

antigen-binding fragment thereof that binds the amino acid regions as set forth in SEQ ID NO: 21.

[0020] The present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof for use as a medicament. **In another aspect**, the present disclosure provides an antibody or an antigen-binding fragment according to the disclosure for use as a medicament.

[0021] In one example, the present disclosure provides an anti-Sema3A or an antigen-binding fragment for inhibiting the vasorepressive effect of SemaA, and/or for improving revascularisation of the retina.

[0022] In one example, the present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof for use in the treatment or prevention of a retinal or eye disease.

[0022a] **In another aspect**, the present disclosure provides use of the antibody or the antigen-binding fragment according to the disclosure in the manufacture of a medicament for treating or preventing an eye or a retinal disease, wherein said disease is selected from the group consisting of diabetic retinopathy including proliferative diabetic retinopathy and non-proliferative diabetic retinopathy, ischemic retinopathy, diabetic macular edema, diabetic macular ischemia, age-related macular edema, retinal neovascularization, glaucoma and choroidal neovascularization.

[0023] In another example, the present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof for use in the treatment or prevention of a disease selected from the group consisting of retinopathy, ischemic retinopathy, diabetic retinopathy including proliferative diabetic retinopathy and non-proliferative diabetic retinopathy, diabetic macular edema, diabetic macular ischemia, age-related macular degeneration, retinitis pigmentosa, inherited retinal dystrophy, myopic degeneration, retinal artery occlusions, endophthalmitis, uveitis, cystoid macular edema, choroidal neovascular membrane secondary to any retinal

CLAIMS

1. An anti-Sema3A antibody or an antigen-binding fragment thereof comprising:

- a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 1 (H-CDR1); the amino acid sequence of SEQ ID NO: 2 (H-CDR2); and the amino acid sequence of SEQ ID NO: 3 (H-CDR3); and
- a light chain variable region comprising the amino acid sequence of SEQ ID NO: 4 (L-CDR1); the amino acid sequence of SEQ ID NO: 5 (L-CDR2); and the amino acid sequence of SEQ ID NO: 6 (L-CDR3).

2. The anti-Sema3A antibody or the antigen-binding fragment thereof according to claim **1**, wherein the antibody or the antigen-binding fragment thereof comprises:

- a heavy chain variable region comprising an amino acid sequence at least 80%, at least 90%, at least 95%, at least 98%, or at least 99% identical to the amino acid sequence SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 or SEQ ID NO: 10; and
- a light chain variable region comprising an amino acid sequence at least 80%, at least 90%, at least 95%, at least 98%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 11, SEQ ID NO: 12 or SEQ ID NO: 13.

3. The anti-Sema3A antibody or the antigen-binding fragment thereof according to claim **1**, wherein the antibody or the antigen-binding fragment thereof comprises:

- a heavy chain variable region comprising the amino acid sequences of SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 or SEQ ID NO: 10 and

- a light chain variable region comprising the amino acid sequence of SEQ ID NO: 11, SEQ ID NO: 12 or SEQ ID NO: 13.

4. The anti-Sema3A antibody or the antigen-binding fragment thereof according to claim **1**, wherein the antibody or the antigen-binding fragment thereof comprises:

- a. a variable heavy chain and a variable light chain comprising the amino acid sequences of SEQ ID NO: 7 and SEQ ID NO: 11, respectively;
- b. a variable heavy chain and a variable light chain comprising the amino acid sequences of SEQ ID NO: 8 and SEQ ID NO: 11, respectively;
- c. a variable heavy chain and a variable light chain comprising the amino acid sequences of SEQ ID NO: 9 and SEQ ID NO: 12, respectively; or
- d. a variable heavy chain and a variable light chain comprising the amino acid sequences of SEQ ID NO: 10 and SEQ ID NO: 13, respectively.

5. The anti-Sema3A antibody or the antigen-binding fragment thereof according to claim **1**, wherein the antibody or the antigen-binding fragment thereof comprises:

- a heavy chain comprising, preferably consisting of, the amino acid sequence of SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 17 or SEQ ID NO: 19; and
- a light chain comprising, preferably consisting of, the amino acid sequence of SEQ ID NO: 15, SEQ ID NO: 18 or SEQ ID NO: 20.

6. The anti-Sema3A antibody or the antigen-binding fragment thereof according to claim **1**, wherein the antibody or the antigen-binding fragment thereof comprises:

- a. a heavy chain comprising the amino acid sequence of SEQ ID NO: 14 and a light chain comprising the amino acid sequence of SEQ ID NO: 15;

- b. a heavy chain comprising the amino acid sequence of SEQ ID NO: 16 and a light chain comprising the amino acid sequence of SEQ ID NO: 15;
- c. a heavy chain comprising the amino acid sequence of SEQ ID NO: 17 and a light chain comprising the amino acid sequence of SEQ ID NO: 18; or
- d. a heavy chain comprising the amino acid sequence of SEQ ID NO: 19 and a light chain comprising the amino acid sequence of SEQ ID NO: 20.

7. An antibody or an antigen-binding fragment according to any one of claims **1 to 6** for use as a medicament.

8. An antibody or an antigen-binding fragment for use according to claim **7** for inhibiting the vasorepressive effect of SemaA3.

9. An antibody or an antigen-binding fragment for use according to claim **7** for improving revascularisation of the retina.

10. Use of the antibody or the antigen-binding fragment according to any one of claims **1 to 6** in the manufacture of a medicament for treating or preventing an eye or a retinal disease, wherein said disease is selected from the group consisting of diabetic retinopathy including proliferative diabetic retinopathy and non-proliferative diabetic retinopathy, ischemic retinopathy, diabetic macular edema, diabetic macular ischemia, age-related macular edema, retinal neovascularization, glaucoma and choroidal neovascularization.

11. The use according to claim **10**, wherein said disease is diabetic macular edema or diabetic macular ischemia.

12. The use according to claim **10**, wherein said disease is diabetic retinopathy.

13. The use according to claim **10** or **12**, wherein said disease is non-proliferative diabetic retinopathy.

14. The use according to claim **10** or **12**, wherein said disease is proliferative diabetic retinopathy.

15. The use according to claim **10**, wherein:

- said disease is diabetic macular ischemia, and
- said antibody or an antigen-binding fragment promotes vascular regeneration within the ischemic retina (revascularization) and prevents pathological neovascularization of the vitreous region of the eye.

16. The use according to claim **10**, wherein:

- said disease is diabetic macular edema, and
- said antibody or an antigen-binding fragment reduces permeability of blood retinal barrier.

17. The use according to claim **10**, wherein said antibody or an antigen-binding fragment inhibits Sema3A-induced permeability of the blood retinal barrier and/or Sema3A-induced vasoregression from ischemic areas.

18. A pharmaceutical composition comprising an antibody or an antigen-binding fragment according to any of claims **1** to **6** and a pharmaceutically acceptable carrier.

19. The antibody or the antigen-binding fragment thereof according to any of claims **1** to **6**, the use according to any one of claims **10** to **17** or the pharmaceutical composition according to claim **18**, wherein the antibody, the antigen-binding fragment thereof or the pharmaceutical composition is prepared in a formulation adapted for a parenteral route, intravenous route, intravitreal route or subcutaneous route of administration.

20. The antibody or the antigen-binding fragment thereof according to any of claims **1** to **6**, the use according to any one of claims **10** to **17** or the pharmaceutical

composition according to claim **18**, wherein the antibody, the antigen-binding fragment thereof or the pharmaceutical composition is prepared in a formulation adapted for an intravitreal route of administration.

21. An isolated polynucleotide or polynucleotides comprising:

- a sequence encoding a heavy chain as shown in SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 17, or SEQ ID NO: 19 or a heavy chain variable region as shown in SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9 or SEQ ID NO: 10; and
- a sequence encoding a light chain as shown in SEQ ID NO: 15, SEQ ID NO: 18 or SEQ ID NO: 20 or a light chain variable region as shown in SEQ ID NO: 11, SEQ ID NO: 12 or SEQ ID NO: 13.

22. An expression vector comprising the isolated polynucleotide or polynucleotides of claim **21**.

23. A host cell comprising an isolated polynucleotide or polynucleotides according to claim **21** or an expression vector according to claim **22**.

24. A method for producing an anti-Sema3A antibody or an antigen-binding fragment thereof comprising:

- a. obtaining a host cell according to claim **23**; and
- b. cultivating the host cell.

25. The method according to claim **24**, further comprising recovering and purifying the antibody or an antigen-binding fragment thereof.