## Claims

1. An isolated antibody or antigen-binding fragment thereof specifically binding to amino acids 1 - 85 of SEQ ID NO:1, wherein said antibody or antigen-binding fragment thereof is internalized following binding to C4.4a expressing cells, and wherein said antibody or antigen-binding fragment thereof comprises the variable heavy chain CDR sequences:

   H-CDR1 comprising SEQ ID NO:45, H-CDR2 comprising SEQ ID NO:46, and H-CDR3 comprising SEQ ID NO:47,
   and wherein said antibody or antigen-binding fragment thereof comprises the variable light chain CDR sequences:

   L-CDR1 comprising SEQ ID NO:48, L-CDR2 comprising SEQ ID NO:49, and
   L-CDR3 comprising SEQ ID NO:50.

2. The antibody or antigen binding fragment according to claim 1 comprising
   a variable heavy chain sequence as presented by SEQ ID NO: 33 and a variable light chain sequence as presented by SEQ ID NO: 29,
   or a variable heavy chain sequence as presented by SEQ ID NO: 51 and a variable light chain sequence as presented by SEQ ID NO: 52.

3. The antibody according to claim 1 or 2, which is an IgG antibody.

4. The antigen-binding fragment according to claim 1 or 2, which is an scFv, Fab, Fab' fragment or a $F(ab')_2$ fragment.

5. The antibody or antigen-binding fragment according to any one of the preceding claims, which is a monoclonal antibody or antigen-binding fragment.

6. The antibody or antigen-binding fragment according to any one of the preceding claims, which is human, humanized or chimeric antibody or antigen-binding fragment.

7. An antibody-drug conjugate, comprising an antibody or antigen binding fragment thereof according to claims 1 to 6.

8. An isolated nucleic acid sequence that encodes the antibody or antigen-binding fragment according to claims 1 to 6.

9. A vector comprising a nucleic acid sequence according to claim 8.

10. An isolated cell expressing an antibody or antigen-binding fragment according to any one of the claims 1 - 6 and /or comprising a nucleic acid according to claim 8 or a vector according to claim 9.

11. An isolated cell according to claim 10, wherein said cell is a prokaryotic or an eukaryotic cell.

12. A method of producing an antibody or antigen-binding fragment according to any one of the claims 1 - 6 comprising culturing of a cell according to claim 11 and purification of the antibody or antigen-binding fragment.

13. An antibody or antigen-binding fragment according to claims 1 - 6 or an antibody-drug conjugate according to claim 7 for use as a medicament.

14. An antibody or antigen-binding fragment according to claims 1 - 6 for use as a diagnostic agent.

15. An antibody or antigen-binding fragment according to claims 1 - 6 or an antibody-drug conjugate according to claim 7 for use as a medicament for the treatment of cancer.

16. A pharmaceutical composition comprising an antibody or antigen-binding fragment according to claims 1 - 6 or an antibody-drug conjugate according to claim 7.

17. A combination of a pharmaceutical composition according to claim 16 and one or more therapeutically active compounds.