Claims

1. An antibody or antigen binding fragment thereof that specifically binds to BST1, said antibody or antigen binding fragment thereof comprising:
    a) a heavy chain variable region comprising:
        i) a first vhCDR comprising SEQ ID NO: 10;
        ii) a second vhCDR comprising a sequence selected from the group consisting of SEQ ID NO: 12 and SEQ ID NO: 51; and
        iii) a third vhCDR comprising SEQ ID NO: 14; and
    b) a light chain variable region comprising:
        i) a first vlCDR comprising SEQ ID NO: 16;
        ii) a second vlCDR comprising SEQ ID NO: 18; and
        iii) a third vlCDR comprising a SEQ ID NO: 20

wherein said antibody or antigen binding fragment thereof has from zero to four amino acid changes collectively in said first vhCDR, said second vhCDR, said third vhCDR, said first vlCDR, said second vlCDR and said third vlCDR.

2. The antibody or antigen binding fragment thereof according to claim 1 comprising:
    a) a heavy chain variable region comprising:
    i) a first vhCDR comprising SEQ ID NO: 10;
    ii) a second vhCDR comprising a sequence selected from the group consisting of SEQ ID NO: 12 and SEQ ID NO: 51;
    iii) a third vhCDR comprising SEQ ID NO: 14; and
    b) a light chain variable region comprising:
    i) a first vlCDR comprising SEQ ID NO: 16;
    ii) a second vlCDR comprising SEQ ID NO: 18; and
    iii) a third vlCDR comprising a SEQ ID NO: 20.

3. The antibody or antigen binding fragment thereof according to claim 1 or 2 comprising:
    a heavy chain at least 95% identical SEQ ID NO: 2, and
    a light chain at least 95% identical SEQ ID NO: 4.

4. The antibody or antigen binding fragment thereof according to claim 3 comprising:
a heavy chain variable region of SEQ ID NO: 2, and
a light chain variable region of SEQ ID NO: 4.

5. The antibody or antigen binding fragment thereof according to claim 1 or 2 comprising:
a heavy chain at least 95% identical SEQ ID NO: 46, and
a light chain at least 95% identical SEQ ID NO: 49.

6. The antibody or antigen binding fragment thereof according to claim 5 comprising:
a heavy chain variable region of SEQ ID NO: 46, and
a light chain variable region of SEQ ID NO: 49.

7. An isolated monoclonal antibody, or an antigen binding portion thereof, which competes for binding to BST1 with, or binds an epitope on BST1 recognized by, an antibody according to any preceding claim.

8. An antibody as claimed in any one of claims 1 to 7, wherein the antibody is a full-length antibody of an IgG1, IgG2, IgG3 or IgG4 isotype.

9. An antibody or an antigen-binding portion thereof, according to any previous claim further comprising a covalently attached moiety.

10. An antibody or an antigen-binding portion thereof, according to claim 9 wherein said moiety is a drug.

11. An antibody or an antigen-binding portion thereof according to claim 10 wherein said drug is selected from the group consisting of a maytansinoid, a dolastatin, an auristatin, a trichothecene, a calicheamicin, CC1065 and derivatives thereof.

12. An isolated antibody or antigen binding fragment thereof according to any of the claims 1-11, wherein said antibody induces antibody-dependent cell-mediated cytotoxicity (ADCC), complement dependent cytotoxicity (CDC) and/or T-cell cytotoxicity.

13. An isolated antibody or antigen binding fragment thereof according to claim 12, wherein the antibody is an engineered antibody having increased binding to Fc receptors and/or increased potency for ADCC, and/or a bispecific antibody.

14. An isolated antibody or antigen binding fragment thereof according to any previous claim, wherein the antibody is a bispecific or multispecific antibody which specificially binds to a first antigen comprising BST1 and a second antigen selected from the group consisting of CD3 antigen and CD5 antigen.

15. A nucleic acid encoding a heavy chain of the antibody of any of the preceding claims.

16. A nucleic acid encoding a light chain of the antibody of any of the preceding claims.

17. A host cell containing the nucleic acids of claim 15 and/or 16.

18. A method of making an antibody or antigen binding fragment thereof comprising culturing a host cell according to claim 17 under conditions where the antibody or an antigen-binding portion thereof is expressed and optionally isolating the antibody or an antigen-binding portion thereof.

18. The antibody drug conjugate of any one of claims 9 to 14 for use in the treatment of a disease wherein the antibody or antigen-binding portion thereof is internalized by a cell expressing BST1.

19. The antibody of any one of claims 1-14 for use in the treatment of a disease wherein the antibody induces antibody-dependent cell-mediated cytotoxicity (ADCC), complement dependent cytotoxicity (CDC) and/or T-cell cytotoxicity.

20. The use of the antibody drug conjugate of claim 18 or the antibody of claim 19 in the manufacture of a medicament for the treatment of cancer, including acute myeloid leukemia (AML), B-cell chronic lymphocytic leukemia, breast cancer, colorectal cancer, kidney cancer, head and neck cancer, lung cancer, ovarian cancer or pancreatic cancer.

21. An antibody or antigen binding fragment thereof as claimed in any one of claims 1-14 for use in therapy or for use as a medicament.

Claims

1. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), said antibody or antigen binding fragment thereof comprising:

a) a heavy chain variable region comprising:
   i) a first vhCDR comprising SEQ ID NO: 10;
   ii) a second vhCDR comprising SEQ ID NO: 12 or SEQ ID NO: 51; and
   iii) a third vhCDR comprising SEQ ID NO: 14; and

b) a light chain variable region comprising:
   i) a first vlCDR comprising SEQ ID NO: 16;
   ii) a second vlCDR comprising SEQ ID NO: 18; and
   iii) a third vlCDR comprising a SEQ ID NO: 20

2. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), said antibody or antigen binding fragment thereof comprising:

a heavy chain variable region comprising SEQ ID NO: 2, and
a light chain variable region comprising SEQ ID NO: 4.

3. An antibody according to claim 1 comprising:
a heavy chain variable region comprising SEQ ID NO: 46, and
a light chain variable region comprising SEQ ID NO: 49.

4. An isolated monoclonal antibody, or an antigen binding portion thereof, which competes for binding to BST1 with an antibody set forth in claim 1 or 2.

5. The antibody of claims 1 or 2, wherein the antibody is of an IgG1 isotype.

6. The antibody or an antigen-binding portion thereof, of claim 1 further comprising a covalently attached moiety.

7. The antibody or an antigen-binding portion thereof, according to claim 6 wherein said moiety is a drug selected from the group consisting of a maytansinoid, a dolastatin, an auristatin, a trichothecene, a calicheamicin, CC1065 and derivatives thereof.

8. The antibody or an antigen-binding portion thereof, of claim 2 further comprising a covalently attached moiety.

9. The antibody or an antigen-binding portion thereof, according to claim 8 wherein said moiety is a drug selected from the group consisting of a maytansinoid, a dolastatin, an auristatin, a trichothecene, a calicheamicin, CC1065 and derivatives thereof.

10. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), wherein said antibody or antigen binding fragment thereof comprises heavy and light chain variable regions, and wherein the heavy chain variable region comprises SEQ ID NO: 2.

11. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), wherein said antibody or antigen binding fragment thereof comprises heavy and light chain variable regions, and wherein the light chain variable region comprises SEQ ID NO: 4.

12. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), wherein said antibody or antigen binding fragment thereof comprises heavy and light chain variable regions, and wherein the heavy chain variable region comprises SEQ ID NO:46

13. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), wherein said antibody or antigen binding fragment thereof comprises heavy and light chain variable regions, and wherein the light chain variable region comprises SEQ ID NO: 49.

14. An isolated antibody or antigen binding fragment thereof that specifically binds to bone marrow stromal antigen 1 (BST1), wherein said antibody or antigen binding fragment thereof comprises a heavy chain variable region comprising SEQ ID NO: 46 and a light chain variable region comprising SEQ ID NO: 49.