

CLAIMS

1. An isolated antibody which binds to human CEACAM5 protein and which comprises a CDR1-H consisting of the amino acid sequence of SEQ ID NO: 3, a CDR2-H consisting of the amino acid sequence of SEQ ID NO: 4, a CDR3-H consisting of the amino acid sequence of SEQ ID NO: 5, a CDR1-L consisting of the amino acid sequence of SEQ ID NO: 6, a CDR2-L consisting of the amino acid sequence of SEQ ID NO: 7, and a CDR3-L consisting of the amino acid sequence of SEQ ID NO: 8.
2. Antibody according to claim 1, which comprises a heavy chain variable region (VH) comprising an amino acid sequence that is at least 85 % identical to the amino acid sequence of SEQ ID NO: 9 -and a light chain variable region (VL) comprising an amino acid sequence that is at least 85 % identical to the amino acid sequence of SEQ ID NO: 10.
3. Antibody according to claim 1 or 2, which comprises a heavy chain variable region (VH) comprising the amino acid sequence of SEQ ID NO: 9 and a light chain variable region (VL) comprising the amino acid sequence of SEQ ID NO: 10.
4. Antibody according to any one of claims 1 to 3, which comprises a heavy chain constant region (CH) comprising an amino acid sequence that is at least 85 % identical to the amino acid sequence of SEQ ID NO: 11 and a light chain constant region (CL) comprising an amino acid sequence that is at least 85 % identical to the amino acid sequence of SEQ ID NO: 12.
5. Antibody according to any one of claims 1 to 4, which comprises a heavy chain constant region (CH) comprising the amino acid sequence of SEQ ID NO: 11 and a light chain constant region (CL) comprising the amino acid sequence of SEQ ID NO: 12.
6. Antibody according to any one of claims 1 to 5, which comprises a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 13 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 14.

~~7. An isolated antibody which competes for binding to A2-B2 domain of human CEACAM5 protein with an antibody comprising a heavy chain variable region (VH) of the amino acid sequence of SEQ ID NO: 9 and a light chain variable region (VL) of the amino acid sequence of SEQ ID NO: 10.~~

~~8. Antibody according to claim 7, wherein the antibody also competes for binding to A2-B2 domain of *Macaca fascicularis* CEACAM5 protein with an antibody comprising a heavy chain variable region (VH) of the amino acid sequence of SEQ ID NO: 9 and a light chain variable region (VL) of the amino acid sequence of SEQ ID NO: 10.~~

~~9. Antibody according to claim 7 or 8, wherein the antibody does not significantly cross-react with human CEACAM1, human CEACAM6, human CEACAM7, human CEACAM8 and *Macaca fascicularis* CEACAM6.~~

~~107.~~ Antibody according to any one of claims 1 to ~~96~~, wherein the antibody is an antibody fragment.

~~118.~~ Antibody according to claim ~~107~~, wherein the antibody is an antibody fragment selected from the group consisting of Fv, Fab, F(ab')₂, Fab', dsFv, (dsFv)₂, scFv, sc(Fv)₂, and diabodies.

~~129.~~ Antibody according to any one of claims 1 to ~~118~~, which is a bispecific or a multispecific antibody.

~~1310.~~ An isolated antibody which binds to human CEACAM5 protein and which consists of two identical heavy chains (HC) comprising the amino acid sequence of SEQ ID NO: 13 and two identical light chains (LC) comprising the amino acid sequence of SEQ ID NO: 14.

~~1411.~~ An isolated nucleic acid comprising a nucleic acid sequence encoding an antibody according to any one of claims 1 to ~~1310~~.

~~15~~12. A host cell which has been transformed with a nucleic acid according to claim ~~14~~11.

~~16~~13. An immunoconjugate comprising an antibody according to any one of claims 1 to ~~13~~10 covalently linked via a linker to at least one growth inhibitory agent.

~~17~~14. Immunoconjugate according to claim ~~16~~13, wherein the growth inhibitory agent is a cytotoxic drug or a radioactive moiety.

~~18~~15. Immunoconjugate according to claim ~~16~~13 or ~~17~~14, wherein the growth inhibitory agent is selected from a group consisting of chemotherapeutic agents, enzymes, antibiotics, toxins such as small molecule toxins or enzymatically active toxins, toxoids, vincas, taxanes, maytansinoids or maytansinoid analogs, tomaymycin or pyrrolobenzodiazepine derivatives, cryptophycin derivatives, leptomycin derivatives, auristatin or dolastatin analogs, prodrugs, topoisomerase I inhibitors, topoisomerase II inhibitors, DNA alkylating agents, anti-tubulin agents, CC-1065 and CC-1065 analogs.

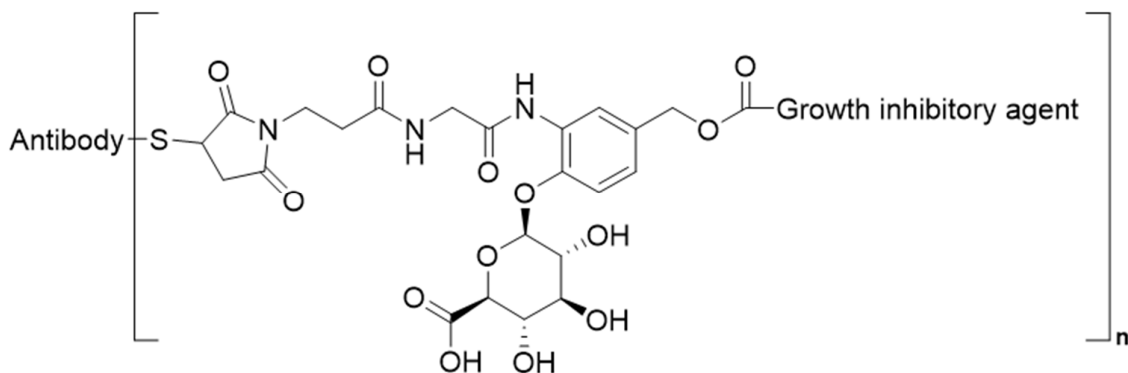
~~19~~16. Immunoconjugate according to any one of claims ~~16~~13 to ~~18~~15, wherein the growth inhibitory agent is exatecan.

~~20~~17. Immunoconjugate according to any one of claims ~~16~~13 to ~~19~~16, wherein the linker is a cleavable linker.

~~21~~18. Immunoconjugate according to any one of claims ~~16~~13 to ~~20~~17, wherein the linker is a linker cleavable in an endosome of a mammalian cell.

~~22~~19. Immunoconjugate according to any one of claims ~~16~~13 to ~~21~~18, wherein the linker is a linker cleavable by a human enzyme selected from glucuronidase and legumain.

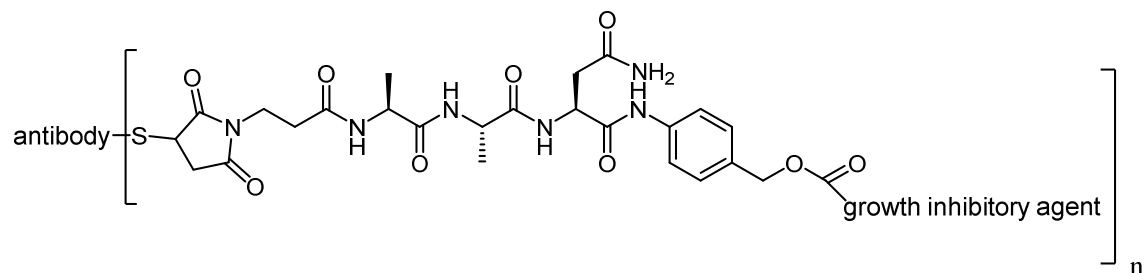
~~23~~20. Immunoconjugate according to any one of claims ~~16~~13 to ~~22~~19, wherein the immunoconjugate has the following **formula (II)**:



(II),

wherein S is a sulfur atom of the antibody, and wherein n is a number of [(linker)-(growth inhibitory agent)] moieties covalently linked to the antibody.

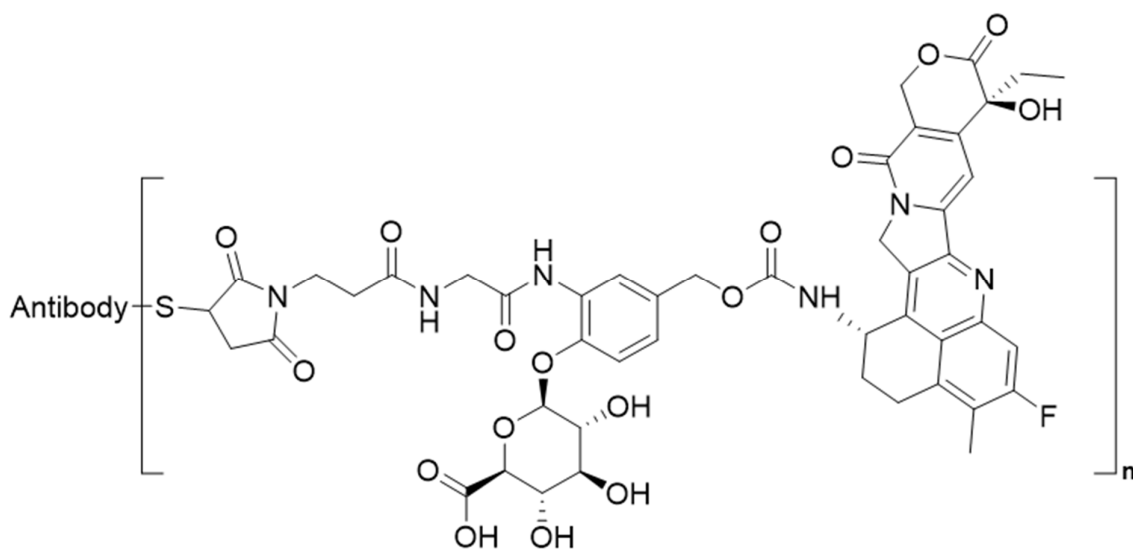
2421. Immunoconjugate according to any one of claims 16-13 to 2219, wherein the immunoconjugate has the following **formula (III)**:



(III),

wherein S is a sulfur atom of the antibody, and wherein n is a number of [(linker)-(growth inhibitory agent)] moieties covalently linked to the antibody.

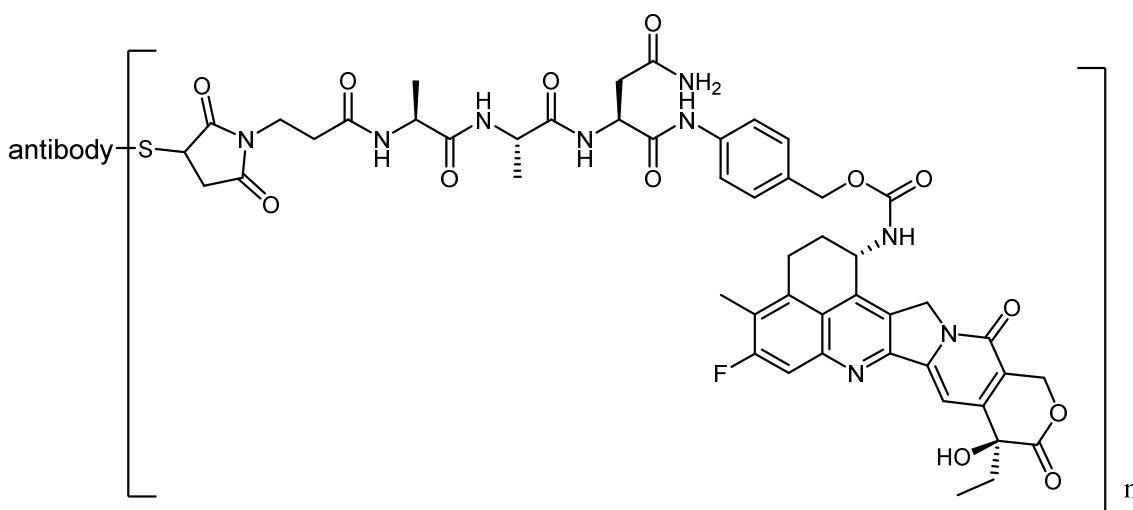
2522. Immunoconjugate according to any one of claims 16-13 to 2320, wherein the immunoconjugate has the following **formula (IV)**:



(IV),

wherein S is a sulfur atom of the antibody, and wherein n is a number of [(linker)-(exatecan)] moieties covalently linked to the antibody.

2623. Immunoconjugate according to any one of claims 46-13 to 22-19 and 2421, wherein the immunoconjugate has the following **formula (V)**:



(V),

wherein S is a sulfur atom of the antibody, and wherein n is a number of [(linker)-(exatecan)] moieties covalently linked to the antibody.

~~27~~24. Immunoconjugate according to any one of claims ~~16-13~~ to ~~26~~23, wherein ~~wherein~~ the S is a sulfur atom of a cysteine of the antibody.

~~28~~25. Immunoconjugate according to claim ~~27~~24, wherein the cysteine of the antibody is one of the cysteines capable of forming an interchain disulfide bond.

~~29~~26. Immunoconjugate according to any one of claims ~~23-20~~ to ~~28~~25, wherein n is between 7 and 8.

~~30~~27. Immunoconjugate according to any one of claims ~~23-20~~ to ~~29~~26, wherein n is between 7.5 and 8.0.

~~31~~28. A pharmaceutical composition comprising an antibody according to any one of claims 1 to ~~13-10~~ or an immunoconjugate according to any one of claims ~~16-13~~ to ~~30~~27, further comprising a pharmaceutically acceptable carrier, diluent and/or excipient.

~~32~~29. An antibody according to any one of claims 1 to ~~13-10~~ or an immunoconjugate according to any one of claims ~~16-13~~ to ~~30-27~~ or a pharmaceutical composition according to claim ~~31-28~~ for use as a medicament.

~~33~~30. An antibody according to any one of claims 1 to ~~13-10~~ or an immunoconjugate according to any one of claims ~~16-13~~ to ~~30-27~~ or a pharmaceutical composition according to claim ~~31-28~~ for use in the treatment of cancer.

~~34~~31. Antibody, immunoconjugate or pharmaceutical composition for the use according to claim ~~33~~30, wherein the cancer is a CEACAM5 expressing cancer.

~~35~~32. Antibody, immunoconjugate or pharmaceutical composition for the use according to claim ~~33-30~~ or ~~34~~31, wherein the cancer is a colorectal cancer, gastric cancer, lung cancer, pancreatic cancer, esophageal cancer or prostate cancer.

~~36. Method of treating cancer, comprising administering to a subject an antibody according to any one of claims 1 to 13 or an immunoconjugate according to any one of claims 16 to 30 or a pharmaceutical composition according to claim 31.~~

~~37. Method according to claim 36, wherein the cancer is a CEACAM5 expressing cancer.~~

~~38. Method according to claim 36 or 37, wherein the cancer is a colorectal cancer, gastric cancer, lung cancer, pancreatic cancer, esophageal cancer or prostate cancer.~~

~~39~~33. Method for detecting CEACAM5 expression *ex vivo* in a biological sample from a subject using an antibody according to any one of claims 1 to ~~13~~10.

~~40~~34. Method according to claim ~~39~~33, wherein the antibody is labelled with a detectable molecule.

~~41~~35. Use of an antibody according to any one of claims 1 to ~~13~~10 for detecting CEACAM5 expression *ex vivo* in a biological sample from a subject.

~~42~~36. Use according to claim ~~41~~35, wherein the antibody is labelled with a detectable molecule.