

Claims

1. An antigen-binding protein, or an antigen-binding fragment thereof, comprising (i) a heavy chain variable domain comprising a VHCDR1 having the amino acid sequence
5 GNTFTSYVMH (SEQ ID NO: 3); a VHCDR2 having the amino acid sequence
YINPYNDGTTYNEKFKG (SEQ ID NO: 4); and a VHCDR3 having the amino acid
sequence STARATPYFYAMDY (SEQ ID NO: 5); and (ii) a light chain variable domain
comprising a VLCDR1 having the amino acid sequence KSSQSLLWSVNQNSYLS (SEQ ID
NO: 6), a VLCDR2 having the amino acid sequence GASIRES (SEQ ID NO: 7), and a
10 VLCDR3 having the amino acid sequence QHNHGSFLPYT (SEQ ID NO: 8).
2. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 1,
wherein the heavy chain variable region comprises the amino acid sequence
SGPELVKPGASVKMSCKASGNTFTSYVMHWVKQKPGQGLEWIGYINPYNDGTTYN
15 EKFKGKATLTSDKSSSTAYMELSSLTSEDSAVYYCARSTARATPYFYAMDYWGQGT
SVTVSS as set forth in SEQ ID NO:1.
3. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 2,
comprising a heavy chain variable region which comprises an amino acid sequence having
20 about 80%, about 85%, about 90%, about 95%, about 96%, about 97%, about 98% or about
99% identity to the amino acid sequence set forth in SEQ ID NO:1.
4. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 1,
wherein the light chain variable region comprises the amino acid sequence
25 DILMTQSPSSLAVTAGEKVTMRCKSSQSLLWSVNQNSYLSWYQLKQGQPPKLLLYG
ASIRESWVPDRFTGSGSGTDFLTISNVHVEDLAVYYCQHNHGSFLPYTFGGGTKLEI
K as set forth in SEQ ID NO:2.
5. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 4,
30 comprising a light chain variable region which comprises an amino acid sequence having
about 80%, about 85%, about 90%, about 95%, about 96%, about 97%, about 98% or about
99% identity to the amino acid sequence set forth in SEQ ID NO:2.
6. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in any one of
35 claims 1 to 5, wherein the antigen binding protein is selected from the group consisting of

monoclonal, recombinant, polyclonal, chimeric, humanised, bispecific and heteroconjugate antibodies; a chimeric antigen receptor (CAR), a single variable domain, a domain antibody, antigen binding fragments, immunologically effective fragments, single chain Fv, a single chain antibody, a univalent antibody lacking a hinge region, a minibody, diabodies, and Tandabs™.

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7. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 6, wherein the binding protein is a monoclonal antibody.

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8. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 7, wherein the monoclonal antibody is humanised.

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9. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 7, wherein the monoclonal antibody is chimeric.

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10. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in any one of claims 1 to 9, wherein the antigen-binding protein, or antigen-binding fragment thereof, binds to CEACAM6.

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11. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 10, wherein the antigen-binding protein, or antigen-binding fragment thereof binds to a glycan on CEACAM6.

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12. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 11, wherein the antigen-binding protein, or an antigen-binding fragment thereof binds to an N-linked glycan on CEACAM6.

13. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in any one of claims 1 to 12, comprising a radioisotope or a cytotoxin conjugated thereto.

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14. The antigen-binding protein, or antigen-binding fragment thereof, as claimed in claim 13, wherein the antibody is conjugated with a cytotoxin selected from the group consisting of monomethyl auristatin E (MMAE), mertansine (DM-1), saporin, gemcitabine, irinotecan, etoposide, vinblastine, pemetrexed, docetaxel, paclitaxel, platinum agents (for example,

cisplatin, oxaliplatin and carboplatin), vinorelbine, capecitabine, mitoxantrone, ixabepilone, eribulin, 5-fluorouracil, trifluridine and tipiracil.

- 5 15. The antigen-binding protein, or antigen-binding fragment thereof as claimed in any one of the preceding claims, wherein the antigen-binding protein, or an antigen-binding fragment is internalized into a cell upon binding to CEACAM6.
- 10 16. The antigen-binding protein, or antigen-binding fragment thereof as claimed in any one of claims 1 to 14, wherein the antigen-binding protein, or an antigen-binding fragment is not internalized into a cell upon binding to CEACAM6.
- 15 17. The antigen-binding protein, or antigen-binding fragment thereof as claimed in any one of the preceding claims, wherein the antigen-binding protein, or an antigen-binding fragment selectively binds to a gefitinib resistant lung cancer cell; a non-small cell lung cancer cell; a breast cancer cell; a colorectal cancer cell.
- 20 18. A composition comprising a physiologically acceptable carrier and a therapeutically effective amount of the antigen-binding protein, or an antigen-binding fragment thereof, as claimed in any one of claims 1 to 17.
- 25 19. The composition as claimed in claim 18, comprising one or more further therapeutic compounds.
20. Use of an antigen-binding protein, or an antigen-binding fragment thereof, as claimed in any one of claims 1 to 17 or composition as claimed in claim 18 or claim 19, in the manufacture of a medicament for treating or preventing cancer.
- 30 21. The use of claim 20, wherein the cancer is selected from the group consisting of gefitinib resistant lung cancer, non-small cell lung cancer, breast cancer, stomach cancer, small intestine cancer, esophageal cancer and colorectal cancer.
22. The use of claim 20 or claim 21, wherein the medicament is to be administered with one or more further active pharmaceutical ingredients.

23. The use of claim 20 or claim 21, wherein the medicament is to be administered with chemotherapy.
- 5 24. The use of claims 22 or 23, wherein the one or more further active pharmaceutical ingredients or chemotherapy is to be administered separately, simultaneously or sequentially with said medicament.
- 10 25. A method for detecting cancer in a subject, the method comprising: contacting a sample obtained from the subject with an antigen-binding protein, or an antigen-binding fragment thereof as claimed in any one of claims 1 to 17 *in vitro*; detecting the binding of the antigen-binding protein, or an antigen-binding fragment thereof in the sample; correlating the binding with a level of binding in a control sample to determine the level of binding in the sample, wherein an increase in the level of binding in the sample relative to the control sample is indicative of cancer.
- 15 26. A method for identifying a subject susceptible to cancer the method comprising: contacting a sample obtained from the subject with an antigen-binding protein, or an antigen-binding fragment thereof as claimed in any one of claims 1 to 17 *in vitro*; detecting the binding of the antigen-binding protein, or an antigen-binding fragment thereof in the sample; correlating the binding with a level of binding in a control sample to determine the level of binding in the sample, wherein an increase in the level of binding in the sample relative to the control sample indicates that the subject is susceptible to cancer.
- 20 27. The method according to claims 25 or 26, wherein the control sample is from the same subject.
- 25 28. The method according to claims 25 or 26, wherein the control sample is from a different subject.
- 30 29. The method according to any one of claims 25 to 28, wherein the antigen-binding protein, or antigen-binding fragment thereof, binds CEACAM6.
- 35 30. The method according to any one of claims 25 to 29, wherein the antigen-binding protein, or antigen-binding fragment thereof, comprises a detectable label.

31. The method according to claim 30, wherein the detectable label is selected from the group consisting of a fluorescent label, a chemiluminescent label, an enzymatic label and a radionuclide label.
- 5 32. The method according to claim 30 or claim 31, wherein the detectable label is selected from the group consisting of biotin, alkaline phosphatase, horseradish peroxidase, FITC, PE and Cy Dyes.
- 10 33. The method according to claims any one of claims 30 to 32, wherein the detectable label is detected in an assay selected from flow cytometry, tissue section, immunofluorescence, immunocytochemistry or immunohistochemistry.
- 15 34. The method as claimed in any one of claims 25 to 33, wherein the cancer is selected from the group consisting of gefitinib resistant lung cancer, non-small cell lung cancer, breast cancer, stomach cancer, small intestine cancer, esophageal cancer and colorectal cancer.
35. A kit when used in the method of any one of claims 25 to 34, comprising an antigen-binding protein, or antigen-binding fragment thereof as claimed in any one of claims 1 to 17, together with instructions for use.