

CLAIMS

[Claim 1]

An anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof comprising:

as a sequence of CDR-1 of the heavy chain variable region (CDR-H1), the amino acid sequence defined in SEQ ID NO:1, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:1 via substitution of one amino acid residue;

as a sequence of CDR-2 of the heavy chain variable region (CDR-H2), the amino acid sequence defined in SEQ ID NO:2, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:2 via substitution of one or two amino acid residues;

as a sequence of CDR-3 of the heavy chain variable region (CDR-H3), the amino acid sequence defined in SEQ ID NO:3, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:3 via substitution of one or two amino acid residues;

as a sequence of CDR-1 of the light chain variable region (CDR-L1), the amino acid sequence defined in SEQ ID NO:4, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:4 via substitution of one or two amino acid residues;

as a sequence of CDR-2 of the light chain variable region (CDR-L2), the amino acid sequence defined in SEQ ID NO:5, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:5 via substitution of one amino acid residue; and

as a sequence of CDR-3 of the light chain variable region (CDR-L3), the amino acid sequence defined in SEQ ID NO:6, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:6 via substitution of one or two amino acid residues;

wherein the antibody, fragment, or derivative thereof specifically binds to a binding region containing the amino acid residues at positions 315 and 316 in the amino acid sequence of SEQ ID NO:14 (human IGF-I receptor).

[Claim 2]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to claim 1, comprising:

as a sequence of a heavy-chain variable region, the amino acid sequence defined in SEQ ID NO:7, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:7 via substitution, deletion, or addition of one or several amino acid residues; and

as a sequence of a light-chain variable region, the amino acid sequence defined in SEQ ID NO:8, or an amino acid sequence derived from the amino acid sequence defined in SEQ ID NO:8 via substitution, deletion, or addition of one or several amino acid residues.

[Claim 3]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to claim 1 or 2, comprising:

as a sequence of a heavy-chain variable region, the amino acid sequence defined in SEQ ID NO:7; and

as a sequence of a light-chain variable region, an amino acid sequence selected from SEQ ID NOs:8, 9, 10, 11, and 12.

[Claim 4]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 3, comprising:

as heavy- and light-chain constant regions, the constant regions of each class of human immunoglobulin.

[Claim 5]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to claim 4, wherein the heavy-chain constant region is the heavy-chain constant region of human IgG class 4.

[Claim 6]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 5, which binds to an epitope comprising a peptide having an amino acid sequence corresponding to the amino acid residues Nos. 308 to 319 (ProSerGlyPhelleArgAsnGlySerGlnSerMet) of SEQ ID NO:14 (human IGF-I receptor) or a region in the vicinity thereof.

[Claim 7]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 6, which, when administered at a dosage sufficient to induce proliferation of cultured myoblasts derived from human or guinea pig, does not induce glucose uptake of the cultured cells.

[Claim 8]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 7, which, when administered to a vertebrate at a dosage sufficient to induce an increase in the muscle mass and/or the body length of the vertebrate, does not decrease the blood glucose level of the vertebrate.

[Claim 9]

The anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to claim 8, which, when administered to a vertebrate at a blood exposure level

which is 10 times or more an effective dosage to induce an increase in the muscle mass and/or the body length of the vertebrate, does not decrease the blood glucose level of the vertebrate.

[Claim 10]

A nucleic acid molecule consisting of a polynucleotide sequence encoding an anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 9.

[Claim 11]

A cloning vector or expression vector comprising at least one nucleic acid molecule according to claim 10.

[Claim 12]

A recombinant cell derived by introducing a vector according to claim 11 into a host cell.

[Claim 13]

A process of producing an anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 9, comprising :
culturing a recombinant cell according to claim 12; and
purifying an anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof produced by the recombinant cell.

[Claim 14]

A pharmaceutical composition comprising, as an active ingredient, an anti-IGF-I receptor humanized antibody or its fragment or a derivative thereof according to any one of claims 1 to 9, a nucleic acid molecule according to claim 10, a vector according to claim 11, or a recombinant cell according to claim 12.

[Claim 15]

Use of a pharmaceutical composition according to claim 14 in the manufacture of a medicament for the treatment of muscle atrophic disease or dwarfism.

[Claim 16]

The use according to claim 15, wherein the muscle atrophic disease is disuse muscle atrophy, sarcopenia, or cachexia.

[Claim 17]

The use according to claim 15, wherein the dwarfism is Laron-type dwarfism or

growth-hormone resistant dwarfism.

[Claim 18]

A pharmaceutical composition according to claim 14 for use in therapy.