effect in short term clinical trials, attention should be paid to the potential effect after long term application. For example, excessive blockade of CTLA4-B7 signaling by CTLA4 mAbs may result in the development of autoimmune diseases. As antibodies can specifically bind to their antigens and induce the lysis of target cells or block the progress of pathology, development and utilization of drugs based on antibodies, especially humanized antibodies have important significance in the clinical treatment of malignant tumors and other immune diseases in humans.

PD-1 is recognized as an important player in immune regulation and the maintenance of peripheral tolerance. PD-1 is moderately expressed on naive T, B and NKT cells and up-regulated by T/B cell receptor signaling on lymphocytes, monocytes and myeloid cells (Sharpe *et al*., The function of programmed cell death 1 and its ligands in regulating autoimmunity and infection. *Nature Immunology* (2007); 8:239-245). It has been proposed that the efficacy of anti-PD-1 antibodies might be enhanced if administered in combination with other approved or experimental cancer therapies, e.g., radiation, surgery, chemotherapeutic agents, targeted therapies, agents that inhibit other signaling pathways that are disregulated in tumors, and other immune enhancing agents. One such agent that has been tested in combination with antagonists of PD-1 is cytotoxic T lymphocyte associated antigen 4 (abbreviated CTLA4).

The need exists for stable formulations of anti-CTLA4 antibodies for pharmaceutical use, *e.g*., for treating various cancers and infectious diseases, as well as for stable formulations of anti-CTLA4 antibodies co-formulated with anti-human PD-1 antibodies. Preferably, such formulations will exhibit a long shelf-life, be stable when stored and transported, and will preferably exhibit stability over months to years under conditions typical for storage of drugs for self-administration, *i.e.* at refrigerator temperature in a syringe, resulting in a long shelf-life for the corresponding drug product.

SUMMARY

The disclosure includes a formulation of an anti-CTLA4 antibody, or antigen binding fragment thereof, comprising (i) an anti-CTLA4 antibody, or antigen binding fragment thereof; (ii) a buffer, (iii) a non-reducing sugar; (iv) a non-ionic surfactant; and an antioxidant. In another example, the formulation further comprises an anti-PD-1 antibody, e.g., pembrolizumab or nivolumab. In one example, the formulation further comprises a chelator.

In an example, the formulation comprises (i) about 10 mg/ml to about 200 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; (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% non-ionic surfactant; and (v) about 1 mM to about 20 mM anti-oxidant. In another example, the formulation further comprises an anti-PD-1 antibody, e.g., pembrolizumab or nivolumab. In another example, the formulation further comprises a chelator. In one example the chelator is present in amount of about 1 µM to about 50 µM.

chelator is DTPA. In one example, the formulation has a pH between 4.5 – 6.5. In particular examples, the pH of the formulation is from about pH 5.0 to about pH 6.0. In a further example, the pH of the formulation is from about pH 5.3 to about pH 5.8. In another example, the pH is 5.3. In another example, the pH is 5.4. In one example, the pH is 5.5. In one example, the pH is 5.6. In a further example, the pH is 5.7. In an example, the pH is 5.8.

In one example of the formulation, the buffer is L-histidine buffer or sodium acetate buffer, the non-reducing sugar is sucrose, the non-ionic surfactant is polysorbate 80, and the anti-oxidant is methionine, or a pharmaceutically acceptable salt thereof. In one example, the anti-oxidant is L-methionine. In another example, the anti-oxidant is a pharmaceutically acceptable salt of L-methionine, such as, for example, methionine HCl.

In another example, formulation comprises (i) about 10 mg/ml to about 200 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; (ii) about 5 mM to about 20 mM of L-histidine or about 5 mM to about 20 mM of sodium acetate 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. In another example, the formulation further comprises an anti-PD-1 antibody, e.g., pembrolizumab or nivolumab. In an example, the formulation further comprises a chelator. In one example, the chelator is present in an amount of about 1 µM to about 50 µM. In one example, the chelator is DTPA. In one example the buffer is a L-histidine buffer. In one example, the formulation comprises about 8mM to about 12 mM of L-histidine. In another example, the formulation comprises about 5 mM to about 10 mM of L-methionine. In a further example, the formulation comprises polysorbate 80 at a weight ratio of approximately 0.02% w/v. In one example, the anti-CTLA4 formulation comprises sucrose at a weight ratio of about 7% (w/v).

In examples of the formulation, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is from about 10 mg/ml to about 100 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 10 mg/ml, 12.5 mg/ml, 15 mg/ml, 20 mg/ml, 25 mg/ml, 50 mg/ml, 75 mg/ml or 100 mg/ml. In one example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 25 mg/mL. In an additional example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 50 mg/ml. In another example, the concentration of the anti-CTLA antibody or antigen binding fragment thereof is about 75 mg/mL. In a further example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 100 mg/mL.

In one example, provided is a formulation comprising about 25 mg/mL of an anti-CTLA4 antibody or antigen binding fragment thereof, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% w/v polysorbate 80, and about 10 mM L-methionine.

In one example, provided is a formulation comprising about 50 mg/mL of an anti-CTLA4 antibody or antigen binding fragment thereof, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% w/v polysorbate 80, and about 10 mM L-methionine.

In one example, provided is a formulation comprising about 75 mg/mL of an anti-CTLA4 antibody or antigen binding fragment thereof, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% w/v polysorbate 80, and about 10 mM L-methionine.

In one example, provided is a formulation comprising about 100 mg/mL of an anti-CTLA4 antibody or antigen binding fragment thereof, 10 mM L-histidine buffer, about 7% w/v sucrose, about 0.02% w/v polysorbate 80, and about 10 mM L-methionine.

In one example of any of the above formulations, the formulation has a pH of about 5.3 to 5.8. In another example, the formulation has a pH of about 5.5 to about 5.6. In another example, the formulation has a pH of about 5.5. In another example, the formulation has a pH of about 5.6.

In one example of any of the above formulations, the formulation comprises an anti-PD1 antibody or antigen binding fragment thereof. In one example the anti-PD1 antibody is pembrolizumab. In another example, the anti-PD1 antibody is nivolumab.

In another example, the formulation may further comprise a chelator. In one example, the chelator is DTPA. In one example, the chelator is EDTA. In one example, the chelator is present in an amount from about 1µM to about 50 µM. In one example, the formulation comprises about 5 µM of the chelator. In one example, the formulation comprises about 10 µM of the chelator. In one example, the formulation comprises about 15 µM of the chelator. In one example, the formulation comprises about 20 µM of the chelator. In one example, the formulation comprises about 25 µM of the chelator. In one example, the formulation comprises about 30 µM of the chelator. In one example, the formulation comprises about 35 µM of the chelator. In one example, the formulation comprises about 40 µM of the chelator. In one example, the formulation comprises about 45 µM of the chelator. In one example, the formulation comprises about 50 µM of the chelator. In one example, the chelating agent is DTPA, which is present at any of the amounts stated above. In another example, the chelating agent is EDTA which is present at any of the amounts stated above.

In one example, the formulation is contained in a glass vial. In another example, the formulation is contained in an injection device. In another example, the formulation is a liquid formulation. In one example, the formulation is frozen to at least below -70° C. In another example, the formulation is a reconstituted solution from a lyophilized formulation.

In certain examples, the formulation is stable at refrigerated temperature (2-8°C) for at least 3 months, preferably 6 months, and more preferably 1 year, and even more preferably up to through 2 years. In one example of the formulation, after 12 months at 5° C the % monomer of the anti-CTLA4 antibody is ≥ 90% as determined by size exclusion chromatography. In another example of the formulation, after 12 months at 5° C the % monomer of the anti-CTLA4 antibody is ≥ 95% as determined by size exclusion

chromatography. In another example of the formulation, after 12 months at 5° C the % heavy chain and light chain of the anti-CTLA4 antibody is ≥ 90% as determined by reduced CE-SDS. In another example of the formulation, after 12 months at 5° C the % heavy chain and light chain of the anti-CTLA4 antibody is ≥ 95% as determined by reduced CE-SDS. In another example of the formulation, after 12 months at 5° C the % intact IgG of the anti-CTLA4 antibody is ≥ 90% as determined by non-reduced CE-SDS. In another example of the formulation, after 12 months at 5° C the % intact IgG of the anti-CTLA4 antibody is ≥ 95% as determined by non-reduced CE-SDS.

In one example of any of the formulations described above, the formulation comprises an anti-CTLA4 antibody or antigen-binding fragment thereof comprising three light chain CDRs and three heavy chain CDRs, wherein the light chain CDRs comprise CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO:39, CDRL3 of SEQ ID NO:40 and the heavy chain CDRs comprise CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDHR3 of SEQ ID NO: 37. In another example, the formulation comprises an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain variable region comprising SEQ ID NO: 88 and a light chain variable region comprising SEQ ID NO: 48. In another example, the formulation comprises an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain comprising SEQ ID NO: 99 and a light chain comprising SEQ ID NO: 100.

In one aspect, the present disclosure provides 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.

In one example, the present disclosure provides a co-formulation of an anti-CTLA4 antibody, or antigen binding fragment thereof and an anti-human PD-1 antibody, or antigen binding fragment thereof, comprising (i) an anti-CTLA4 antibody, or antigen binding fragment thereof; (ii) an anti-human PD-1 antibody, or antigen binding fragment thereof, (ii) a buffer, (iii) a non-reducing sugar; (iv) a non-ionic surfactant; and an antioxidant. In an example, the co-formulation further comprises a chelator. In one example the chelator is EDTA. In another example, the chelator is DTPA. In one example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:2. In another example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:1. In a further example of the co-formulation, the ratio of the anti-human PD-1 antibody to

the anti-CTLA4 antibody is 2:1. In another example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 10:1. In a further example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:10. In another example, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 8:1. In a further example, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 8:3.

In an example of the disclosure, the co-formulation comprises (i) about 1 mg/ml to about 100 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; (ii) about 1 mg/ml to about 100 mg/ml of an anti-human PD-1 antibody (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% non-ionic surfactant; and (v) about 1 mM to about 20 mM anti-oxidant. In an example, the co-formulation further comprises a chelator. In one example, the chelator is DTPA. In one example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:2. In another example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:1. In a further example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 2:1. In another example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 10:1. In a further example of the co-formulation, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 1:10. In another example, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 8:1. In a further example, the ratio of the anti-human PD-1 antibody to the anti-CTLA4 antibody is 8:3. In one example, the co-formulation has a pH between 4.5 and 6.5. In other examples, the pH of the formulation is from about pH 5.0 to about pH 6.0. In a further example, the pH of the formulation is from about pH 5.3 to about pH 5.8.

In one example of the co-formulation, the buffer is a histidine buffer or sodium acetate buffer, the non-reducing sugar is sucrose, the non-ionic surfactant is polysorbate 80, and the anti-oxidant is methionine or a pharmaceutically acceptable salt thereof. In one example, anti-oxidant is L-methionine. In another example, anti-oxidant is a pharmaceutically acceptable salt of L-methionine, such as, for example, methionine HCl.

In another example, the co-formulation comprises (i) about 1 mg/ml to about 100 mg/ml of an anti-CTLA4 antibody, or antigen binding fragment thereof; (ii) about 1 mg/ml to about 100 mg/ml of an anti-human PD-1 antibody or antigen binding fragment thereof; (iii) about 5 mM to about 20 mM of L-histidine buffer or about 5 mM to about 20 mM of sodium acetate buffer; (iv) about 6% to about 8% w/v sucrose; (v) about 0.01 % to about 0.10% w/v polysorbate 80; and (vi) about 1 mM to about 20 mM L-methionine. In an example, the co-formulation further comprises a chelator. In one example, the chelator is DTPA. In one example, the buffer is L-histidine buffer. In one example, the co-formulation comprises about 8mM to about 12 mM of L-histidine buffer. In another example, the co-formulation comprises about 5 mM to about 10 mM of L-methionine. In a further example, the co-formulation comprises polysorbate 80 at a weight ratio of approximately 0.02% w/v. In one example, co-formulation comprises sucrose at a weight ratio of about 7% (w/v).

In examples of the co-formulation, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is from about 1 mg/mL to about 100 mg/mL. In another example, the concentration of the anti-CTLA4 antibody is from about 10 mg/ml to about 100 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 10 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 1.25 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof

is 2.5 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 5 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 12.5 mg/ml. In a further example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 25 mg/ml. In a further example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 50 mg/ml. In another example, the anti-CTLA4 antibody or antigen biding fragment thereof is 75 mg/ml. In another example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is 100 mg/ml. In an additional example, the concentration of the anti-CTLA4 antibody or antigen binding fragment thereof is about 50 mg/ml. In another example, the concentration of the anti-CTLA4 antibody is 2.9 mg/mL. In another example, the concentration of the anti-CTLA4 antibody is 7.9 mg/mL.

In examples of the co-formulation, the concentration of the anti-human PD-1 antibody is from about 1 mg/mL to about 100 mg/mL. In another example, the concentration of the anti-human PD-1 antibody is about10 mg/ml to about 100 mg/ml. In another example, the concentration of the anti-human PD-1 antibody is about 25 mg/ml. In another example, the concentration of the anti-human PD-1 antibody is about 22.7 mg/ml. In another example, the concentration of the anti-human PD-1 antibody is about 2.27 mg/ml. In another example, the concentration of the anti-human PD-1 antibody is about 21.1 mg/ml. In another example, the concentration of the anti-human PD-1 antibody is about 23.5 mg/ml.

In one example, the co-formulation comprises about 25 mg/mL of the anti-PD1 antibody, about 12.5 mg/mL of the 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.

In one example, the co-formulation comprises about 25 mg/mL of the anti-PD1 antibody, about 25 mg/mL of the 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.

In one example, the co-formulation comprises about 25 mg/mL of the anti-PD1 antibody, about 50 mg/mL of the 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.

In one example, the co-formulation comprises about 22.72 mg/mL of the anti-PD1 antibody, about 2.3 mg/mL of the 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.

In one example, the co-formulation comprises about 2.27 mg/mL of the anti-PD1 antibody, about 22.7 mg/mL of the 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.

In one example, the co-formulation comprises about 23.5 mg/mL of the anti-PD1 antibody, about 2.9 mg/mL of the 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.

In one example, the co-formulation comprises about 21.1 mg/mL of the anti-PD1 antibody, about 7.9 mg/mL of the 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.

In one example of any of the formulations described above, the formulation comprises an anti-CTLA4 antibody or antigen-binding fragment thereof comprising three light chain CDRs and three heavy chain CDRs, wherein the light chain CDRs comprise CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO:39, CDRL3 of SEQ ID NO:40 and the heavy chain CDRs comprise CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDHR3 of SEQ ID NO: 37. In another example, the formulation comprises an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain variable region comprising SEQ ID NO: 88 and a light chain variable region comprising SEQ ID NO: 48. In another example, the formulation comprises an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain comprising SEQ ID NO: 99 and a light chain comprising SEQ ID NO: 100. In one example of any of the formulations described above, the anti-human PD-1 antibody or antigen binding fragment thereof comprises three light chain CDRs and three heavy chain CDRs, wherein the light chain CDRs comprise CDRL1 of SEQ ID NO: 1, CDRL2 of SEQ ID NO:2, CDRL3 of SEQ ID NO:3 and the heavy chain CDRs comprise CDRH1 of SEQ ID NO: 6, CDRH2 of SEQ ID NO: 7, and CDHR3 of SEQ ID NO: 8. In another example, the formulations comprise an anti-human PD1 antibody or antigen binding fragment thereof comprising a light chain variable region comprising SEQ ID NO: 4 and a heavy chain variable region comprising SEQ ID NO: 9. In another example, the formulations comprise an anti-human PD1 antibody or antigen binding fragment thereof comprising a light chain comprising SEQ ID NO: 5 and a heavy chain comprising SEQ ID NO: 10. In one example of any of the formulations described above, the anti-human PD-1 antibody or antigen binding fragment thereof is pembrolizumab. In another example, the anti-human PD-1 antibody or antigen binding fragment thereof is nivolumab.

In one aspect, the present disclosure provides 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.

In one example of any of the co-formulations described above, the formulation comprises (i) an anti-CTLA4 antibody or antigen-binding fragment thereof comprising three light chain CDRs and three heavy chain CDRs, wherein the light chain CDRs comprise CDRL1 of SEQ ID NO: 38, CDRL2 of SEQ ID NO:39, CDRL3 of SEQ ID NO:40 and the heavy chain CDRs comprise CDRH1 of SEQ ID NO: 35, CDRH2 of SEQ ID NO: 36, and CDHR3 of SEQ ID NO: 37 and (ii) an anti-human PD-1 antibody or antigen binding fragment thereof comprising three light chain CDRs and three heavy chain CDRs, wherein the light chain CDRs comprise CDRL1 of SEQ ID NO: 1, CDRL2 of SEQ ID NO:2, CDRL3 of SEQ ID NO:3 and the heavy chain CDRs comprise CDRH1 of SEQ ID NO: 6, CDRH2 of SEQ ID NO: 7, and CDHR3 of SEQ ID NO: 8.

In one example of any of the co-formulations described above, the formulation comprises (i) an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain variable region comprising SEQ ID NO: 88 and a light chain variable region comprising SEQ ID

NO: 48 and (ii) an anti-human PD1 antibody or antigen binding fragment thereof comprising a light chain variable region comprising SEQ ID NO: 4 and a heavy chain variable region comprising SEQ ID NO: 9.

In another example of any of the co-formulations described above, the formulation comprises (i) an anti-CTLA4 antibody or antigen binding fragment thereof comprising a heavy chain comprising SEQ ID NO: 99 and a light chain comprising SEQ ID NO: 100 and (ii) an anti-human PD1 antibody or antigen binding fragment thereof comprising a light chain comprising SEQ ID NO: 5 and a heavy chain comprising SEQ ID NO: 10.

In one example, the formulation is contained in a glass vial. In another example, the formulation is contained in an injection device. In another example, the formulation is a liquid formulation. In one example, the formulation is frozen to at least below -70° C. In another example, the formulation is a reconstituted solution from a lyophilized formulation.

In one example, provided are methods of treating chronic infection or cancer in a mammalian subject (e.g. a human) in need thereof comprising: administering an effective amount of the anti-CTLA4 formulation or the co-formulation set forth herein.

In one aspect, the present disclosure provides the formulation as disclosed herein for use in treatment of cancer or chronic infection.

In one aspect, the present disclosure provides use of the formulation as disclosed herein for the preparation of a medicament for treating cancer or for treating chronic infection.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1A shows the UV A350 absorbance of the formulation A1 at 5°, 25°, and 40° C over 8 weeks. FIGURE 1B shows the UV A350 absorbance of the formulation A2 at 5°, 25°, and 40° C over 8 weeks.

FIGURE 2 shows the UV A350 absorbance of the formulations A1 and A2 for freeze thaw, agitation and light stress studies.

FIGURE 3A and 3B show %HMW, as determined by UP-SEC, vs. Time data at 5°, 25°, and 40° C storage conditions for Formulations A1 and A2, respectively.

FIGURE 4A and 4B show % monomer, as determined by UP-SEC, vs. Time data at 5°, 25°, and 40° C storage conditions for Formulations A1 and A2, respectively.

FIGURE 5 shows %HMW, as determined by UP-SEC, for Formulations A1 and A2 for freeze thaw, agitation and light stress studies.

FIGURE 6 shows % monomer, as determined by UP-SEC, for Formulations A1 and A2 for freeze thaw, agitation and light stress studies.

FIGURE 7A and 7B shows % Acidic, as determined by HP-IEX, vs. Time data at 5°, 25°, and 40° C storage conditions for Formulations A1 and A2, respectively.

FIGURE 8A and 8B shows % Basic, as determined by HP-IEX, vs. Time data at 5°, 25°, and 40° C storage conditions for Formulations A1 and A2, respectively.

FIGURE 9A and 9B shows % Main, as determined by HP-IEX, vs. Time data at 5°, 25°, and 40° C storage conditions for Formulations A1 and A2, respectively.

FIGURE 10 shows % Acidic, as determined by HP-IEX, for Formulations A1 and A2 for freeze thaw, agitation and light stress studies.