

[0015] In yet another example, the present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof comprising:

- 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.

[0016] In a particular example, the disclosure relates to an anti-Sema3A antibody or an antigen-binding fragment thereof comprising:

- 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.

[0017] In a particular preferred example, the anti-Sema3A antibody is a humanized anti-Sema3A antibody.

[0018] The present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof that binds to at least one amino acid residue within amino acid regions 370-382 of the human Sema3A as set forth in SEQ ID NO: 22.

[0019] In one example, the present disclosure provides an anti-Sema3A antibody or an antigen-binding fragment thereof that binds to at least one amino acid residue within amino acid regions as set forth in SEQ ID NO: 21 (DSTKDLPPDDVITF). In a preferred example, the present disclosure provides an anti-Sema3A antibody or an

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. **In another aspect**, the present disclosure provides the antibody or the antigen-binding fragment according to the disclosure for use for treating or preventing an eye or a retinal 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.

[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. The antibody or the antigen-binding fragment according to any one of claims **1 to 6** for use for treating or preventing an eye or a retinal disease.

11. 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.

12. The antibody or the antigen-binding fragment for use according to claim **10** or the use according to claim **11**, wherein said disease is 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 diseases, optic neuropathies, glaucoma, retinal detachment, toxic retinopathy, radiation retinopathy, traumatic retinopathy, drug-induced retinal

vasculopathy, retinal neovascularisation, polypoidal choroidal vasculopathy, retinal vasculitis, retinal microaneurysm, Fuch's dystrophy, macular telangiectasia, usher syndrome, and Stargardt disease.

13. The antibody or the antigen-binding fragment for use according to any one of claims **10** or **12**, or the use according to claim **11** or **12**, 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.

14. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, wherein said disease is diabetic macular edema and/or diabetic macular ischemia.

15. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, wherein said disease is diabetic retinopathy.

16. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, wherein said disease is non-proliferative diabetic retinopathy.

17. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, wherein said disease is proliferative diabetic retinopathy.

18. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, 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.

19. The antibody or the antigen-binding fragment for use according to any one of claims **10**, **12** and **13**, or the use according to any one of claims **11** to **13**, wherein:

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

20. The antibody or the antigen-binding fragment for use or the use according to claim **19**, 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.

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

22. The antibody or the antigen-binding fragment thereof according to any of claims **1** to **6**, the use according to any one of claims **11** to **20** or the pharmaceutical composition according to claim **21**, 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.

23. The antibody or the antigen-binding fragment thereof according to any of claims **1** to **6**, the use according to any one of claims **11** to **20** or the pharmaceutical composition according to claim **21**, wherein the antibody, the antigen-binding fragment thereof or the pharmaceutical composition is prepared in a formulation adapted for an intravitreal route of administration.

24. 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.

25. An expression vector comprising the isolated polynucleotide or polynucleotides of claim **24**.

26. A host cell comprising an isolated polynucleotide or polynucleotides according to claim **24** or an expression vector according to claim **25**.

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

- a. obtaining a host cell according to claim **26**; and
- b. cultivating the host cell.

28. The method according to claim **27**, further comprising recovering and purifying the antibody or an antigen-binding fragment thereof.