

Claims

[Claim 1]

An isolated anti-FcRn antibody comprising:

CDR1 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 21, 24, 27, 30, 33, 36, 39 and 42;
CDR2 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 22, 25, 28, 31, 34, 37, 40 and 43; and
CDR3 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 23, 26, 29, 32, 35, 38, 41 and 44, or a fragment thereof.

[Claim 2]

The antibody or a fragment thereof according to claim 1, comprising:

CDR1 comprising amino acid sequence of SEQ ID No: 21, CDR2 comprising amino acid sequence of SEQ ID No: 22 and CDR3 comprising amino acid sequence of SEQ ID No: 23,
CDR1 comprising amino acid sequence of SEQ ID No: 27, CDR2 comprising amino acid sequence of SEQ ID No: 28 and CDR3 comprising amino acid sequence of SEQ ID No: 29,
CDR1 comprising amino acid sequence of SEQ ID No: 33, CDR2 comprising amino acid sequence of SEQ ID No: 34 and CDR3 comprising amino acid sequence of SEQ ID No: 35, or
CDR1 comprising amino acid sequence of SEQ ID No: 39, CDR2 comprising amino acid sequence of SEQ ID No: 40 and CDR3 comprising amino acid sequence of SEQ ID No: 41.

[Claim 3]

The antibody or a fragment thereof according to claim 1, comprising:

CDR1 comprising amino acid sequence of SEQ ID No: 24, CDR2 comprising amino acid sequence of SEQ ID No: 25 and CDR3 comprising amino acid sequence of SEQ ID No: 26,
CDR1 comprising amino acid sequence of SEQ ID No: 30, CDR2 comprising amino acid sequence of SEQ ID No: 31 and CDR3 comprising amino acid sequence of SEQ ID No: 32,
CDR1 comprising amino acid sequence of SEQ ID No: 36, CDR2 comprising amino acid sequence of SEQ ID No: 37 and CDR3 comprising amino acid sequence of SEQ ID No: 38, or
CDR1 comprising amino acid sequence of SEQ ID No: 42, CDR2 comprising amino acid sequence of SEQ ID No: 43 and CDR3 comprising amino acid sequence of SEQ ID No: 44.

[Claim 4]

The antibody or a fragment thereof according to claim 1 comprising one or more heavy chain variable regions and light chain variable

regions selected from the group consisting of:

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 21, CDR2 comprising amino acid sequence of SEQ ID No: 22 and CDR3 comprising amino acid sequence of SEQ ID No: 23, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 24, CDR2 comprising amino acid sequence of SEQ ID No: 25 and CDR3 comprising amino acid sequence of SEQ ID No: 26;

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 27, CDR2 comprising amino acid sequence of SEQ ID No: 28 and CDR3 comprising amino acid sequence of SEQ ID No: 29, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 30, CDR2 comprising amino acid sequence of SEQ ID No: 31 and CDR3 comprising amino acid sequence of SEQ ID No: 32;

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 33, CDR2 comprising amino acid sequence of SEQ ID No: 34 and CDR3 comprising amino acid sequence of SEQ ID No: 35, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 36, CDR2 comprising amino acid sequence of SEQ ID No: 37 and CDR3 comprising amino acid sequence of SEQ ID No: 38; and

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 39, CDR2 comprising amino acid sequence of SEQ ID No: 40 and CDR3 comprising amino acid sequence of SEQ ID No: 41, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 42, CDR2 comprising amino acid sequence of SEQ ID No: 43 and CDR3 comprising amino acid sequence of SEQ ID No: 44.

[Claim 5]

An isolated anti-FcRn antibody comprising:

CDR1 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 21, 24, 27, 30, 33, 36, 39 and 42; CDR2 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 22, 25, 28, 31, 34, 37, 40 and 43; and CDR3 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the

group consisting of SEQ ID Nos: 23, 26, 29, 32, 35, 38, 41 and 44, or a fragment thereof.

[Claim 6] An isolated anti-FcRn antibody or a fragment thereof comprising one or more heavy chain variable regions and light chain variable regions comprising one or more amino acid sequences selected from the group consisting of amino acid sequences of SEQ ID Nos: 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20.

[Claim 7] The antibody or a fragment thereof according to claim 6, comprising a heavy chain variable region comprising an amino acid sequence of SEQ ID Nos: 2, 4, 6, 8, or 10.

[Claim 8] The antibody or a fragment thereof according to claim 6, comprising a light chain variable region comprising an amino acid sequence of SEQ ID Nos: 12, 14, 16, 18 or 20.

[Claim 9] The antibody or a fragment thereof according to claim 6, comprising one or more heavy chain variable regions and light chain variable regions selected from the group consisting of:
heavy chain variable region comprising amino acid sequence of SEQ ID No: 2 and light chain variable region comprising amino acid sequence of SEQ ID No: 12;
heavy chain variable region comprising amino acid sequence of SEQ ID No: 4 and light chain variable region comprising amino acid sequence of SEQ ID No: 14;
heavy chain variable region comprising amino acid sequence of SEQ ID No: 6 and light chain variable region comprising amino acid sequence of SEQ ID No: 16;
heavy chain variable region comprising amino acid sequence of SEQ ID No: 8 and light chain variable region comprising amino acid sequence of SEQ ID No: 18; and
heavy chain variable region comprising amino acid sequence of SEQ ID No: 10 and light chain variable region comprising amino acid sequence of SEQ ID No: 20.

[Claim 10] An isolated anti-FcRn antibody or a fragment thereof comprising one or more heavy chain variable regions and light chain variable regions comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequences selected from the group consisting of amino acid sequences of SEQ ID Nos: 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20.

[Claim 11] The antibody or a fragment thereof according to any one of claims 1 to

- 10, wherein the antibody binds FcRn with a KD(dissociation constant) value of 0.01 to 2 nM, at pH 6.0 or pH 7.4 condition.
- [Claim 12] The antibody or a fragment thereof according to any one of claims 1 to 10, wherein the antibody is monoclonal antibody, murine antibody, chimeric antibody, humanized antibody or human antibody.
- [Claim 13] The antibody or a fragment thereof according to any one of claims 1 to 10, wherein the antibody or fragment thereof comprises full-length antibodies, Fab, F(ab')₂, Fd, Fv, scFv, domain antibodies, dual-specific antibodies, bibodies, minibodies, tribodies, scap (sterol regulatory binding protein cleavage activating protein), bispecific antibodies, trispecific antibodies, multispecific antibodies, diabodies, triabodies, tetrabodies, intrabodies, nanobodies, small modular immunopharmaceuticals (SMIP), binding-domain immunoglobulin fusion proteins, camelized antibodies or VHH containing antibodies.
- [Claim 14] The antibody or a fragment thereof according to any one of claims 1 to 10, wherein the antibody comprises IgD antibodies, IgE antibodies, IgM antibodies, IgG1 antibodies, IgG2 antibodies, IgG3 antibodies, IgG4 antibodies.
- [Claim 15] A Polynucleotide encoding the antibody or a fragment thereof according to any one of claims 1 to 14.
- [Claim 16] A Polynucleotide encoding an anti-FcRn antibody or a fragment thereof comprising one or more sequence selected from the group consisting of SEQ ID Nos: 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19.
- [Claim 17] A Polynucleotide encoding an anti-FcRn antibody or a fragment thereof comprising sequence, which has at least 90% homology with one or more sequence selected from the group consisting of SEQ ID Nos: 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19.
- [Claim 18] A recombinant expression vector comprising the polynucleotide according to any one of claims 15 to 17.
- [Claim 19] A host cell, which is transected with the recombinant expression vector of claim 18.
- [Claim 20] A method of preparing an anti-FcRn antibody or a fragment thereof comprising:
culturing the host cell of claim 19 and producing the antibody therefrom; and
isolating and purifying the produced antibody to recover the antibody binding specifically to FcRn.
- [Claim 21] A pharmaceutical composition comprising the antibody or a fragment

thereof according to any one of claims 1 to 14, and one or more pharmaceutically acceptable carrier.

[Claim 22]

A method of treating a patient suffering from an autoimmune disease, comprising administering the composition of claim 21 to said patient.

[Claim 23]

The method of claim 22, wherein the autoimmune disease is one selected from the group consisting of immune neutropenia, Guillain-Barre syndrome, epilepsy, autoimmune encephalitis, Isaac's syndrome, nevus syndrome, pemphigus vulgaris, Pemphigus foliaceus, Bullous pemphigoid, epidermolysis bullosa acquisita, pemphigoid gestationis, mucous membrane pemphigoid, antiphospholipid syndrome, autoimmune anemia, autoimmune Grave's disease, Goodpasture's syndrome, myasthenia gravis, multiple sclerosis, rheumatoid arthritis, lupus, idiopathic thrombocytopenic purpura, lupus nephritis and membranous nephropathy.

[Claim 24]

A composition comprising the antibody or a fragment thereof according to any one of claims 1 to 14 labelled with a detection label.

[Claim 25]

A method of detecting FcRn in vivo or in vitro comprising using the antibody or a fragment thereof according to any one of claims 1 to 14.

Claims

1. An isolated anti-FcRn antibody comprising:

CDR1 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 21, 24, 27, 30, 33, 36, 39 and 42;

CDR2 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 22, 25, 28, 31, 34, 37, 40 and 43; and

CDR3 comprising one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 23, 26, 29, 32, 35, 38, 41 and 44, or a fragment thereof.

2. The antibody or a fragment thereof according to claim 1, comprising:

CDR1 comprising amino acid sequence of SEQ ID No: 21, CDR2 comprising amino acid sequence of SEQ ID No: 22 and CDR3 comprising amino acid sequence of SEQ ID No: 23,

CDR1 comprising amino acid sequence of SEQ ID No: 27, CDR2 comprising amino acid sequence of SEQ ID No: 28 and CDR3 comprising amino acid sequence of SEQ ID No: 29,

CDR1 comprising amino acid sequence of SEQ ID No: 33, CDR2 comprising amino acid sequence of SEQ ID No: 34 and CDR3 comprising amino acid sequence of SEQ ID No: 35, or

CDR1 comprising amino acid sequence of SEQ ID No: 39, CDR2 comprising amino acid sequence of SEQ ID No: 40 and CDR3 comprising amino acid sequence of SEQ ID No: 41.

3. The antibody or a fragment thereof according to claim 1, comprising:

CDR1 comprising amino acid sequence of SEQ ID No: 24, CDR2 comprising amino acid sequence of SEQ ID No: 25 and CDR3 comprising amino acid sequence of SEQ ID No: 26,

CDR1 comprising amino acid sequence of SEQ ID No: 30, CDR2 comprising amino acid sequence of SEQ ID No: 31 and CDR3 comprising amino acid sequence of SEQ ID No: 32,

CDR1 comprising amino acid sequence of SEQ ID No: 36, CDR2 comprising amino acid sequence of SEQ ID No: 37 and CDR3 comprising amino acid sequence of SEQ ID No: 38, or

CDR1 comprising amino acid sequence of SEQ ID No: 42, CDR2 comprising amino acid sequence of SEQ ID No: 43 and CDR3 comprising amino acid sequence of SEQ ID No: 44.

4. The antibody or a fragment thereof according to claim 1, comprising one or more heavy chain variable regions and light chain variable regions selected from the group consisting of:

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 21, CDR2 comprising amino acid sequence of SEQ ID No: 22 and CDR3 comprising amino acid sequence of SEQ ID No: 23, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 24, CDR2 comprising amino acid sequence of SEQ ID No: 25 and CDR3 comprising amino acid sequence of SEQ ID No: 26;

heavy chain variable region comprising CDR1 comprising amino

acid sequence of SEQ ID No: 27, CDR2 comprising amino acid sequence of SEQ ID No: 28 and CDR3 comprising amino acid sequence of SEQ ID No: 29, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 30, CDR2 comprising amino acid sequence of SEQ ID No: 31 and CDR3 comprising amino acid sequence of SEQ ID No: 32;

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 33, CDR2 comprising amino acid sequence of SEQ ID No: 34 and CDR3 comprising amino acid sequence of SEQ ID No: 35, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 36, CDR2 comprising amino acid sequence of SEQ ID No: 37 and CDR3 comprising amino acid sequence of SEQ ID No: 38; and

heavy chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 39, CDR2 comprising amino acid sequence of SEQ ID No: 40 and CDR3 comprising amino acid sequence of SEQ ID No: 41, and light chain variable region comprising CDR1 comprising amino acid sequence of SEQ ID No: 42, CDR2 comprising amino acid sequence of SEQ ID No: 43 and CDR3 comprising amino acid sequence of SEQ ID No: 44.

5. An isolated anti-FcRn antibody comprising:

CDR1 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 21, 24, 27, 30, 33, 36, 39 and 42;

CDR2 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 22, 25, 28, 31, 34, 37, 40 and 43; and

CDR3 comprising amino acid sequence, which has at least 90% homology with one or more amino acid sequence selected from the group consisting of SEQ ID Nos: 23, 26, 29, 32, 35, 38, 41 and 44, or a fragment thereof.

6. An isolated anti-FcRn antibody or a fragment thereof comprising one or more heavy chain variable regions and light chain variable regions comprising one or more amino acid sequences selected from the group consisting of amino acid sequences of SEQ ID Nos: 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20.

7. The antibody or a fragment thereof according to claim 6, comprising a heavy chain variable region comprising an amino acid sequence of SEQ ID Nos: 2, 4, 6, 8, or 10.

8. The antibody or a fragment thereof according to claim 6, comprising a light chain variable region comprising an amino acid sequence of SEQ ID Nos: 12, 14, 16, 18 or 20.

9. The antibody or a fragment thereof according to claim 6, comprising one or more heavy chain variable regions and light

chain variable regions selected from the group consisting of:
heavy chain variable region comprising amino acid sequence of
SEQ ID No: 2 and light chain variable region comprising amino
acid sequence of SEQ ID No: 12;

heavy chain variable region comprising amino acid sequence of
SEQ ID No: 4 and light chain variable region comprising amino
acid sequence of SEQ ID No: 14;

heavy chain variable region comprising amino acid sequence of
SEQ ID No: 6 and light chain variable region comprising amino
acid sequence of SEQ ID No: 16;

heavy chain variable region comprising amino acid sequence of
SEQ ID No: 8 and light chain variable region comprising amino
acid sequence of SEQ ID No: 18; and

heavy chain variable region comprising amino acid sequence of
SEQ ID No: 10 and light chain variable region comprising amino
acid sequence of SEQ ID No: 20.

10. An isolated anti-FcRn antibody or a fragment thereof
comprising one or more heavy chain variable regions and light
chain variable regions comprising amino acid sequence, which
has at least 90% homology with one or more amino acid
sequences selected from the group consisting of amino acid
sequences of SEQ ID Nos: 2, 4, 6, 8, 10, 12, 14, 16, 18 and
20.

11. The antibody or a fragment thereof according to any one of

claims 1, 5, 6 and 10, wherein the antibody binds FcRn with a KD(dissociation constant) value of 0.01 to 2 nM, at pH 6.0 or pH 7.4 condition.

12. The antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10, wherein the antibody is monoclonal antibody, murine antibody, chimeric antibody, humanized antibody or human antibody.

13. The antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10, wherein the antibody or fragment thereof comprises full-length antibodies, Fab, F(ab')₂, Fd, Fv, scFv, domain antibodies, dual-specific antibodies, bibodies, minibodies, tribodies, scap (sterol regulatory binding protein cleavage activating protein), bispecific antibodies, trispecific antibodies, multispecific antibodies, diabodies, triabodies, tetrabodies, intrabodies, nanobodies, small modular immunopharmaceuticals (SMIP), binding-domain immunoglobulin fusion proteins, camelized antibodies or VHH containing antibodies.

14. The antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10, wherein the antibody comprises IgD antibodies, IgE antibodies, IgM antibodies, IgG1 antibodies, IgG2 antibodies, IgG3 antibodies, IgG4 antibodies.

15. A Polynucleotide encoding the antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10.

16. A Polynucleotide encoding an anti-FcRn antibody or a fragment thereof comprising one or more sequence selected from the group consisting of SEQ ID Nos: 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19.

17. A Polynucleotide encoding an anti-FcRn antibody or a fragment thereof comprising sequence, which has at least 90% homology with one or more sequence selected from the group consisting of SEQ ID Nos: 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19.

18. A recombinant expression vector comprising the polynucleotide according to any one of claims 15 to 17.

19. A host cell, which is transected with the recombinant expression vector of claim 18.

20. A method of preparing an anti-FcRn antibody or a fragment thereof comprising:

culturing the host cell of claim 19 and producing the antibody therefrom; and

isolating and purifying the produced antibody to recover the antibody binding specifically to FcRn.

21. A pharmaceutical composition comprising the antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10, and one or more pharmaceutically acceptable carrier.

22. A method of treating a patient suffering from an autoimmune disease, comprising administering the composition of claim 21 to said patient.

23. The method of claim 22, wherein the autoimmune disease is one selected from the group consisting of immune neutropenia, Guillain-Barré syndrome, epilepsy, autoimmune encephalitis, Isaac's syndrome, nevus syndrome, pemphigus vulgaris, Pemphigus foliaceus, Bullous pemphigoid, epidermolysis bullosa acquisita, pemphigoid gestationis, mucous membrane pemphigoid, antiphospholipid syndrome, autoimmune anemia, autoimmune Grave's disease, Goodpasture's syndrome, myasthenia gravis, multiple sclerosis, rheumatoid arthritis, lupus, idiopathic thrombocytopenic purpura, lupus nephritis and membranous nephropathy.

24. A composition comprising the antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10 labelled with a detection label.

25. A method of detecting FcRn in vivo or in vitro comprising using the antibody or a fragment thereof according to any one of claims 1, 5, 6 and 10.