

pharmaceutical composition comprising a bispecific antibody disclosed herein. The composition may be lyophilized, suspended in solution, etc. and may be provided in a unit dose formulation.

[0018] In some embodiments, a method is provided for treatment of cancer, the method comprising administering to an individual in need thereof an effective dose of a mono-specific, bi-specific, *etc.* antibody of the disclosure. Where the antibody is bispecific, a second antigen-binding site may specifically bind a tumor antigen, a checkpoint protein, etc. In various embodiments, the cancer is selected from the group consisting of ovarian cancer, breast cancer, gastrointestinal, brain cancer, head and neck cancer, prostate cancer, colon cancer, lung cancer, leukemia, lymphoma, sarcoma, carcinoma, neural cell tumors, squamous cell carcinomas, germ cell tumors, metastases, undifferentiated tumors, seminomas, melanomas, myelomas, neuroblastomas, mixed cell tumors, and neoplasias caused by infectious agents.

[0019] In some embodiments, a method is provided for treatment of infectious disease, the method comprising administering to an individual in need thereof an effective dose of a mono-specific, bi-specific, *etc.* antibody of the disclosure. Where the antibody is bispecific, a second antigen-binding site may specifically bind a pathogen antigen, e.g. bacteria, viruses or parasites.

[0019a] In another aspect, there is provided a multispecific antibody disclosed herein, or the pharmaceutical composition disclosed herein, for use in therapy in an individual in need. In another aspect, there is provided a bispecific three-chain antibody like molecule disclosed herein, or the pharmaceutical composition disclosed herein, for use in therapy in an individual in need. In another aspect, there is provided a bispecific antibody disclosed herein, or the pharmaceutical composition disclosed herein, for use in therapy in an individual in need. In another aspect, there is provided a bispecific three-chain antibody like molecule disclosed herein, or the pharmaceutical composition disclosed herein, for use in therapy in an individual in need.

[0019b] In another aspect, there is provided use of an effective dose of the multispecific antibody disclosed herein, or the pharmaceutical composition disclosed herein, in the preparation of a medicament for treating a disease or condition in an individual in need, wherein the disease is an autoimmune disease or a cancer. In another aspect, there is provided use of an effective dose of the bispecific antibody disclosed herein, or the pharmaceutical composition disclosed herein, in the preparation of a medicament for treating a disease or condition in an individual in need, wherein the disease is an autoimmune disease or a cancer. In another aspect, there is provided use of an effective dose of the bispecific antibody disclosed herein, or the pharmaceutical composition of disclosed herein, in the preparation of a medicament for treating a cancer in an individual with cancer. In another aspect, there is provided use of a bispecific three-chain antibody like molecule disclosed herein, or the pharmaceutical

WHAT IS CLAIMED IS:

1. A multispecific antibody comprising:
a first binding moiety that has binding specificity for CD3, comprising:
a heavy chain variable domain comprising a CDR1 sequence comprising GFTFDDYA or GFTFHNYA, a CDR2 sequence comprising ISWNSGSI, and a CDR3 sequence comprising AKDSRGYGDYRLGGAY or AKDSRGYGDYSLGGAY; and
a light chain variable domain comprising a CDR1 sequence comprising QSVSSN, a CDR2 sequence comprising GAS, and a CDR3 sequence comprising QQYNNWPWT.
2. The multispecific antibody of claim 1, wherein the first binding moiety comprises a heavy chain variable domain comprising a CDR1 sequence comprising GFTFDDYA, a CDR2 sequence comprising ISWNSGSI, and a CDR3 sequence comprising AKDSRGYGDYRLGGAY.
3. The multispecific antibody of claim 1, wherein the first binding moiety comprises a heavy chain variable domain comprising a CDR1 sequence comprising GFTFHNYA, a CDR2 sequence comprising ISWNSGSI, and a CDR3 sequence comprising AKDSRGYGDYSLGGAY.
4. The multispecific antibody of any one of claims 1-3, wherein:
the CDR1, CDR2 and CDR3 sequences in the heavy chain variable domain of the first binding moiety are present in a human VH framework; and
the CDR1, CDR2 and CDR3 sequences in the light chain variable domain of the first binding moiety are present in a human Vkappa framework.
5. The multispecific antibody of claim 4, wherein:
the heavy chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 1; and
the light chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 19.
6. The multispecific antibody of claim 4, wherein:
the heavy chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 13; and
the light chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 19.

7. The multispecific antibody of claim 5, wherein:
the heavy chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 1; and
the light chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 19.
8. The multispecific antibody of claim 6, wherein:
the heavy chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 13; and
the light chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 19.
9. The multispecific antibody of any one of claims 1-8, further comprising a second binding moiety having binding specificity to a protein other than CD3.
10. The multispecific antibody of claim 9, wherein the second binding moiety comprises a single heavy chain variable region, in a single or tandem configuration.
11. The multispecific antibody of claim 9, wherein the first binding moiety comprises a light chain polypeptide subunit and a heavy chain polypeptide subunit, and wherein the second binding moiety comprises a heavy chain polypeptide subunit.
12. The multispecific antibody of claim 11, wherein the light chain polypeptide subunit of the first binding moiety comprises a light chain constant domain.
13. The multispecific antibody of claim 11, wherein the heavy chain polypeptide subunit of the first binding moiety comprises at least one heavy chain constant domain.
14. The multispecific antibody of claim 13, wherein the heavy chain polypeptide subunit of the first binding moiety comprises a CH1 domain, a CH2 domain, and a CH3 domain.
15. The multispecific antibody of claim 14, wherein the heavy chain polypeptide subunit of the first binding moiety comprises a hinge region positioned between the CH1 domain and the CH2 domain.

16. The multispecific antibody of claim 11, wherein the heavy chain polypeptide subunit of the second binding moiety comprises at least one constant domain.
17. The multispecific antibody of claim 16, wherein the heavy chain polypeptide subunit of the second binding moiety comprises a CH2 domain and a CH3 domain, but no CH1 domain.
18. The multispecific antibody of claim 16 or 17, wherein the heavy chain polypeptide subunit of the second binding moiety comprises a hinge region positioned between the second binding moiety and the CH2 domain.
19. The multispecific antibody of any one of claims 14-18, wherein the CH2 and CH3 domains of the heavy chain polypeptide subunit of the first binding moiety and the CH2 and CH3 domains of the heavy chain polypeptide subunit of the second binding moiety together form an Fc region.
20. The multispecific antibody of claim 19, wherein the Fc region comprises a native-sequence human IgG1 Fc region.
21. The multispecific antibody of claim 19, wherein the Fc region comprises a variant human IgG1 Fc region.
22. The multispecific antibody of claim 21, wherein the variant human IgG1 Fc region has been engineered to reduce one or more effector functions.
23. The multispecific antibody of claim 19, wherein the Fc region comprises a native-sequence human IgG4 Fc region.
24. The multispecific antibody of claim 19, wherein the Fc region comprises a variant human IgG4 Fc region.
25. The multispecific antibody of claim 24, wherein the variant human IgG4 Fc region has been engineered to reduce one or more effector functions.

26. The multispecific antibody according to any one of claims 19-25, wherein the Fc region has been engineered to reduce homodimer formation.
27. The multispecific antibody of any one of claims 9-26, wherein the second binding moiety has binding specificity for a protein other than CD3.
28. The multispecific antibody of claim 27, wherein the protein other than CD3 is a tumor-associated antigen (TAA) or a tumor-specific antigen (TSA).
29. The multispecific antibody of claim 28, wherein the TAA is B-cell maturation antigen (BCMA).
30. A pharmaceutical composition comprising a multispecific antibody according to any one of claims 1-29.
31. A polynucleotide encoding a multispecific antibody according to any one of claims 1-29.
32. A vector comprising a polynucleotide according to claim 31.
33. A cell comprising a vector according to claim 32.
34. A method of producing a multispecific antibody according to any one of claims 1-29, comprising growing a cell according to claim 33 under conditions permissive for expression of the multispecific antibody, and isolating the multispecific antibody from the cell.
35. The multispecific antibody of any one of claims 1-29, or the pharmaceutical composition of claim 30, for use in therapy in an individual in need.
36. Use of an effective dose of the multispecific antibody according to any one of claims 1-29, or the pharmaceutical composition of claim 30, in the preparation of a medicament for treating a disease of condition in an individual in need, wherein the disease is an autoimmune disease or a cancer.

37. A kit for treating a disease or disorder in an individual in need, comprising a multispecific antibody of any one of claims 1-29, or the pharmaceutical composition of claim 30, and instructions for use.
38. The kit of claim 37, further comprising at least one additional reagent.
39. The kit of claim 38, wherein the at least one additional reagent comprises a chemotherapeutic drug.
40. A bispecific three-chain antibody like molecule comprising:
a first polypeptide subunit comprising:
 a light chain variable domain (VL) comprising the sequence of SEQ ID NO: 19; and
 a light chain constant domain (CL);
a second polypeptide subunit comprising:
 a heavy chain variable domain (VH) comprising:
 (i) the sequence of SEQ ID NO: 1; or
 (ii) the sequence of SEQ ID NO: 13; and
 a heavy chain constant domain (CH) comprising a CH1 domain, a hinge region, a CH2 domain, a CH3 domain;
 wherein the light chain variable domain and the heavy chain variable domain together form a first binding moiety that has binding specificity for CD3; and
a third polypeptide subunit comprising:
 a single heavy chain variable region, in a single or tandem configuration, that has binding specificity for a protein other than CD3; and
 a heavy chain constant domain (CH) comprising a hinge region, a CH2 domain, and a CH3 domain, in the absence of a CH1 domain.
41. The bispecific three-chain antibody like molecule of claim 40, wherein the heavy chain constant domain of the second polypeptide subunit and the heavy chain constant domain of the third polypeptide subunit have been engineered to reduce one or more effector functions.
42. The bispecific three-chain antibody like molecule of claim 40 or 41, wherein the heavy chain constant domain of the second polypeptide subunit and the heavy chain constant domain of the third polypeptide subunit have been engineered to reduce homodimer formation.

43. A pharmaceutical composition comprising the bispecific three-chain antibody like molecule of any one of claims 40-42.
44. The bispecific three-chain antibody like molecule of any one of claims 40-42, or the pharmaceutical composition of claim 43, for use in therapy in an individual in need.
45. Use of an effective dose of the bispecific antibody according to any one of claims 40-42, or the pharmaceutical composition of claim 43, in the preparation of a medicament for treating a disease or condition in an individual in need, wherein the disease is an autoimmune disease or a cancer.
46. A kit for treating a disease or disorder in an individual in need, comprising a bispecific three-chain antibody like molecule of any one of claims 40-42, or the pharmaceutical composition of claim 43, and instructions for use.
47. The kit of claim 46, further comprising at least one additional reagent.
48. The kit of claim 47, wherein the at least one additional reagent comprises a chemotherapeutic drug.
49. A bispecific antibody comprising:
- (a) a first binding moiety that has binding specificity for CD3, comprising:
 - (i) a heavy chain variable domain comprising a CDR1 sequence comprising GFTFDDYA, a CDR2 sequence comprising ISWNSGSI, and a CDR3 sequence comprising AKDSRGGYGDYRLGGAY; and
 - (ii) a light chain variable domain comprising a CDR1 sequence comprising QSVSSN, a CDR2 sequence comprising GAS, and a CDR3 sequence comprising QQYNNWPWT; and
 - (b) a second binding moiety comprising a tandem configuration of two single heavy chain variable regions that have binding specificity for BCMA, wherein the two single heavy chain variable regions are connected by a linker sequence, and wherein each single heavy chain variable region comprises:
 - (i) a CDR1 sequence comprising GFTVSSYG, a CDR2 sequence comprising IRGSDGST, and a CDR3 sequence comprising AKQGENDGPFDH.

50. The bispecific antibody of claim 49, wherein:
the CDR1, CDR2 and CDR3 sequences in the heavy chain variable domain of the first binding moiety are present in a human VH framework;
the CDR1, CDR2 and CDR3 sequences in the light chain variable domain of the first binding moiety are present in a human Vkappa framework; and
the CDR1, CDR2 and CDR3 sequences in each single heavy chain variable region are present in a human VH framework.
51. The bispecific antibody of claim 50, wherein:
the heavy chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 1;
the light chain variable domain of the first binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 19; and
each single heavy chain variable region sequence in the second binding moiety comprises a sequence having at least 95% identity to SEQ ID NO: 21.
52. The bispecific antibody of claim 51, wherein:
the heavy chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 1;
the light chain variable domain of the first binding moiety comprises the sequence of SEQ ID NO: 19; and
each single heavy chain variable region sequence in the second binding moiety comprises the sequence of SEQ ID NO: 21.
53. The bispecific antibody of any one of claims 49-52, wherein the first binding moiety comprises a light chain polypeptide subunit and a heavy chain polypeptide subunit, and wherein the second binding moiety comprises a heavy chain polypeptide subunit.
54. The bispecific antibody of claim 53, wherein the light chain polypeptide subunit of the first binding moiety comprises a light chain constant domain.
55. The bispecific antibody of claim 53, wherein the heavy chain polypeptide subunit of the first binding moiety comprises at least one heavy chain constant domain.

56. The bispecific antibody of claim 55, wherein the heavy chain polypeptide subunit of the first binding moiety comprises a CH1 domain, a CH2 domain, and a CH3 domain.
57. The bispecific antibody of claim 56, wherein the heavy chain polypeptide subunit of the first binding moiety comprises a hinge region positioned between the CH1 domain and the CH2 domain.
58. The bispecific antibody of claim 53, wherein the heavy chain polypeptide subunit of the second binding moiety comprises at least one constant domain.
59. The bispecific antibody of claim 58, wherein the heavy chain polypeptide subunit of the second binding moiety comprises a CH2 domain and a CH3 domain, but no CH1 domain.
60. The bispecific antibody of claim 58 or 59, wherein the heavy chain polypeptide subunit of the second binding moiety comprises a hinge region positioned between the tandem configuration of single heavy chain variable domains and the CH2 domain.
61. The bispecific antibody of any one of claim 59 or 60, wherein the CH2 and CH3 domains of the heavy chain polypeptide subunit of the first binding moiety and the CH2 and CH3 domains of the heavy chain polypeptide subunit of the second binding moiety together form an Fc region.
62. The bispecific antibody of claim 61, wherein the Fc region comprises a native-sequence human IgG1 Fc region.
63. The bispecific antibody of claim 62, wherein the Fc region comprises a variant human IgG1 Fc region.
64. The bispecific antibody of claim 63, wherein the variant human IgG1 Fc region has been engineered to reduce one or more effector functions.
65. The bispecific antibody of claim 61, wherein the Fc region comprises a native-sequence human IgG4 Fc region.

66. The bispecific antibody of claim 61, wherein the Fc region comprises a variant human IgG4 Fc region.
67. The bispecific antibody of claim 66, wherein the variant human IgG4 Fc region has been engineered to reduce one or more effector functions.
68. The bispecific antibody according to any one of claims 61-67, wherein the Fc region has been engineered to reduce homodimer formation.
69. A pharmaceutical composition comprising a bispecific antibody according to any one of claims 49-68.
70. A polynucleotide encoding a bispecific antibody according to any one of claims 49-68.
71. A vector comprising a polynucleotide according to claim 70.
72. A cell comprising a vector according to claim 71.
73. A method of producing a bispecific antibody according to any one of claims 49-68, comprising growing a cell according to claim 72 under conditions permissive for expression of the bispecific antibody, and isolating the bispecific antibody from the cell.
74. The bispecific antibody of any one of claims 49-68, or the pharmaceutical composition of claim 69, for use in therapy in an individual in need.
75. Use of an effective dose of the bispecific antibody according to any one of claims 49-68, or the pharmaceutical composition of claim 69, in the preparation of a medicament for treating a cancer in an individual with cancer.
76. The use according to claim 75, wherein the cancer is a myeloma.
77. A bispecific three-chain antibody like molecule comprising:
a first polypeptide subunit comprising:
a light chain variable domain (VL) comprising the sequence of SEQ ID NO: 19; and

a light chain constant domain (CL);
a second polypeptide subunit comprising:
a heavy chain variable domain (VH) comprising the sequence of SEQ ID NO: 1; and
a heavy chain constant domain (CH) comprising a CH1 domain, a hinge region, a CH2 domain, and a CH3 domain;
wherein the light chain variable domain and the heavy chain variable domain together form a first binding moiety that has binding specificity for CD3; and
a third polypeptide subunit comprising:
a tandem configuration of two single heavy chain variable regions, comprising the sequence of SEQ ID NO: 20; and
a heavy chain constant domain (CH) comprising a hinge region, a CH2 domain, and a CH3 domain, in the absence of a CH1 domain;
wherein the tandem configuration of two single heavy chain variable regions forms a second binding moiety that has binding specificity for BCMA.

78. The bispecific three-chain antibody like molecule of claim 77, wherein the heavy chain constant domain of the second polypeptide subunit and the heavy chain constant domain of the third polypeptide subunit have been engineered to reduce one or more effector functions.

79. The bispecific three-chain antibody like molecule of claim 77 or 78, wherein the heavy chain constant domain of the second polypeptide subunit and the heavy chain constant domain of the third polypeptide subunit have been engineered to reduce homodimer formation.

80. A pharmaceutical composition comprising the bispecific three-chain antibody like molecule of any one of claims 77-79.

81. Use of a bispecific three-chain antibody like molecule of any one of claims 77-79, or the pharmaceutical composition of claim 80, in the preparation of a medicament for the treatment of a disease or disorder in an individual in need.

82. The bispecific three-chain antibody like molecule of any one of claims 77-79, or the pharmaceutical composition of claim 80, for use in therapy in an individual in need.

83. A kit for treating a disease or disorder in an individual in need, comprising a bispecific three-chain antibody like molecule of any one of claims 77-79, or the pharmaceutical composition of claim 80, and instructions for use.

84. The kit of claim 83, further comprising at least one additional reagent.

85. The kit of claim 84, wherein the at least one additional reagent comprises a chemotherapeutic drug.