domain, wherein the mutated Fc domain comprises at least one amino acid substitution compared to the non-mutated parent Fc domain.

In one aspect, the disclosure relates to an antigen binding receptor comprising an anchoring transmembrane domain and an extracellular domain comprising an antigen binding moiety, wherein the antigen binding moiety is capable of specific binding to a mutated fragment crystallizable (Fc) domain but not capable of specific binding to the non-mutated parent Fc domain, wherein the mutated Fc domain comprises at least one amino acid substitution compared to the non-mutated parent Fc domain, wherein the antigen binding moiety is a scFv, wherein the mutated Fc domain comprises the amino acid mutation P329G, wherein the non-mutated Fc domain is a human IgG1 Fc domain~~a Fab, a crossFab or a scFab~~.

In one example, Fc receptor binding of the mutated Fc domain is reduced compared to Fc receptor binding of the non-mutated parent Fc domain, particularly wherein the Fc receptor is a Fcγ receptor or neonatal Fc receptor (FcRn). In one example, Fc receptor binding is measured by Surface Plasmon Resonance (SPR) at 25°C.

In one example, the antigen binding moiety is a scFv, a Fab, a crossFab, or a scFab. In a preferred example, the antigen binding moiety is a scFv. In another preferred example, the antigen binding moiety is a Fab or a crossFab.

In one example, the anchoring transmembrane domain is a transmembrane domain selected from the group consisting of the CD8, the CD3z, the FCGR3A, the NKG2D, the CD27, the CD28, the CD137, the OX40, the ICOS, the DAP10 or the DAP12 transmembrane domain or a fragment thereof.

In one example, the anchoring transmembrane domain is the CD28 transmembrane domain, in particular wherein the anchoring transmembrane domain comprises the amino acid sequence of SEQ ID NO:11.

In one example, the antigen binding receptor further comprises at least one stimulatory signaling domain and/or at least one co-stimulatory signaling domain. In one example, the at least one stimulatory signaling domain is individually selected from the group consisting of the intracellular domain of CD3z, of FCGR3A and of NKG2D, or fragments thereof. In one example, the at least one stimulatory signaling domain is a fragment of the intracellular domain of CD3z, in particular wherein the at least one stimulatory signaling domain comprises the amino acid sequence of SEQ ID NO:13. In one example, the at least one co-stimulatory signaling domain is individually

CLAIMS

1. An antigen binding receptor comprising an anchoring transmembrane domain and an extracellular domain comprising an antigen binding moiety, wherein the antigen binding moiety is capable of specific binding to a mutated fragment crystallizable (Fc) domain but not capable of specific binding to the non-mutated parent Fc domain, wherein the mutated Fc domain comprises at least one amino acid substitution compared to the non-mutated parent Fc domain, wherein the antigen binding moiety is a scFv, wherein the mutated Fc domain comprises the amino acid mutation P329G, wherein the non-mutated Fc domain is a human IgG1 Fc domain~~a Fab, a crossFab or a scFab~~.

2. The antigen binding receptor of claim 1, wherein Fc receptor binding of the mutated Fc domain is reduced compared to Fc receptor binding of the non-mutated parent Fc domain.

3. The antigen binding receptor of claim 2, wherein the Fc receptor is a Fcγ receptor or neonatal Fc receptor (FcRn).

4. The antigen binding receptor of any one of claims 1 to 3, wherein the anchoring transmembrane domain is a transmembrane domain selected from the group consisting of the CD8, the CD3z, the FCGR3A, the NKG2D, the CD27, the CD28, the CD137, the OX40, the ICOS, the DAP10 or the DAP12 transmembrane domain.

5. The antigen binding receptor of claim 4, wherein the anchoring transmembrane domain is the CD28 transmembrane domain.

6. The antigen binding receptor of any one of claims 1 to 5 further comprising at least one stimulatory signaling domain and/or at least one co-stimulatory signaling domain.

7. The antigen binding receptor of any one of claims 1 to 6, wherein the at least one stimulatory signaling domain is individually selected from the group consisting of the intracellular domain of CD3z, of FCGR3A and of NKG2D.

8. The antigen binding receptor of claim 7, wherein the at least one stimulatory signaling domain is the CD3z intracellular domain.

9. The antigen binding receptor of any one of claims 1 to 8, wherein the at least one co-stimulatory signaling domain is individually selected from the group consisting of the intracellular domain of CD27, of CD28, of CD137, of OX40, of ICOS, of DAP10 and of DAP12.

10. The antigen binding receptor of claim 9, wherein the at least one co-stimulatory signaling domain is the CD28 intracellular domain.

11. The antigen binding receptor of any one of claims 1 to 10, wherein the antigen binding receptor comprises one stimulatory signaling domain comprising the intracellular domain of CD28, and wherein the antigen binding receptor comprises one co-stimulatory signaling domain comprising the intracellular domain of CD3z.

12. The antigen binding receptor of any one of claims 1 to 11~~, wherein the antigen binding moiety is a scFv fragment~~, wherein the scFv fragment is connected at the C-terminus to the N-terminus of the anchoring transmembrane domain.

13. The antigen binding receptor of claim 12, wherein the scFv fragment is connected at the C-terminus to the N-terminus of the anchoring transmembrane domain through a peptide linker.

~~14. The antigen binding receptor of any one of claims 1 to 13, wherein the antigen binding moiety is a Fab or a crossFab fragment, wherein the Fab or crossFab fragment is connected at the C-terminus of the heavy chain to the N-terminus of the anchoring transmembrane domain.~~

~~15. The antigen binding receptor of claim 14, wherein the Fab or crossFab fragment is connected at the C-terminus of the heavy chain to the N-terminus of the anchoring transmembrane domain through a peptide linker.~~

~~16. The antigen binding receptor of any one of claims 1 to 15, wherein the mutated Fc domain comprises at least one amino acid mutation at a position selected from the group consisting of L234, L235, I253, H310, P331, P329 and H435 according to EU numbering.~~

~~17. The antigen binding receptor of claim 16, wherein the amino acid mutation is L234A, L235A, I253A, N297A, H310A, P329G and/or H435A.~~

~~18~~14. The antigen binding receptor of any one of claims 1 to ~~17~~13, wherein the mutated Fc domain comprises the amino acid mutation P329G according to EU numbering, wherein Fcγ receptor binding of the mutated Fc domain is reduced compared to Fcγ receptor binding of the non-mutated parent Fc domain.

~~19. The antigen binding receptor of any one of claims 1 to 17, wherein the mutated Fc domain comprises at least one amino acid mutation at a position selected from the group consisting of I253, H310 and H435 according to EU numbering, wherein FcRn binding of the mutated Fc domain is reduced compared to FcRn binding of the non-mutated parent Fc domain.~~

~~20. The antigen binding receptor of claim 19, wherein the mutated Fc domain comprises the amino acid mutations I253A, H310A and H435A ("AAA").~~

~~21~~15. The antigen binding receptor of any one of claims 1 to ~~18~~14, wherein the at least one antigen binding moiety is capable of specific binding to a mutated Fc domain comprising the P329G mutation but not capable of specific binding to the non-mutated parent Fc domain, wherein the antigen binding moiety comprises:

(i) a heavy chain variable region (VH) comprising

(a) the heavy chain complementarity-determining region (CDR H) 1 amino acid sequence RYWMN (SEQ ID NO:1);

(b) the CDR H2 amino acid sequence EITPDSSTINYTPSLKD (SEQ ID NO:2); and

(c) the CDR H3 amino acid sequence PYDYGAWFAS (SEQ ID NO:3); and

(ii) a light chain variable region (VL) comprising

(d) the light chain complementary-determining region (CDR L) 1 amino acid sequence RSSTGAVTTSNYAN (SEQ ID NO:4);

(e) the CDR L2 amino acid sequence GTNKRAP (SEQ ID NO:5); and

(f) the CDR L3 amino acid sequence ALWYSNHWV (SEQ ID NO:6).

~~22. The antigen binding receptor of any one of claims 1 to 17, 19 or 20, wherein the at least one antigen binding moiety is capable of specific binding to a mutated Fc domain comprising the I253A, H310A and H435A ("AAA") mutations but not capable of specific binding to the non-mutated parent Fc domain, wherein the antigen binding moiety comprises:~~

~~(i) a heavy chain variable region (VH) comprising~~

~~(a) the heavy chain complementarity-determining region (CDR H) 1 amino acid sequence SYGMS (SEQ ID NO:53);~~

~~(b) the CDR H2 amino acid sequence SSGGSY (SEQ ID NO:54); and~~

~~(c) the CDR H3 amino acid sequence LGMITTGYAMDY (SEQ ID NO:55); and~~

~~(ii) a light chain variable region (VL) comprising~~

~~(d) the light chain complementary-determining region (CDR L) 1 amino acid sequence RSSQTIVHSTGHTYLE (SEQ ID NO:56);~~

~~(e) the CDR L2 amino acid sequence KVSNRFS (SEQ ID NO:57); and~~

~~(f) the CDR L3 amino acid sequence FQGSHVPYT (SEQ ID NO:58).~~

~~23~~16. A transduced T cell capable of expressing the antigen binding receptor of any one of claims 1 to ~~22~~15.

~~24~~17. An isolated polynucleotide encoding the antigen binding receptor of any one of claims 1 to ~~22~~15.

~~25~~18. A vector comprising the polynucleotide of claim ~~24~~17.

~~26~~19. The vector of claim ~~25~~18, wherein the vector is an expression vector.

~~27~~20. A kit comprising

(A) a transduced T cell capable of expressing the antigen binding receptor of any one of claims 1 to ~~22~~15; and

(B) an antibody comprising a mutated Fc domain;

wherein the antigen binding receptor is capable of specific binding to the mutated Fc domain but not capable of specific binding to the non-mutated parent Fc domain.

~~28~~21. A kit comprising

(A) an isolated polynucleotide encoding the antigen binding receptor of any one of claims 1 to ~~22~~15; and

(B) an antibody comprising a mutated Fc domain;

wherein the antigen binding receptor is capable of specific binding to the mutated Fc domain but not capable of specific binding to the non-mutated parent Fc domain.

~~29~~22. The kit of any one of claims ~~27 or 28~~20 or 21, wherein the antibody comprising the mutated Fc domain is capable of specific binding to an antigen selected from the group consisting of fibroblast activation protein (FAP), carcinoembryonic antigen (CEA), mesothelin (MSLN), CD20, folate receptor 1 (FOLR1), and tenascin (TNC).

~~30~~23. The kit of claim ~~27~~ 20 for use as a medicament.

~~31~~24. The kit of claim ~~27~~ 20 for use in the treatment of a disease.

~~32~~25. The kit for use of claim ~~31~~24, wherein the disease is a malignant disease.

~~33~~26. The transduced T cell of claim ~~23~~ 16 for use as a medicament, wherein a transduced T cell expressing the antigen binding receptor is to be administered before, simultaneously with or after administration of an antibody comprising a mutated Fc domain wherein the antigen binding receptor is capable of specific binding to the mutated Fc domain but not capable of specific binding to the non-mutated parent Fc domain.

~~34~~27. The transduced T cell of claim ~~23~~ 16 for use in the treatment of a malignant disease, wherein the treatment comprises administration of a transduced T cell expressing the antigen binding receptor before, simultaneously with or after administration of an

antibody comprising a mutated Fc domain wherein the antigen binding receptor is capable of specific binding to the mutated Fc domain but not capable of specific binding to the non-mutated parent Fc domain.

~~35~~28. A method for inducing lysis of a target cell, comprising contacting the target cell with a transduced T cell capable of expressing the antigen binding receptor of any one of claims 1 to ~~22~~ 15 in the presence of an antibody comprising a mutated Fc domain wherein the antigen binding receptor is capable of specific binding to the mutated Fc domain but not capable of specific binding to the non-mutated parent Fc domain.

~~36~~29. Use of the transduced T cell of claim ~~23~~ 16 in the manufacture of a medicament for the treatment of a malignant disease.

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