

## CLAIMS:

1. An isolated monoclonal antibody or antigen-binding fragment thereof which binds to the MUC1 SEA domain, wherein said antibody comprises:
  - a heavy chain complementarity determining region (CDRH) 1 denoted by SEQ ID NO. 25, CDRH2 denoted by SEQ ID NO. 26, CDRH3 denoted by SEQ ID NO. 27, and a light chain complementarity determining region (CDRL) 1 denoted by SEQ ID NO. 28, a CDRL2 denoted by SEQ ID NO. 29, and a CDRL3 denoted by SEQ ID NO. 30.
2. The isolated monoclonal antibody according to claim 1, wherein said antibody comprises a heavy chain variable region and a light chain variable region, wherein:
  - said heavy chain variable region is encoded by a nucleic acid sequence which is at least 70% identical to the nucleic acid sequence denoted by SEQ ID NO. 1
  - and wherein said light chain variable region is encoded by a nucleic acid sequence which is at least 70% identical to SEQ ID NO. 2.
3. The isolated monoclonal antibody according to claim 1 or claim 2, wherein said antibody comprises:
  - a heavy chain variable region comprising the amino acid sequence denoted by SEQ ID NO. 13 and a light chain variable region comprising the amino acid sequence denoted by SEQ ID NO. 14.
4. The isolated monoclonal antibody or antigen-binding fragment thereof according to any one of the preceding claims, wherein said antibody is a mouse antibody, a chimeric antibody, a humanized antibody, or a human antibody.
5. The isolated monoclonal antibody or antigen-binding fragment thereof according to any one of the preceding claims, wherein said antigen-binding fragment thereof is Fv, single chain Fv (scFv), single chain Fv-Fc (scFv-Fc), Fab', Fab, F(ab')<sub>2</sub> or F(ab)<sub>2</sub>.
6. An isolated nucleic acid molecule comprising a nucleotide sequence encoding an antibody or any antigen-binding fragment thereof according to any one of claims 1-5.
7. An expression vector comprising the isolated nucleic acid molecule according to claim 6.
8. An isolated host cell transfected with the expression vector according to claim 7.
9. An immunoconjugate comprising the antibody or antigen-binding fragment thereof according to any one of claims 1-5 and an additional cytotoxic or therapeutic agent.

10. The immunoconjugate according to claim 9 wherein said cytotoxic agent is selected from a group consisting of alkylating drugs, anthracyclines, pyrimidine derivatives, vinca alkaloids, photodynamic drugs, platinum-containing compounds, taxanes, topoisomerase inhibitors, ribosome inactivating agents, agents that induce DNA damage, tubulin inhibitors, anti-mitotic agents, radioisotopes, cytotoxic antibodies and bacterial toxins.
11. The immunoconjugate according to claim 9 wherein said cytotoxic agent is pseudomonas exotoxin.
12. A bispecific antibody comprising the antibody or antigen-binding fragment thereof according to any one of claims 1-5 and a second antibody binding a different antigen target.
13. A pharmaceutical composition comprising as an active ingredient the isolated monoclonal antibody or antigen-binding fragment thereof according to any one of claims 1-5, or immunoconjugate according to any one of claims 9 to 11, the bispecific antibody of claim 12 and a pharmaceutically acceptable carrier, excipient, or diluent, optionally comprising an additional therapeutic agent.
14. Use of a therapeutically effective amount of an , immunoconjugate according to any one of claims 9 to 11 in the manufacture of a medicament in the treatment of a MUC1 expressing cancer .
15. The use according to claim 14 , wherein said MUC1 expressing cancer is selected from the group consisting of, lung carcinoma, prostate carcinoma, breast carcinoma, ovarian carcinoma, colon carcinoma, pancreatic carcinoma, multiple myeloma, and acute myelogenous leukemia.
16. A method of diagnosing a disease or disorder in a subject, wherein said disease or disorder is associated with MUC-1 expression, said method comprising:
  - a. contacting a biopsy obtained from said patient with at least one isolated monoclonal antibody or antigen-binding fragment thereof according to any one of claims 1-5; and
  - b. detecting said isolated monoclonal antibody or any antigen-binding fragment thereof;wherein detection of cells over-expressing MUC1 SEA in the biopsy indicates that the subject is diagnosed with said disease or disorder.
17. Use of an isolated anti-MUC1 SEA monoclonal antibody or antigen-binding fragment thereof according to any one of claims 1-5 in the manufacture of an

imaging agent to image a disease or disorder associated with MUC1 expression in a subject in need thereof, wherein said antibody or antigen-binding fragment thereof are detectably labelled with a radioisotope or a visualizable agent in order to be visualized, and wherein the detection of cells and/or tissues labelled with said isotope or visualizable agent indicates the presence, the location and/or extent of said disease or disorder in said subject.

- 18.** Use according to claim 17 wherein said disease or disorder is a MUC1 expressing cancer.