CLAUSES

1. A composition comprising anti-BCMA antibodies, wherein the anti-BCMA antibodies comprise a belantamab variant, wherein the belantamab variant comprises one or more of:
    a. deamidation of a residue selected from the group consisting of N388 and N393 of SEQ ID NO:9;
    b. oxidation at a residue selected from the group consisting of M34, M256, and M432 of SEQ ID NO:9;
    c. an amino acid change of aspartic acid (D) to asparagine (N) at residue 103 of SEQ ID NO:9;
    d. C-terminal lysine cleavage; or
    e. N-terminal conversion of glutamine to pyroglutamic acid.

2. The composition of clause 1, wherein 0.1-40% of antibodies in the composition comprise the oxidation.

3. The composition of clause 1 or clause 2, wherein 0.1-25% of the antibodies comprise the amino acid change.

4. The composition of clause 2, wherein the oxidation is at residue M34 of SEQ ID NO:9.

5. The composition of clause 3, wherein the anti-BCMA antibodies comprise an anti-BCMA antibody comprising (i) a heavy chain amino acid sequence that is at least about 90% identical to the heavy chain amino acid sequence of SEQ ID NO:9 and (ii) the light chain amino acid sequence of SEQ ID NO:10.

6. The composition of clause 4, wherein the anti-BCMA antibodies comprise an anti-BCMA antibody comprising (i) a heavy chain amino acid sequence that is at least about 90% identical to the heavy chain amino acid sequence of SEQ ID NO:9 and (ii) the light chain amino acid sequence of SEQ ID NO:10.

7. The composition according to any preceding clause, wherein 0.1-100% of the belantamab variant in the composition comprises oxidation at residue M256.

8. The composition according to any preceding clause, wherein 0.1-100% of the belantamab variant in the composition comprises oxidation at residue M432.

9. The composition according to any preceding clause wherein 0.1-100% of the belantamab variant in the composition comprises at least one selected from the group consisting of:
    a. deamidation of a residue selected from the group consisting of N388 and N393 of SEQ ID NO:9;
    b. oxidation at a residue selected from the group consisting of M34, M256, and M432 of SEQ ID NO:9;

c. an amino acid change of aspartic acid (D) to asparagine (N) at residue 103 of SEQ ID NO:9;
d. C-terminal lysine cleavage; or
e. N-terminal conversion of glutamine to pyroglutamic acid.

10. The composition according to any one of clauses 1-6, wherein the composition comprises any percentage of glycoforms G0, G1, G2, G0-GlcNac or G0-2GlcNac.

11. The composition according to any one of clauses 1-6, which comprises belantamab.

12. The composition according to any one of clauses 1-6, wherein an anti-BCMA antibody is conjugated to a cytotoxic agent to form an antibody-drug-conjugate.

13. The composition according to any one of clauses 1-6, which comprises belantamab mafodotin.

14. The composition of clauses 12-13, wherein percent DL2 is at least about 30%, about 15% to about 27%, or about 15% to about 32%; percent DL4a is at least about 30%, about 35% to about 38%, or about 30% to about 40%; percent DL4b is at least about 5%, about 7% to about 9%, or about 5% to about 10%; percent DL6 is at least about 10%, about 14% to about 20%, or about 10% to about 20%; and/or DL8 is at least about 1%, about 6.0% to about 12.0%, or about 4% to about 15%.

15. The composition of clauses 12-14, wherein the average DAR is about 3.4 to about 4.6.

16. The composition of clauses 12-15, wherein percent DL0 is less than or equal to about 10% or about 5%.

17. A pharmaceutical composition comprising the composition of any preceding clause and at least one pharmaceutically acceptable excipient.

18. A formulation comprising the pharmaceutical composition of clause 17 comprising an anti-BCMA antigen binding protein at about 20 mg/mL to about 60 mg/mL, citrate buffer at about 10 mM to about 30 mM, trehalose at about 120 mM to about 240 mM, EDTA at about 0.01 mM to about 0.1 mM, polysorbate 20 or polysorbate 80 at about 0.01% to about 0.05%, at a pH of about 5.9 to about 6.5.

19. The formulation of clause 18, comprising about 20 mg/mL, about 25 mg/mL, about 50 mg/mL, or about 60 mg/mL belantamab mafodotin, 25 mM citrate buffer, 200 mM trehalose, 0.05 mM disodium EDTA, 0.02% polysorbate 20 or polysorbate 80, at a pH of about 5.9 to about 6.5.

20. A method of treating cancer comprising administering to a subject in need thereof a therapeutically effective amount a composition of clauses 1-16.

21. A composition of clauses 1-14 for use in the treatment of cancer.

22. Use of a composition of clauses 1-16 in the manufacture of a medicament for use in the treatment of cancer.

23. A composition comprising an anti-BCMA antibody-drug-conjugate (ADC), wherein the wherein percent DL2 is at least about 30%, about 15% to about 27%, or about 15% to about 32%; percent DL4a is at least about 30%, about 35% to about 38%, or about 30% to about 40%; percent DL4b is at least about 5%, about 7% to about 9%, or about 5% to about 10%; percent DL6 is at least about 10%, about 14% to about 20%, or about 10% to about 20%; and/or DL8 is at least about 1%, about 6.0% to about 12.0%, or about 4% to about 15%.

24. The composition of clause 23, wherein the antibody comprises a CDRH1 with the amino acid sequence set forth in SEQ ID NO:1, a CDRH2 with the amino acid sequence set forth in SEQ ID NO:2, a CDRH3 with the amino acid sequence set forth in SEQ ID NO:3, a CDRL1 with the amino acid sequence set forth in SEQ ID NO:4, a CDRL2 with the amino acid sequence set forth in SEQ ID NO:5, and a CDRL3 with the amino acid sequence set forth in SEQ ID NO:6.

25. The composition of clause 23 or 24, wherein percent DL2 is about 15% to about 32%, percent DL4a is about 30% to about 40%, percent DL4b is about 5% to about 10%, percent DL6 is about 10% to about 20%, and DL8 is about 4% to about 15%.

26. The composition of clause 23 or 24, wherein percent DL2 is about 15% to about 27%, percent DL4a is about 35% to about 38%, percent DL4b is about 7% to about 9%, percent DL6 is about 14% to about 20%, and DL8 is about 6.0% to about 12.0%.

27. The composition of clauses 23-26, wherein the average drug-antibody ratio (DAR) is about 2.1 to about 5.7.

28. The composition of clauses 23-26, wherein the average DAR is about 3.4 to about 4.6.

29. The composition of clauses 23-26, wherein the average DAR is about 3.8 to about 4.5.

30. A composition comprising an anti-BCMA antibody-drug-conjugate (ADC), wherein percent DL0 is less than or equal to about 10% or about 5%.

31. The composition of clause 30, wherein the antibody comprises a CDRH1 with the amino acid sequence set forth in SEQ ID NO:1, a CDRH2 with the amino acid sequence set forth in SEQ ID NO:2, a CDRH3 with the amino acid sequence set forth in SEQ ID NO:3, a CDRL1 with the amino acid sequence set forth in SEQ ID NO:4, a CDRL2 with the amino acid sequence set forth in SEQ ID NO:5, and a CDRL3 with the amino acid sequence set forth in SEQ ID NO:6.

32. The composition of clause 30 or 31, wherein the percent DL0 is less than or equal to about 5%.

33. The composition of clauses 30-32, wherein percent DL2 is about 15% to about 32%, percent DL4a is about 30% to about 40%, percent DL4b is about 5% to about 10%, percent DL6 is about 10% to about 20%, and DL8 is about 4% to about 15%.

34. The composition of clauses 30-32, wherein percent DL2 is about 15% to about 27%, percent DL4a is about 35% to about 38%, percent DL4b is about 7% to about 9%, percent DL6 is about 14% to about 20%, and DL8 is about 6.0% to about 12.0%.

35. The composition of clauses 30-34, wherein the average drug-antibody ratio (DAR) is about 2.1 to about 5.7.

36. The composition of clauses 30-34, wherein the average DAR is about 3.4 to about 4.6.

37. The composition of clauses 30-34, wherein the average DAR is about 3.8 to about 4.5.

38. The composition of clauses 23-37, wherein the antibody comprises a V_H with the amino acid sequence set forth in SEQ ID NO:7, and a V_L with the amino acid sequence set forth in SEQ ID NO:8.

39. The composition of clauses 23-38, wherein the antibody is belantamab.

40. The composition of clauses 23-37, wherein the cytotoxic agent is MMAE or MMAF.

41. The composition of clauses 21-40, wherein the anti-BCMA ADC is belantamab mafodotin.

42. The composition of clauses 23-41, wherein the percent DL is determined by separating individual DL species using hydrophobic interaction chromatography (HIC), calculating the area under the curve for each DL peak, and dividing each DL peak by the total area under the curve for all DL species combined.

43. The composition of clause 42, wherein the average DAR is calculated from the area under the curve of each DL species using the following formula:

$$\%\text{DL Component}_X = \frac{A_X}{A_0 + A_1 + A_2 + A_3 + A_{4a} + A_{4b} + A_5 + A_6 + A_8 + A_{10}} \times 100$$

$$\text{DAR} = \frac{(A_1 \times 2) + (A_2 \times 2) + (A_3 \times 2) + (A_{4a} \times 4) + (A_{4b} \times 4) + (A_5 \times 6) + (A_6 \times 6) + (A_8 \times 8) + (A_{10} \times 8)}{A_0 + A_1 + A_2 + A_3 + A_{4a} + A_{4b} + A_5 + A_6 + A_8 + A_{10}}$$

Where:

A_X =	Peak area of loading X peak
X =	A_0, A_1, A_2, A_3, A_{4a}, A_{4b}, A_5, A_6, A_8, and A_{10}
A_0, A_1, A_2, A_3, A_{4a}, A_{4b}, A_5, A_6, A_8, and A_{10} =	is the peak area of DL0, DL1, DL2, DL3, DL4a, DL4b, DL5, DL6, DL8 and DL10 peaks (only including peaks ≥ DL (0.08%))

44. A pharmaceutical composition comprising the composition of clauses 23-43 and at least one pharmaceutically acceptable excipient.

45. A formulation comprising the pharmaceutical composition of clause 44 comprising an anti-BCMA antigen binding protein at about 20 mg/mL to about 60 mg/mL, citrate buffer at about 10 mM to about 30 mM, trehalose at about 120 mM to about 240 mM, EDTA at about 0.01 mM to about 0.1 mM, polysorbate 20 or polysorbate 80 at about 0.01% to about 0.05%, at a pH of about 5.9 to about 6.5.

46. The formulation of clause 45, comprising about 20 mg/mL, about 25 mg/mL, about 50 mg/mL, or about 60 mg/mL belantamab mafodotin, 25 mM citrate buffer, 200 mM trehalose, 0.05 mM disodium EDTA, 0.02% polysorbate 20 or polysorbate 80, at a pH of about 5.9 to about 6.5.

47. A method of treating cancer comprising administering to a subject in need thereof a therapeutically effective amount a composition of clauses 23-43.

48. A composition of clauses 23-43 for use in the treatment of cancer.

49. Use of a composition of clauses 23-43 in the manufacture of a medicament for use in the treatment of cancer.

50. A composition comprising an acidic variant of an antibody, wherein the acidic variant comprises a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises 1-70% acidic variant.

51. A composition comprising an acidic variant of an antibody, wherein the acidic variant comprises a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises ≤70% acidic variant.

52. A composition comprising a basic variant of an antibody, wherein the basic variant comprises a heavy chain amino acid sequence comprising a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises 1-30% basic variant.

53. A composition comprising a basic variant of an antibody, wherein the basic variant comprises a heavy chain amino acid sequence comprising a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises ≤30% basic variant.

54. A composition comprising a main isoform of an antibody, wherein the main isoform comprises a heavy chain amino acid sequence comprising a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises 1-90% main isoform.

55. A composition comprising a main isoform of an antibody, wherein the main isoform comprises a heavy chain amino acid sequence comprising a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid

sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises ≥1% main isoform.

56. A composition comprising a charged variant of the antibody comprising a heavy chain amino acid sequence comprising a CDRH1 of SEQ ID NO: 1, a CDRH2 of SEQ ID NO: 2, and a CDRH3 of SEQ ID NO: 3, and a light chain amino acid sequence comprising a CDRL1 of SEQ ID NO: 4, a CDRL2 of SEQ ID NO: 5, and a CDRL3 of SEQ ID NO: 6; wherein the composition comprises: ≤70% acidic variant; and/or ≤30% basic variant; and/or ≥1% main isoform.

57. Use of a composition of clauses 1-16 in the manufacture of a medicament for the treatment of cancer.

CLAIMS

What is claimed is:

1. A composition comprising anti-BCMA antibodies, wherein the anti-BCMA antibodies comprise a belantamab variant, wherein the belantamab variant comprises one or more of:
    a. deamidation of a residue selected from the group consisting of N388 and N393 of SEQ ID NO:9;
    b. oxidation at a residue selected from the group consisting of M34, M256, and M432 of SEQ ID NO:9;
    c. an amino acid change of aspartic acid (D) to asparagine (N) at residue 103 of SEQ ID NO:9;
    d. C-terminal lysine cleavage; or
    e. N-terminal conversion of glutamine to pyroglutamic acid.

2. The composition of claim 1, wherein 0.1-40% of antibodies in the composition comprise the oxidation.

3. The composition of claim 1 or claim 2, wherein 0.1-25% of the antibodies comprise the amino acid change.

4. The composition of claim 2, wherein the oxidation is at residue M34 of SEQ ID NO:9.

5. The composition of claim 3, wherein the anti-BCMA antibodies comprise an anti-BCMA antibody comprising (i) a heavy chain amino acid sequence that is at least about 90% identical to the heavy chain amino acid sequence of SEQ ID NO:9 and (ii) the light chain amino acid sequence of SEQ ID NO:10.

6. The composition of claim 4, wherein the anti-BCMA antibodies comprise an anti-BCMA antibody comprising (i) a heavy chain amino acid sequence that is at least about 90% identical to the heavy chain amino acid sequence of SEQ ID NO:9 and (ii) the light chain amino acid sequence of SEQ ID NO:10.

7. The composition according to any preceding claim, wherein 0.1-100% of the belantamab variant in the composition comprises oxidation at residue M256.

8. The composition according to any preceding claim, wherein 0.1-100% of the belantamab variant in the composition comprises oxidation at residue M432.

9. The composition according to any preceding claim wherein 0.1-100% of the belantamab variant in the composition comprises at least one selected from the group consisting of:
    a. deamidation of a residue selected from the group consisting of N388 and N393 of SEQ ID NO:9;
    b. oxidation at a residue selected from the group consisting of M34, M256, and M432 of SEQ ID NO:9;

c. an amino acid change of aspartic acid (D) to asparagine (N) at residue 103 of SEQ ID NO:9;
d. C-terminal lysine cleavage; or
e. N-terminal conversion of glutamine to pyroglutamic acid.

10. The composition according to any one of claims 1-6, wherein the composition comprises any percentage of glycoforms G0, G1, G2, G0-GlcNac or G0-2GlcNac.

11. The composition according to any one of claims 1-6, which comprises belantamab.

12. The composition according to any one of claims 1-6, wherein an anti-BCMA antibody is conjugated to a cytotoxic agent to form an antibody-drug-conjugate.

13. The composition according to any one of claims 1-6, which comprises belantamab mafodotin.

14. The composition of claims 12-13, wherein percent DL2 is at least about 30%, about 15% to about 27%, or about 15% to about 32%; percent DL4a is at least about 30%, about 35% to about 38%, or about 30% to about 40%; percent DL4b is at least about 5%, about 7% to about 9%, or about 5% to about 10%; percent DL6 is at least about 10%, about 14% to about 20%, or about 10% to about 20%; and/or DL8 is at least about 1%, about 6.0% to about 12.0%, or about 4% to about 15%.

15. The composition of claims 12-14, wherein the average DAR is about 3.4 to about 4.6.

16. The composition of claims 12-15, wherein percent DL0 is less than or equal to about 10% or about 5%.

17. A pharmaceutical composition comprising the composition of any preceding claim and at least one pharmaceutically acceptable excipient.

18. A formulation comprising the pharmaceutical composition of claim 17 comprising an anti-BCMA antigen binding protein at about 20 mg/mL to about 60 mg/mL, citrate buffer at about 10 mM to about 30 mM, trehalose at about 120 mM to about 240 mM, EDTA at about 0.01 mM to about 0.1 mM, polysorbate 20 or polysorbate 80 at about 0.01% to about 0.05%, at a pH of about 5.9 to about 6.5.

19. The formulation of claim 18, comprising about 20 mg/mL, about 25 mg/mL, about 50 mg/mL, or about 60 mg/mL belantamab mafodotin, 25 mM citrate buffer, 200 mM trehalose, 0.05 mM disodium EDTA, 0.02% polysorbate 20 or polysorbate 80, at a pH of about 5.9 to about 6.5.

20. A composition of claims 1-14 for use in the treatment of cancer.

21. Use of a composition of claims 1-16 in the manufacture of a medicament for the treatment of cancer.