CLAIMS

1. A bispecific binding molecule that specifically binds to (i) CD3 and (ii) a surface target antigen on cancer cells,

wherein the binding molecule comprises

(a) an antibody specifically binding to CD3, and

(b) a Fyn-SH3-derived polypeptide binding to a surface target antigen on cancer cells,

wherein said Fyn-SH3-derived polypeptide consists of the amino acid sequence of SEQ ID NO: 1, with the proviso that

(i) at least one amino acid within amino acids positions 10 to 19 of SEQ ID NO: 1 is substituted, deleted or added, and

(ii) at least one amino acid amino acid within amino acids positions 29 to 36 of SEQ ID NO: 1 is substituted, deleted or added,

provided that said polypeptide has at least 85% sequence identity to the amino acid sequence of SEQ ID NO: 1, wherein the determination of identity excludes amino acid positions 12 to 17 and 31 to 34 of SEQ ID NO: 1.

2. The binding molecule according to claim 1, wherein the antibody specifically binding to CD3 is teplizumab, otelixizumab, Cris-7 or SP34.

3. The binding molecule according to any one of claims 1 or 2, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to EGFR, HER2, CD33, CD19, CEA, EPHA2, melanoma-associated chondroitin sulfate proteoglycan, IGFR1, fibroblast-activating protein alpha, prostate stem cell antigen (PSCA), c-MET, EpCAM, or PSMA.

4. The binding molecule according to any one of claims 1 to 3, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to HER2, and wherein the first of said two polypeptides is linked to the first N-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two heavy chains of said antibody.

5. The binding molecule according to any one of claims 1 to 3, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to EGFR, and wherein (i) the first of said two polypeptides is linked to the first N-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two heavy chains of said antibody, (ii) the first of said two polypeptides is linked to the first C-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two heavy chains of said antibody, (iii) the first of said two polypeptides is linked to the first N-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two light chains of

said antibody, or (iv) the first of said two polypeptides is linked to the first C-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two light chains of said antibody..

6. The binding molecule according to any one of claims 1 to 3, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to CD33, and wherein the first of said two polypeptides is linked to the first C-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two light chains of said antibody.

7. The binding molecule according to any one of claims 1 to 6, wherein the antibody specifically binding to CD3 and the Fyn-SH3-derived polypeptide are linked by a linker.

8. The binding molecule according to claim 7, wherein the linker is a peptide-linker.

9. The binding molecule according to claim 8, wherein the linker has a sequence selected from the group consisting of SEQ ID Nos: 162, 160 and 161.

10. The binding molecule according to any one of claims 1 to 4, 8 and 9, wherein the bispecific binding molecule comprises SEQ ID NOs 163 and/or 164.

11. The binding molecule according to any one of claims 1 to 3, 5, 8 and 9, wherein the bispecific binding molecule comprises SEQ ID NOs 171 and/or 198.

12. The binding molecule according to any one of claims 1 to 3, 6, 8 and 9, wherein the bispecific binding molecule comprises SEQ ID NOs 2 and/or 175.

13. A nucleic acid molecule encoding the binding molecule of any one of claims 1 to 12.

14. A vector comprising the nucleic acid molecule of claim 13.

15. A host cell or a non-human host transformed with the vector of claim 14.

16. A pharmaceutical composition comprising the binding molecule of any one of claims 1 to 12, the nucleic acid molecule of claim 13, the vector of claim 14, and/or the host cell or non-human host of claim 15.

17. The pharmaceutical composition of claim 16 for use in a method of treating or preventing cancer.

18. The pharmaceutical composition for use according to claim 17, wherein said cancer is selected from the group consisting of breast cancer, hematological malignancies such as NHL, B-ALL, AML, other cancers as prostate cancer, melanoma, lung cancer, gastric cancer, ovarian cancer, head-and-neck cancer, colorectal cancer, pancreatic cancer, thyroid cancer, glioma, bladder cancer, kidney cancer, liver cancer, or malignant ascites.

19. The pharmaceutical composition for use according to claim 17 or 18, wherein said cancer expresses the surface target antigen being specifically bound by the binding molecule of any one of claims 1 to 12, being specifically bound by the binding molecule encoded the nucleic acid molecule of claim 13, being specifically bound by the binding molecule expressed by the vector of claim 14, and/or being specifically bound by the binding molecule expressed by the host cell or non-human host of claim 15 in an amount being at least two times higher as the amount expressed on non-tumor cells.

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wherein the binding molecule comprises
(a) an antibody specifically binding to CD3, and
(b) a Fyn-SH3-derived polypeptide binding to a surface target antigen on cancer cells,
wherein said Fyn-SH3-derived polypeptide consists of the amino acid sequence of SEQ ID NO: 1, with the proviso that
(i) at least one amino acid within amino acids positions 10 to 19 of SEQ ID NO: 1 is substituted, deleted or added, and
(ii) at least one amino acid amino acid within amino acids positions 29 to 36 of SEQ ID NO: 1 is substituted, deleted or added,
provided that said polypeptide has at least 85% sequence identity to the amino acid sequence of SEQ ID NO: 1, wherein the determination of identity excludes amino acid positions 12 to 17 and 31 to 34 of SEQ ID NO: 1.

2. The binding molecule according to claim 1, wherein the antibody specifically binding to CD3 comprises an Fc part.

3. The binding molecule according to any one of claims 1 or 2, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to EGFR, HER2, CD33, CD19, CEA, EPHA2, melanoma-associated chondroitin sulfate proteoglycan, IGFR1, fibroblast-activating protein alpha, prostate stem cell antigen (PSCA), c-MET, EpCAM, or PSMA.

4. The binding molecule according to any one of claims 1 to 3, wherein the Fyn-SH3-derived polypeptide specifically binds to HER2 and comprises any one of the amino acid sequences chosen from the group consisting of SEQ ID NOs: 4 and 9-159, preferably SEQ ID NO: 4.

5. The binding molecule according to any one of claims 1 to 3, wherein the Fyn-SH3-derived polypeptide specifically binds to EGFR and comprises any one of the amino acid sequences chosen from the group consisting of SEQ ID NOs: 169, 187-197 and 201-203, preferably SEQ ID NO: 169 or 187.

6. The binding molecule according to any one of claims 1 to 3, wherein the Fyn-SH3-derived polypeptide specifically binds to CD33 and comprises any one of the amino acid sequences from the group consisting of SEQ ID NOs: 174, 177-186 and 207, preferably SEQ ID NO: 174.

7. The binding molecule according to any one of claims 1 to 4, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to HER2, and wherein the first of said two polypeptides is linked to the first N-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two heavy chains of said antibody.

8. The binding molecule according to any one of claims 1 to 3, or 5, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to EGFR, and wherein (i) the first of said two polypeptides is linked to the first N-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two heavy chains of said antibody, (ii) the first of said two polypeptides is linked to the first C-terminus of the two heavy chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two heavy chains of said antibody, (iii) the first of said two polypeptides is linked to the first N-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second N-terminus of the two light chains of said antibody, or (iv) the first of said two polypeptides is linked to the first C-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two light chains of said antibody.

9. The binding molecule according to any one of claims 1 to 3, or 6, wherein the binding molecule comprises two Fyn-SH3-derived polypeptides specifically binding to CD33, and wherein the first of said two polypeptides is linked to the first C-terminus of the two light chains of said antibody and the second of said two polypeptides is linked to the second C-terminus of the two light chains of said antibody.

10. The binding molecule according to any one of claims 1 to 9, wherein the antibody specifically binding to CD3 and the Fyn-SH3-derived polypeptide are linked by a linker, preferably wherein the linker is a peptide-linker, more preferably wherein the peptide linker has a sequence selected from the group consisting of SEQ ID Nos: 162, 160 and 161.

11. A nucleic acid molecule encoding the binding molecule of any one of claims 1 to 10.

12. A vector comprising the nucleic acid molecule of claim 11.

13. A host cell or a non-human host transformed with the vector of claim 12.

14. A pharmaceutical composition comprising the binding molecule of any one of claims 1 to 10, the nucleic acid molecule of claim 11, the vector of claim 12, and/or the host cell or non-human host of claim 13.

15. The pharmaceutical composition of claim 14 for use in a method of treating or preventing cancer.

16. The pharmaceutical composition for use according to claim 15, wherein said cancer is selected from the group consisting of breast cancer, hematological malignancies such as NHL, B-ALL, AML, other cancers as prostate cancer, melanoma, lung cancer, gastric cancer, ovarian cancer, head-and-neck cancer, colorectal cancer, pancreatic cancer, thyroid cancer, glioma, bladder cancer, kidney cancer, liver cancer, or malignant ascites, preferably wherein said cancer expresses the surface target antigen being specifically bound by the binding molecule of any one of claims 1 to 10 in an amount being at least two times higher as the amount expressed on non-tumor cells.