

Claims

1. An antibody that binds to T Cell Receptor Gamma Variable 9 (TRGV9), wherein the antibody comprises a heavy chain variable region (VH) and a light chain variable region (VL).
2. The antibody of claim 1, wherein the antibody comprises:
 - (A) (i) a VH comprising a VH complementarity determining region (CDR) 1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:31; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the antibody comprises a VH having an amino acid sequence of SEQ ID NO:34, and/or a VL having an amino acid sequence of SEQ ID NO:8;
 - (B) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:32; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the antibody comprises a VH having an amino acid sequence of SEQ ID NO:35, and/or a VL having an amino acid sequence of SEQ ID NO:8;
 - (C) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:33; and

- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the antibody comprises a VH having an amino acid sequence of SEQ ID NO:36, and/or a VL having an amino acid sequence of SEQ ID NO:8;
- (D)
 - (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:76, and a VH CDR3 having an amino acid sequence of SEQ ID NO:3; and
 - (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:77, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the antibody comprises a VH having an amino acid sequence of SEQ ID NO:65, and/or a VL having an amino acid sequence of SEQ ID NO:66;
- (E)
 - (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:60, a VH CDR2 having an amino acid sequence of SEQ ID NO:61, and a VH CDR3 having an amino acid sequence of SEQ ID NO:62; and
 - (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:63, a VL CDR2 having an amino acid sequence of SEQ ID NO:64, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the antibody comprises a VH having an amino acid sequence of SEQ ID NO:67, and/or a VL having an amino acid sequence of SEQ ID NO:68;
- (F)
 - (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:98, a VH CDR2 having an amino acid sequence of SEQ ID NO:99, and a VH CDR3 having an amino acid sequence of SEQ ID NO:100; and

- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:101, a VL CDR2 having an amino acid sequence of SEQ ID NO:102, and a VL CDR3 having an amino acid sequence of SEQ ID NO:103;
- wherein optionally, the antibody comprises a VH having an amino acid sequence of SEQ ID NO:104, and/or a VL having an amino acid sequence of SEQ ID NO:105;
- (G) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:107, a VH CDR2 having an amino acid sequence of SEQ ID NO:108, and a VH CDR3 having an amino acid sequence of SEQ ID NO:109; and
- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:110, a VL CDR2 having an amino acid sequence of SEQ ID NO:111, and a VL CDR3 having an amino acid sequence of SEQ ID NO:112;
- wherein optionally, the antibody comprises a VH having an amino acid sequence of SEQ ID NO:113, and/or a VL having an amino acid sequence of SEQ ID NO:114;
- (H) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:117, a VH CDR2 having an amino acid sequence of SEQ ID NO:118, and a VH CDR3 having an amino acid sequence of SEQ ID NO:119; and
- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:120, a VL CDR2 having an amino acid sequence of SEQ ID NO:121, and a VL CDR3 having an amino acid sequence of SEQ ID NO:122;
- wherein optionally, the antibody comprises a VH having an amino acid sequence of SEQ ID NO:123, and/or a VL having an amino acid sequence of SEQ ID NO:124;
- (I) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:127, a VH CDR2 having an amino acid sequence of SEQ ID

NO:128, and a VH CDR3 having an amino acid sequence of SEQ ID NO:129; and

(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:130, a VL CDR2 having an amino acid sequence of SEQ ID NO:131, and a VL CDR3 having an amino acid sequence of SEQ ID NO:132;

wherein optionally, the antibody comprises a VH having an amino acid sequence of SEQ ID NO:133, and/or a VL having an amino acid sequence of SEQ ID NO:134.

3. The antibody of any one of claims 1 to 2, wherein
 - (a) the TRGV9 is present on the surface of a $\gamma\delta$ T cell;
 - (b) the antibody is a humanized antibody;
 - (c) the antibody is an IgG antibody; wherein optionally the IgG antibody is an IgG1, IgG2, IgG3, or IgG4 antibody; and/or
 - (d) wherein the antibody is multivalent;
wherein optionally the antibody is capable of binding at least three antigens or at least five antigens.
4. A nucleic acid encoding the antibody of any one of claims 1 to 3.
5. A vector comprising the nucleic acid of claim 4.
6. A host cell comprising the vector of claim 5.
7. A kit comprising the vector of claim 5 and packaging for the same.
8. A pharmaceutical composition comprising the antibody of any one of claims 1 to 3, and a pharmaceutically acceptable carrier.

9. A method of producing the pharmaceutical composition of claim 8, comprising combining the antibody with a pharmaceutically acceptable carrier to obtain the pharmaceutical composition.
10. Use of the antibody of any one of claims 1 to 3, in the manufacture of a medicament for activating a $\gamma\delta$ T cell expressing TRGV9, wherein the medicament is to be used to contact the $\gamma\delta$ T cell;
wherein optionally the contacting results in an increase in CD69, CD25, and/or Granzyme B expression, as compared to a control $\gamma\delta$ T cell expressing TRGV9.
11. A bispecific antibody comprising:
 - (a) a first binding domain that binds to TRGV9, and
 - (b) a second binding domain that binds to a second target that is not TRGV9.
12. The bispecific antibody of claim 11, wherein the first binding domain comprises:
 - (A)
 - (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:3;
and
 - (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6;
wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:7, and/or a VL having an amino acid sequence of SEQ ID NO:8;
 - (B)
 - (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:31;
and

- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:34, and/or a VL having an amino acid sequence of SEQ ID NO:8;
- (C) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:32; and
 - (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:35, and/or a VL having an amino acid sequence of SEQ ID NO:8;
- (D) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:2, and a VH CDR3 having an amino acid sequence of SEQ ID NO:33; and
 - (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:4, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:36, and/or a VL having an amino acid sequence of SEQ ID NO:8.
- (E) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:1, a VH CDR2 having an amino acid sequence of SEQ ID NO:76, and a VH CDR3 having an amino acid sequence of SEQ ID NO:3; and

- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:77, a VL CDR2 having an amino acid sequence of SEQ ID NO:5, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:65, and/or a VL having an amino acid sequence of SEQ ID NO:66;
- (F) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:60, a VH CDR2 having an amino acid sequence of SEQ ID NO:61, and a VH CDR3 having an amino acid sequence of SEQ ID NO:62; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:63, a VL CDR2 having an amino acid sequence of SEQ ID NO:64, and a VL CDR3 having an amino acid sequence of SEQ ID NO:6; wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:67, and/or a VL having an amino acid sequence of SEQ ID NO:68;
- (G) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:89, a VH CDR2 having an amino acid sequence of SEQ ID NO:90, and a VH CDR3 having an amino acid sequence of SEQ ID NO:91; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:92, a VL CDR2 having an amino acid sequence of SEQ ID NO:93, and a VL CDR3 having an amino acid sequence of SEQ ID NO:94;
wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:95, and/or a VL having an amino acid sequence of SEQ ID NO:96;
- (H) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:98, a VH CDR2 having an amino acid sequence of SEQ ID NO:99, and a VH CDR3 having an amino acid sequence of SEQ ID NO:100; and

- (ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:101, a VL CDR2 having an amino acid sequence of SEQ ID NO:102, and a VL CDR3 having an amino acid sequence of SEQ ID NO:103;
wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:104, and/or a VL having an amino acid sequence of SEQ ID NO:105;
- (I) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:107, a VH CDR2 having an amino acid sequence of SEQ ID NO:108, and a VH CDR3 having an amino acid sequence of SEQ ID NO:109; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:110, a VL CDR2 having an amino acid sequence of SEQ ID NO:111, and a VL CDR3 having an amino acid sequence of SEQ ID NO:112;
wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:113, and/or a VL having an amino acid sequence of SEQ ID NO:114;
- (J) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:117, a VH CDR2 having an amino acid sequence of SEQ ID NO:118, and a VH CDR3 having an amino acid sequence of SEQ ID NO:119; and
(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:120, a VL CDR2 having an amino acid sequence of SEQ ID NO:121, and a VL CDR3 having an amino acid sequence of SEQ ID NO:122;
wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:123, and/or a VL having an amino acid sequence of SEQ ID NO:124;
- (K) (i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:127, a VH CDR2 having an amino acid sequence of SEQ ID

NO:128, and a VH CDR3 having an amino acid sequence of SEQ ID NO:129; and

(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:130, a VL CDR2 having an amino acid sequence of SEQ ID NO:131, and a VL CDR3 having an amino acid sequence of SEQ ID NO:132;

wherein optionally the first binding domain comprises a VH having an amino acid sequence of SEQ ID NO:133, and/or a VL having an amino acid sequence of SEQ ID NO:134.

13. The bispecific antibody of any one of claims 11 or 12, wherein the second target is a cancer antigen present on the surface of a cancer cell, wherein optionally the antigen on the surface of the cancer cell is a tumor-specific antigen, a tumor associated antigen, or a neoantigen.

14. The bispecific antibody of any one of claims 11 to 13, wherein the second target is CD123;

wherein optionally the second binding domain comprises:

(i) a VH comprising a VH CDR1 having an amino acid sequence of SEQ ID NO:9, a VH CDR2 having an amino acid sequence of SEQ ID NO:10, and a VH CDR3 having an amino acid sequence of SEQ ID NO:11; wherein optionally the second binding domain comprises a VH having an amino acid sequence of SEQ ID NO:15; and

(ii) a VL comprising a VL CDR1 having an amino acid sequence of SEQ ID NO:12, a VL CDR2 having an amino acid sequence of SEQ ID NO:13, and a VL CDR3 having an amino acid sequence of SEQ ID NO:14; wherein optionally the second binding domain comprises a VL having an amino acid sequence of SEQ ID NO:16.

15. The bispecific antibody of any one of claims 11 to 14, wherein the TRGV9 is present on the surface of a $\gamma\delta$ T cell;

wherein optionally the second target is a cancer antigen expressed on the surface of the cancer cell;

wherein optionally the cancer cell is killed when the bispecific antibody binds to the TRGV9 on the surface of the $\gamma\delta$ T cell and the antigen on the surface of the cancer cell.

16. The bispecific antibody of any one of claims 11 to 15, wherein the first binding domain is humanized, the second binding domain is humanized, or both the first binding domain and the second binding domain are humanized;
wherein optionally the bispecific antibody is an IgG antibody;
wherein optionally wherein the IgG antibody is an IgG1, IgG2, IgG3, or IgG4 antibody.
17. An isolated TRGV9 bispecific antibody or antigen binding fragment thereof, the isolated TRGV9 bispecific antibody or antigen binding fragment thereof comprising:
 - a. a first heavy chain (HC1);
 - b. a second heavy chain (HC2);
 - c. a first light chain (LC1); and
 - d. a second light chain (LC2),wherein HC1 is associated with LC1 and HC2 is associated with LC2, and wherein
 - (A) HC1 comprises a heavy chain complementarity determining region 1 (HCDR1), HCDR2, and HCDR3 comprising the amino acid sequences of:
 - i. SEQ ID NO:1, SEQ ID NO:2, and SEQ ID NO:3, respectively,
 - ii. SEQ ID NO:1, SEQ ID NO:2, and SEQ ID NO:31, respectively,
 - iii. SEQ ID NO:1, SEQ ID NO:2, and SEQ ID NO:32, respectively, or

- iv. SEQ ID NO:1, SEQ ID NO:2, and SEQ ID NO:33,
respectively,
and LC1 comprises a light chain complementarity determining
region 1 (LCDR1), LCDR2, and LCDR3 comprising the amino
acid sequences of SEQ ID NO:4, SEQ ID NO:5, and SEQ ID
NO:6, respectively, to form a binding site for a first antigen, and
wherein HC2 and LC2 form a binding site for a second antigen;
- (B) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the
amino acid sequences of SEQ ID NO:1, SEQ ID NO:76, and SEQ
ID NO:3, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising
the amino acid sequences of SEQ ID NO:77, SEQ ID NO:5, and
SEQ ID NO:6, respectively, to form a binding site for a first
antigen, and wherein HC2 and LC2 form a binding site for a
second antigen;
- (C) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the
amino acid sequences of SEQ ID NO:60, SEQ ID NO:61, and SEQ
ID NO:62, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising
the amino acid sequences of SEQ ID NO:63, SEQ ID NO:64, and
SEQ ID NO:6, respectively, to form a binding site for a first
antigen, and wherein HC2 and LC2 form a binding site for a
second antigen;
- (D) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the
amino acid sequences of SEQ ID NO:89, SEQ ID NO:90, and SEQ
ID NO:91, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising
the amino acid sequences of SEQ ID NO:92, SEQ ID NO:93, and
SEQ ID NO:94, respectively, to form a binding site for a first
antigen, and wherein HC2 and LC2 form a binding site for a
second antigen;

- (E) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the amino acid sequences of SEQ ID NO:98, SEQ ID NO:99, and SEQ ID NO:100, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NO:101, SEQ ID NO:102, and SEQ ID NO:103, respectively, to form a binding site for a first antigen, and wherein HC2 and LC2 form a binding site for a second antigen;
- (F) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the amino acid sequences of SEQ ID NO:107, SEQ ID NO:108, and SEQ ID NO:109, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NO:110, SEQ ID NO:111, and SEQ ID NO:112, respectively, to form a binding site for a first antigen, and wherein HC2 and LC2 form a binding site for a second antigen;
- (G) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the amino acid sequences of SEQ ID NO:117, SEQ ID NO:118, and SEQ ID NO:119, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NO:120, SEQ ID NO:121, and SEQ ID NO:122, respectively, to form a binding site for a first antigen, and wherein HC2 and LC2 form a binding site for a second antigen; or
- (H) HC1 comprises a HCDR1, HCDR2, and HCDR3 comprising the amino acid sequences of SEQ ID NO:127, SEQ ID NO:128, and SEQ ID NO:129, respectively,
and LC1 comprises a LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NO:130, SEQ ID NO:131, and SEQ ID NO:132, respectively, to form a binding site for a first

antigen, and wherein HC2 and LC2 form a binding site for a second antigen.

18. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof of claim 17, wherein
- (A) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:7, SEQ ID NO:34, SEQ ID NO:35, or SEQ ID NO:36, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:8; wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:7, SEQ ID NO:34, SEQ ID NO:35, or SEQ ID NO:36, and LC1 comprises the amino acid sequence of SEQ ID NO:8;
 - (B) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:65, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:66; wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:65, and LC1 comprises the amino acid sequence of SEQ ID NO:66;
 - (C) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:67, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:68; wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:67, and LC1 comprises the amino acid sequence of SEQ ID NO:68;
 - (D) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:95, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:96; wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:95, and LC1 comprises the amino acid sequence of SEQ ID NO:96;

- (E) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:104, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:105;
wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:104, and LC1 comprises the amino acid sequence of SEQ ID NO:105;
- (F) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:113, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:114;
wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:113, and LC1 comprises the amino acid sequence of SEQ ID NO:114;
- (G) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:123, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:124;
wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:123, and LC1 comprises the amino acid sequence of SEQ ID NO:124;
or
- (H) HC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:133, and LC1 comprises an amino acid sequence having at least 95% identity to the amino acid sequence of SEQ ID NO:134;
wherein optionally HC1 comprises the amino acid sequence of SEQ ID NO:133, and LC1 comprises the amino acid sequence of SEQ ID NO:134.
19. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof any one of claims 17 or 18, wherein the binding site for a first antigen binds to TRGV9 on a $\gamma\delta$ T cell; wherein optionally the binding site for a second antigen binds to a cancer antigen present on the surface of a cancer cell .

20. The isolated TRGV9 bispecific antibody or antigen binding fragment of claim 19, wherein the binding of the bispecific antibody to TRGV9 present on the surface of the $\gamma\delta$ T cell and the binding of the cancer antigen present on the surface of the cancer cell results in the killing of the cancer cell.
21. The isolated TRGV9 bispecific antibody or antigen binding fragment of any one of claims 17 to 20, wherein HC1 and LC1 are humanized; wherein optionally HC2 and LC2 bind to CD123.
22. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof any one of claims 17 to 21, wherein the bispecific antibody or antigen binding fragment thereof is an IgG1, an IgG2, an IgG3, or an IgG4 isotype; wherein optionally the bispecific antibody or antigen binding fragment thereof is an IgG4 isotype.
23. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof any one of claims 17 to 22, wherein the bispecific antibody or antigen binding fragment thereof induces $\gamma\delta$ T cell dependent cytotoxicity of a cancer cell *in vitro* with an EC₅₀ of less than about 500 pM; wherein optionally the bispecific antibody or antigen binding fragment thereof induces $\gamma\delta$ T cell dependent cytotoxicity of a cancer cell *in vitro* with an EC₅₀ of less than about 300 pM or less than about 160 pM.
24. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof of claim 23, wherein the EC₅₀ is assessed with a mixture of $\gamma\delta$ T effector cells and Kasumi3 AML target cells; and/or wherein the effector cell to target cell ratio is about 0.01 to 1 to about 5 to 1; wherein optionally the effector cell to target cell ratio is about 0.1 to 1 to about 2 to 1; wherein optionally the effector cell to target cell ratio is about 1:1.

25. The isolated TRGV9 bispecific antibody or antigen binding fragment thereof of any one of claims 17 to 24, wherein the bispecific antibody or antigen binding fragment thereof is multivalent;
wherein optionally the bispecific antibody or antigen binding fragment thereof is capable of binding at least three antigens or at least five antigens.
26. A pharmaceutical composition comprising the bispecific antibody of any one of claims 11 to 25, and a pharmaceutically acceptable carrier.
27. The pharmaceutical composition of claim 26 for use in treating a cancer in a subject in need thereof.
28. Use of the bispecific antibody of any one of claims 11 to 25, in the manufacture of a medicament for the treatment of cancer, by directing a $\gamma\delta$ T cell expressing TRGV9 to a cancer cell, whereby the $\gamma\delta$ T cell is to be placed in contact with the medicament, such that the contacting will direct the $\gamma\delta$ T cell to the cancer cell.
29. Use of the bispecific antibody of any one of claims 11 to 25 in the manufacture of a medicament for inhibiting growth or proliferation of cancer cells expressing a cancer antigen on the cell surface, wherein the medicament is to be allowed to contact the cancer cells, in such a way that the contacting of the cancer cells with the medicament in the form of the pharmaceutical composition, will inhibit growth or proliferation of the cancer cells; and
wherein optionally the cancer cells are in the presence of a $\gamma\delta$ T cell expressing TRGV9 while in contact with the medicament.
30. An effective amount of the bispecific antibody of any one of claims 11 to 25 for use in eliminating cancer cells in a subject;
wherein optionally the subject is a subject in need thereof or the subject is a human.

31. Use of the bispecific antibody of any one of claims 11 to 25, in the manufacture of a medicament for activating a $\gamma\delta$ T cell expressing TRGV9, wherein the medicament is to be used to contact the $\gamma\delta$ T cell.