

CLAIMS

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1. A multispecific molecule capable of simultaneous binding to a Mucosal Associated Invariant T (MAIT) cell and a tumor cell, which multispecific molecule comprises at least one domain that specifically binds a $V\alpha 7.2$ T cell receptor (TCR) and at least one domain that specifically binds a tumor associated antigen (TAA).

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2. The multispecific molecule of claim 1, which is a multispecific, preferably bispecific, antibody or an antigen-binding fragment thereof.

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3. The multispecific molecule of claim 1 or 2, which comprises at least one multispecific antigen-binding fragment comprising at least two Fab fragments with different CH1 and CL domains, wherein said Fab fragments are tandemly arranged in any order, the C-terminal end of the CH1 domain of a first Fab fragment being linked to the N-terminal end of the VH domain of the following Fab fragment through a polypeptide linker, wherein at least one Fab fragment binds $V\alpha 7.2$, and at least another Fab fragment binds the TAA.

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4. The multispecific molecule of claim 3, that consists of a multispecific antigen-binding fragment as defined in claim 3.

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5. The multispecific molecule of claim 3, that comprises two identical antigen-binding arms, each consisting of a multispecific antigen-binding fragment as defined in claim 3, preferably wherein the multispecific molecule has an immunoglobulin-like structure, comprising:

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- two identical antigen-binding arms each consisting of a multispecific antigen-binding fragment as defined in claim 3;

- the dimerized CH2 and CH3 domains of an immunoglobulin;

- the hinge region of an IgA, IgG, or IgD, linking the C-terminal ends of CH1 domains of the antigen-binding arms to the N-terminal ends of the CH2 domains,

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still preferably wherein the multispecific molecule is bispecific antibody that

comprises at least two heavy chains and four light chains, wherein each heavy chain further comprises a Fc region of an immunoglobulin comprising Hinge-CH2-CH3 domains.

6. The multispecific molecule of any of claims 1 to 5, wherein the domain that binds a $V\alpha 7.2$ TCR binds $V\alpha 7.2$ -Ja33, $V\alpha 7.2$ -Ja20 or $V\alpha 7.2$ -Ja12.
- 5 7. The multispecific molecule of claim 6, which is capable of competing or binds to the same or substantially the same epitope of the $V\alpha 7.2$ -Ja33 polypeptide as monoclonal antibody 3C10.
- 10 8. The multispecific molecule of claim 6 or 7, wherein the heavy variable chain of the anti- $V\alpha 7.2$ domain comprises the following CDRs: GFNIKDTH (SEQ ID NO: 4); TDPASGDT (SEQ ID NO:5) and CAHYRDDVNYAMDY (SEQ ID NO:6); and/or the light variable chain of the anti- $V\alpha 7.2$ domain comprises the following CDRs : QNVGSN (SEQ ID NO:7); SSS, and QQYNTYPYT (SEQ ID NO:8).
- 15 9. The multispecific molecule of any of claims 1 to 8, wherein the TAA is a tumor cell surface antigen that is expressed on hematological malignancies or solid tumor cells.
- 20 10. The multispecific molecule of claim 9, wherein the TAA is selected from the group consisting of CD19, CD20, CD38, EGFR, HER2, VEGF, CD52, CD33, RANK-L, GD2, CD33, CEA family (including CEACAM antigens, e.g. CEACAM1, CEACAM5; or PSG antigen), MUC1, PSCA, PSMA, GPA33, CA9, PRAME, CLDN1, HER3, glypican-3, CD22, CD25, CD40, CD30, CD79b, CD138 (syndecan-1), BCMA, SLAMF7 (CS1, CD319), CD56, CCR4, EpCAM, PDGFR- α , Apo2L/TRAIL, and PD-L1.
- 25 11. The multispecific molecule of claim 10, wherein the TAA is CD19.
12. The multispecific molecule of claim 10, wherein the TAA is EGFR.
13. The multispecific molecule of claim 10, wherein the TAA is HER2.
- 30 14. A polypeptide which comprises, preferably consists of, a heavy chain of the antigen-binding fragment or a heavy chain of the multispecific antibody as defined in any of claims 2 to 13.
- 35 15. A polynucleotide comprising a sequence encoding the polypeptide of claim 14.
16. A host cell transfected with an expression vector comprising the polynucleotide of claim 15, preferably wherein the host cell is further transformed with at least two

polynucleotides encoding two different light chains: a first light chain pairing specifically with a first VH/CH1 region of said heavy chain; a second light chain pairing specifically with a second VH/CH1 region of said heavy chain.

- 5 17. A method for producing an antigen-binding fragment or a multispecific antibody as defined in any of claims 2 to 13, said method comprising the following steps: a) culturing in suitable medium and culture conditions a host cell expressing an antibody heavy chain as defined in any of claims 2 to 13, and an antibody light chain as defined in any of claims any of claims 2 to 13; and b) recovering said produced antibodies from the
- 10 culture medium or from said cultured cells.
18. A multispecific molecule as defined in any of claims 1 to 13, for use in treating a tumor in a patient.
- 15 19. The multispecific molecule for use of claim 18, wherein the tumor is a solid tumor.