

WHAT IS CLAIMED IS:

1. A formulation comprising:

(i) about 1 mg/ml to about 100 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; wherein the anti-CTLA4 antibody or antigen-binding fragment thereof comprises three light chain CDRs comprising CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO: 39, and CDRL3 of SEQ ID NO: 40 and three heavy chain CDRs comprising CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDRH3 of SEQ ID NO: 37;

(ii) about 5 mM to about 20 mM buffer;

(iii) about 6% to about 8% weight / volume (w/v) non-reducing sugar;

(iv) about 0.01 % to about 0.10% w/v non-ionic surfactant; and

(v) about 1 mM to about 20 mM anti-oxidant.

2. The formulation of claim 1, wherein the anti-CTLA4 antibody or antigen binding fragment thereof comprises a heavy chain variable region comprising SEQ ID NO: 88 and a light chain variable region comprising SEQ ID NO: 48.

3. The formulation of any one of claims 1-2, wherein the formulation has a pH between 5.0 and 6.0.

4. The formulation of any one of claims 1-3, wherein the buffer is a L-histidine buffer, the non-reducing sugar is sucrose, the non-ionic surfactant is polysorbate 80, and the anti-oxidant is L-methionine, the formulation comprising:

(i) about 1 mg/ml to about 100 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; wherein the anti-CTLA4 antibody or antigen-binding fragment thereof comprises three light chain CDRs comprising CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO: 39, and CDRL3 of SEQ ID NO: 40 and three heavy chain CDRs comprising CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDRH3 of SEQ ID NO: 37;

(ii) about 5 mM to about 20 mM of L-histidine buffer;

(iii) about 6% to about 8% w/v sucrose;

(iv) about 0.01 % to about 0.10% w/v polysorbate 80; and

(v) about 1 mM to about 20 mM L-methionine.

5. The formulation of claim 4, comprising about 8 mM to about 12 mM of L-histidine buffer.

6. The formulation of any of claims 4-5, comprising about 5 mM to about 10 mM of L-methionine.

7. The formulation of any of claims 4-6, comprising polysorbate 80 at a weight ratio of approximately 0.02% w/v.

8. The formulation of any of claims 1-7, wherein the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 1-50 mg/ml.

9. The formulation of any of claims 1-7, wherein the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 1.25 mg/ml, about 2.5 mg/ml, about 2.9 mg/ml, about 25 mg/ml, or about 50 mg/ml.

10. The formulation of any of claims 1-4 comprising about 50 mg/mL of the anti-CTLA4 antibody, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% polysorbate 80, and about 10 mM L-methionine.

11. The formulation of any of claims 1-4 comprising about 2.9 mg/mL of the anti-CTLA4 antibody, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% polysorbate 80, and about 10 mM L-methionine.

12. The formulation of any of claims 1-11, wherein the formulation has a pH of about 5.3 to about 5.8.

13. The formulation of claim 12, wherein the formulation has a pH of about 5.5 to about 5.6.

14. The formulation of any of claims 1-13, further comprising an anti-PD1 antibody or antigen binding fragment thereof, wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises three light chain CDRs comprising CDRL1 of SEQ ID NO:1, CDRL2 of SEQ ID NO:2 and CDRL3 of SEQ ID NO:3 and three heavy chain CDRs comprising CDRH1 of SEQ ID NO:6, CDRH2 of SEQ ID NO:7 and CDRH3 of SEQ ID NO:8.

15. The formulation of any of claims 1-14, wherein after 12 months at 5°C:
(i) the % monomer of the anti-CTLA4 antibody is $\geq 95\%$ as determined by size exclusion chromatography;

(ii) the % heavy chain and light chain of the anti-CTLA4 antibody is $\geq 90\%$ as measured by reduced CE – SDS;

(iii) the % heavy chain and light chain of the anti-CTLA4 antibody is $\geq 95\%$ as measured reduced CE – SDS;

(iv) the % intact IgG of the anti-CTLA4 antibody is $\geq 90\%$ as measured by non-reduced CE-SDS; and/or

(v) % intact IgG of the anti-CTLA4 antibody is $\geq 95\%$ as measured by non-reduced CE-SDS.

16. A formulation comprising:

(i) about 1 mg/ml to about 100 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; wherein the anti-CTLA4 antibody or antigen-binding fragment thereof comprises three light chain CDRs comprising CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO: 39, and CDRL3 of SEQ ID NO: 40 and three heavy chain CDRs comprising CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDRH3 of SEQ ID NO: 37;

(ii) about 1 mg/ml to about 100 mg/ml of an anti-PD1 antibody, or antigen binding fragment thereof; wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises three light chain CDRs comprising CDRL1 of SEQ ID NO:1, CDRL2 of SEQ ID NO:2 and CDRL3 of SEQ ID NO:3 and three heavy chain CDRs comprising CDRH1 of SEQ ID NO:6, CDRH2 of SEQ ID NO:7 and CDRH3 of SEQ ID NO:8;

(iii) a buffer;

(iv) a non-reducing sugar;

(v) a non-ionic surfactant; and

(vi) an anti-oxidant.

17. The formulation of claim 16, wherein the formulation comprises:

(i) about 5 mM to about 20 mM buffer;

(ii) about 6% to about 8% weight / volume (w/v) non-reducing sugar;

(iii) about 0.01 % to about 0.10% w/v non-ionic surfactant; and

(iv) about 1 mM to about 20 mM anti-oxidant.

18. The formulation of any of claims 16 or 17, wherein the buffer is a L-histidine buffer, the non-reducing sugar is sucrose, the non-ionic surfactant is polysorbate 80, and the anti-oxidant is L-methionine, the formulation comprises:

- (i) about 5 mM to about 20 mM of L-histidine buffer;
- (ii) about 6% to about 8% w/v sucrose;
- (iii) about 0.01 % to about 0.10% w/v polysorbate 80; and
- (iv) about 1 mM to about 20 mM L-methionine.

19. The formulation of any of claims 16-18, wherein the anti-CTLA4 antibody or antigen binding fragment thereof comprises a heavy chain variable region comprising SEQ ID NO: 88, and a light chain variable region comprising SEQ ID NO: 48.

20. The formulation of any of claims 16-19, wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises a V_L region which comprises the amino acid sequence set forth in SEQ ID NO:4, and a V_H region which comprises the amino acid sequence set forth in SEQ ID NO:9.

21. The formulation of any of claims 16-20, wherein the formulation comprises an anti-human PD-1 antibody that is pembrolizumab.

22. The formulation of claim 16-21, wherein the ratio of the anti-PD1 antibody to the anti-CTLA4 antibody is 1:2, 1:1, 2:1, 10:1, 1:10, 8:3, or 8:1.

23. The formulation of claim 22, wherein the ratio of the anti-PD1 antibody to the anti-CTLA4 antibody is 8:1.

24. The formulation of any of claims 16-23, wherein the formulation has a pH between 5.0 and 6.0.

25. The formulation of any of claims 16-24, comprising about 8mM to about 12 mM of L-histidine buffer.

26. The formulation of any of claims 16-25, comprising about 5 mM to about 10 mM of L-methionine.

27. The formulation of any of claims 16-26, comprising polysorbate 80 at a weight ratio of approximately 0.02% w/v.

28. The formulation of any one of claims 16-27, wherein the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 1.25 mg/ml, 2.5 mg/ml, 2.9 mg/ml, 5 mg/ml, 7.9 mg/ml, 10 mg/ml, 12.5 mg/ml, 25 mg/ml, 50 mg/ml, 75 mg/ml, or 100 mg/ml.

29. The formulation of any of claims 16-27, wherein the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 1-25 mg/ml.

30. The formulation of any of claims 16-29, wherein the concentration of the anti-PD1 antibody or antigen binding fragment thereof is about 25 mg/mL, 22.7 mg/mL, 2.27 mg/mL, 21.1 mg/mL or 23.5 mg/ml.

31. The formulation of any of claims 16-29, wherein the concentration of the anti-PD1 antibody or antigen binding fragment thereof is about 1-25 mg/ml.

32. The formulation of any of claims 16-31, comprising about 23.5 mg/mL of the anti-PD1 antibody and about 2.9 mg/mL anti-CTLA4 antibody, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% w/v polysorbate 80, and about 10 mM L-methionine.

33. The formulation of any of claims 1-32, further comprising a chelator, wherein the chelator is diethylenetriaminepentaacetic acid (DTPA).

34. The formulation of any of claims 1-33, wherein the formulation is contained in a glass vial or an injection device.

35. The formulation of any of claim 1-34, that is a liquid formulation, or that is frozen to at least below -70° C, or that is a reconstituted solution from a lyophilized formulation.

36. The formulation of any one of claims 1-35 for use in treatment of cancer or chronic infection.

37. Use of the formulation of any one of claims 1-36 for the preparation of a medicament for treating cancer or for treating chronic infection.