Claims

1. A monoclonal antibody, or portion thereof, that binds to CXCR5, which comprises:
   a. A heavy chain variable domain comprising H-CDR1, H-CDR2 and H-CDR3, wherein:
      i. H-CDR1 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 8 and 9,
      ii. H-CDR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 10 and 11, and
      iii. H-CDR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 12 and 13; and
   b. A light chain variable domain comprising L-CDR1, L-CDR2 and L-CDR3, wherein:
      i. L-CDR1 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs:14 and 15,
      ii. L-CDR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 16 and 17, and
      iii. L-CDR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 18 and 19.

2. The monoclonal antibody according to claim 1, wherein:
   a. H-CDR1, H-CDR2 and H-CDR3 comprise or consist respectively of:
      i. amino acid sequences SEQ ID NOs: 8, 10 and 12,
      ii. amino acid sequences SEQ ID NOs: 8, 11 and 12; or
      iii. amino acid sequences SEQ ID NOs: 9, 11 and 13.
   b. L-CDR1, L-CDR2 and L-CDR3 comprise or consist respectively of:
      i. amino acid sequences SEQ ID NOs: 14, 16 and 18,
      ii. amino acid sequences SEQ ID NOs: 15, 17 and 18, or
      iii. amino acid sequences SEQ ID NOs: 15, 17 and 19.

3. The monoclonal antibody according to any one of claims 1 or 2, wherein:
   a. the heavy chain variable domain further comprises Framework Regions H-FR1, H-FR2, H-FR3 and H-FR4, wherein:
      i. H-FR1 comprises or consists of an amino acid sequence of SEQ ID NO: 20,
      ii. H-FR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 21 and 22,
      iii. H-FR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 23 and 24, and
      iv. H-FR4 comprises or consists of an amino acid sequence of SEQ ID NO: 25; and
   b. the light chain variable domain further comprises Framework regions L-FR1, L-FR2, L-FR3 and L-FR4, wherein:

i. L-FR1 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 26, 27 and 28,
ii. L-FR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 29, 30 and 31,
iii. L-FR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 32 and 33, and
iv. L-FR4 comprises or consists of an amino acid sequence consisting of SEQ ID NO: 34.

4. The monoclonal antibody according to claim 3, wherein:
   a. H-FR1, H-FR2, H-FR3 and H-FR4 comprise or consist respectively of:
      i. amino acid sequences SEQ ID NOs: 20, 21, 23 and 25, or
      ii. amino acid sequences SEQ ID NOs: 20, 22, 24 and 25,
   b. L-FR1, L-FR2, L-FR3 and L-FR4 comprise or consist respectively of:
      i. amino acid sequences SEQ ID NOs: 26, 29, 32 and 34, or
      ii. amino acid sequences SEQ ID NOs: 27, 30, 33 and 34, or
      iii. amino acid sequences SEQ ID NOs: 28, 31, 33 and 34.

5. The monoclonal antibody according to any one of the previous claims ,wherein:
   a. The heavy chain variable domain comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs:1, 3 and 4; and
   b. The light chain variable domain comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs:.2, 5, 6 or 7

6. A monoclonal antibody according to any one of the previous claims, wherein said monoclonal antibody comprises an heavy chain constant region, said constant region being preferably selected from the type IgG1, IgG2, IgG3 or IgG4.

7. A polynucleotide encoding the heavy chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 6.

8. A polynucleotide encoding the light chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 6.

9. A polynucleotide encoding both the heavy chain and the light chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 6.

10. An expression vector comprising a polynucleotide according to claim 7.

11. An expression vector comprising a polynucleotide according to claim 8.

12. An expression vector comprising:
    a. A polynucleotide according to claim 7 and a polynucleotide according to claim 8
    b. A polynucleotide according to claim 9.

13. A host cell transformed with:
    a. An expression vector according to claim 10 and an expression vector according to claim 11, or
    b. An expression vector according to claim 12.

14. The host cell according to claim 13, wherein said cell is a mammalian cell.

15. A method for producing a monoclonal antibody according to any one of claims 1 to 6, comprising the steps of:
    a. Culturing a host cell according to claim 13 or claim 14, and
    b. Isolating said antibody produced by the host cell.

16. A pharmaceutical composition comprising a monoclonal antibody according to any one of claims 1 to 6, or a monoclonal antibody produced by the method according to claim 15.

17. A monoclonal antibody according to any one of claims 1 to 6, or a monoclonal antibody produced by the method according to claim 15, for use as a medicament.

18. A monoclonal antibody according to any one of claims 1 to 6, or a monoclonal antibody produced by the method according to claim 15, for use in the treatment of autoimmune or inflammatory diseases, as well as cancers.

Claims

1. A monoclonal antibody, or portion thereof, that binds to CXCR5, which comprises:
    a. A heavy chain variable domain comprising H-CDR1, H-CDR2 and H-CDR3, wherein H-CDR1, H-CDR2 and H-CDR3 comprise or consist respectively of:
        i. amino acid sequences SEQ ID NOs: 8, 11 and 12; or
    b. ii. amino acid sequences SEQ ID NOs: 9, 11 and 13andA light chain variable domain comprising L-CDR1, L-CDR2 and L-CDR3, wherein L-CDR1, L-CDR2 and L-CDR3 comprise or consist respectively of:
        i. amino acid sequences SEQ ID NOs: 15, 17 and 18, or
        ii. amino acid sequences SEQ ID NOs: 15, 17 and 19.

2. The monoclonal antibody according to claim 1, wherein:
    a. the heavy chain variable domain further comprises Framework Regions H-FR1, H-FR2, H-FR3 and H-FR4, wherein:
        i. H-FR1 comprises or consists of an amino acid sequence of SEQ ID NO: 20,
        ii. H-FR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 21 and 22,
        iii. H-FR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 23 and 24, and
        iv. H-FR4 comprises or consists of an amino acid sequence of SEQ ID NO: 25; and
    b. the light chain variable domain further comprises Framework regions L-FR1, L-FR2, L-FR3 and L-FR4, wherein:
        i. L-FR1 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 26, 27 and 28,
        ii. L-FR2 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 29, 30 and 31,
        iii. L-FR3 comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 32 and 33, and
        iv. L-FR4 comprises or consists of an amino acid sequence consisting of SEQ ID NO: 34.

3. The monoclonal antibody according to claim 2, wherein:
    a. H-FR1, H-FR2, H-FR3 and H-FR4 comprise or consist respectively of:
        i. amino acid sequences SEQ ID NOs: 20, 21, 23 and 25, or
        ii. amino acid sequences SEQ ID NOs: 20, 22, 24 and 25,

b. L-FR1, L-FR2, L-FR3 and L-FR4 comprise or consist respectively of:
   i. amino acid sequences SEQ ID NOs: 26, 29, 32 and 34, or
   ii. amino acid sequences SEQ ID NOs: 27, 30, 33 and 34, or
   iii. amino acid sequences SEQ ID NOs: 28, 31, 33 and 34.

4. The monoclonal antibody according to any one of the previous claims ,wherein:
   a. The heavy chain variable domain comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs: 3 and 4; and
   b. The light chain variable domain comprises or consists of an amino acid sequence selected from the group consisting of SEQ ID NOs:. 5, 6 and 7

5. A monoclonal antibody according to any one of the previous claims, wherein said monoclonal antibody comprises an heavy chain constant region, said constant region being preferably selected from the type IgG1, IgG2, IgG3 or IgG4.

6. A polynucleotide encoding the heavy chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 5.

7. A polynucleotide encoding the light chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 5.

8. A polynucleotide encoding both the heavy chain and the light chain of the monoclonal antibody, or portion thereof, according to any one of claims 1 to 5.

9. An expression vector comprising a polynucleotide according to claim 6.

10. An expression vector comprising a polynucleotide according to claim 7.

11. An expression vector comprising:
   a. A polynucleotide according to claim 6 and a polynucleotide according to claim 7
   b. A polynucleotide according to claim 8.

12. A host cell transformed with:
   a. An expression vector according to claim 9 and an expression vector according to claim 10, or
   b. An expression vector according to claim 11.

13. The host cell according to claim 12, wherein said cell is a mammalian cell.

14. A method for producing a monoclonal antibody according to any one of claims 1 to 5, comprising the steps of:
    a. Culturing a host cell according to claim 11 or claim 13, and
    b. Isolating said antibody produced by the host cell.

15. A pharmaceutical composition comprising a monoclonal antibody according to any one of claims 1 to 5, or a monoclonal antibody produced by the method according to claim 14.

16. A monoclonal antibody according to any one of claims 1 to 5, or a monoclonal antibody produced by the method according to claim 14, for use as a medicament.

17. A monoclonal antibody according to any one of claims 1 to 5, or a monoclonal antibody produced by the method according to claim 14, for use in the treatment of autoimmune or inflammatory diseases, as well as cancers.