having an amino acid sequence set forth in SEQ ID NO:6; or

(2) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:9, heavy chain CDR2 having an amino acid sequence

Claims

[Claim 1]

An antibody that binds to insoluble fibrin or an antigen-binding fragment thereof, comprising

(1) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:1, heavy chain CDR2 having an amino acid sequence set forth in SEQ ID NO:2 and heavy chain CDR3 having an amino acid sequence set forth in SEQ ID NO:3, and

a light chain variable region comprising light chain CDR1 having an amino acid sequence set forth in SEQ ID NO:4, light chain CDR2 having an amino acid sequence set forth in SEQ ID NO:5 and Light chain CDR3 having an amino acid sequence set forth in SEQ ID NO:6; or

(2) a heavy chain variable region comprising heavy chain CDR1 having an amino acid sequence set forth in SEQ ID NO:9, heavy chain CDR2 having an amino acid sequence set forth in SEQ ID NO:10 and heavy chain CDR3 having an amino acid sequence set forth in SEQ ID NO:11, and

a light chain variable region comprising light chain CDR1 having an amino acid sequence set forth in SEQ ID NO:12, light chain CDR2 having an amino acid sequence set forth in SEQ ID NO:13 and light chain CDR3 having an amino acid sequence set forth in SEQ ID NO:14.

[Claim 2]

The antibody that binds to insoluble fibrin or an antigen-binding fragment thereof according to claim 1, comprising

(3) a heavy chain variable region having an amino acid sequence set forth in SEQ ID NO:7 and a light chain variable region having an amino acid sequence set forth in SEQ ID NO:8; or

(4) a heavy chain variable region having an amino acid sequence set forth in SEQ ID NO:15 and a light chain variable region having an amino acid sequence set forth in SEQ ID NO:16.

[Claim 3]

The antibody that binds to insoluble fibrin or an antigen-binding fragment thereof according to claim 1 or 2, wherein the antibody binds to insoluble fibrin with a stronger affinity than to fibrinogen, or binds to insoluble fibrin with a stronger affinity than to fibrinogen, and comprises

(5) a heavy chain variable region having an amino acid sequence having an identity of 90% or more to the heavy chain variable region of the antibody described in any one of the above (1) to (4) and the light chain variable region of the antibody,

(6) the heavy chain variable region of the antibody described in any one of the above (1) to (4) and a light chain variable region having an amino acid sequence

having an identity of 90% or more to the light chain variable region of the antibody,

(7) a heavy chain variable region having an amino acid sequence having an identity of 90% or more to the heavy chain variable region of the antibody described in any one of the above (1) to (4) and a light chain variable region having an amino acid sequence having an identity of 90% or more to the light chain variable region of the antibody,

(8) a heavy chain variable region having an amino acid sequence having an identity of 95% or more to the heavy chain variable region of the antibody described in any one of the above (1) to (4) and the light chain variable region of the antibody,

(9) the heavy chain variable region of the antibody described in any one of the above (1) to (4) and a light chain variable region having an amino acid sequence having an identity of 95% or more to the light chain variable region of the antibody, or

(10) a heavy chain variable region having an amino acid sequence having an identity of 95% or more to the heavy chain variable region of the antibody described in any one of the above (1) to (4) and a light chain variable region having an amino acid sequence having an identity of 95% or more to the light chain variable region of the antibody.

[Claim 4]

The antibody or an antigen-binding fragment thereof according to any one of claims 1 to 3, which is a humanized antibody or an antigen-binding fragment thereof.

[Claim 5]

An antibody-drug conjugate comprising the antibody or an antigen-binding fragment thereof according to any one of claims 1 to 4.

[Claim 6]

A pharmaceutical composition comprising the antibody-drug conjugate according to claim 5.

[Claim 7]

The pharmaceutical composition according to claim 6, for use in therapy.

[Claim 8]

A pharmaceutical composition, comprising an anti-cancer agent comprising the antibody or an antigen-binding fragment thereof according to any one of claims 1 to 4, for use in therapy.

[Claim 9]

Use of the pharmaceutical composition according to claim 6 in the manufacture of a medicament for treating a cancer.

[Claim 10]

Use of the pharmaceutical composition comprising the antibody or an antigen-binding fragment thereof according

to any one of claims 1 to 4, in the manufacture of a medicament for treating a cancer.

[Claim 11]

An *in-vivo* diagnostic agent comprising the antibody or an antigen-binding fragment thereof according to any one of claims 1 to 4.