WHAT IS CLAIMED IS:

1. A formulation comprising:

a) about 5020 mg/mL to about 175200 mg/mL of an anti-human PD-1 antibody, or antigen binding fragment thereof;

b) about 0.0009 – 0.050 mg/ml of a PH20 variant or fragment thereof;

c) about 5 mM to about 20 mM buffer;

d) about 3% to about 10% weight/volume (w/v) of a non-reducing dissacharide selected from the group consisting of sucrose and trehalose;

e) about 0.005 % to about 0.10% (w/v) non-ionic surfactant; and, optionally

f) about 1 mM to about 30 mM anti-oxidant;

wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises a light chain variable region comprising three light chain CDRs comprising CDRL1 of SEQ ID NO:1, CDRL2 SEQ ID NO:2 and CDRL3 of SEQ ID NO:3 and a heavy chain variable region comprising three heavy chain CDRs of CDRH1 of SEQ ID NO:6, CDRH2 of SEQ ID NO:7 and CDRH3 SEQ ID NO:8; wherein the PH20 variant has amino acid residue substitutions including M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D, and I361T in SEQ ID NO: 21, and the fragment thereof has either an N-terminus deletion of amino acid residues 1-36, 1-37, 1-38, 1-39, 1-40, 1-41, or 1-42 of SEQ ID NO: 21 and/or a C-terminus deletion of amino acid residues 455-509, 456-509, 457-509, 458-509, 459-509, 460-509, 461-509, 462-509, 463-509, 464-509, 465-509, 466-509, 467-509, 468-509, 469-509, 470-509, 471-509, 472-509, 473-509, 474-509, 475-509, 476-509, 477-509, 478-509, 479-509, 480-509, 481-509, 482-509, 483-509, 484-509, 485-509, 486-509, 487-509, 488-509, 489-509, 490-509, 491-509, 492-509, 493-509, 494-509, 495-509, 496-509, 497-509, 498-509, 499-509, 500-509, 501-509, 502-509, 503-509, 504-509, 505-509, 506-509, 507-509, 508-509, or 509, wherein the numbering is by reference to SEQ ID NO: 21.

2. The formulation of claim 1, wherein the formulation has a pH between about 5.2 and about 5.8.

3. The formulation of claim 1, wherein the formulation has a pH between about 5.0 and about 6.0.

4. The formulation of any one of claims 1-3, wherein the buffer is a histidine buffer.

5. The formulation of any one of claims 1-3, wherein the buffer is a histidine buffer, which is present at a concentration of about 8 mM to about 12 mM.

6. The formulation of any one of claims 1-5, wherein sucrose, or trehalose is about 6% to about 8% weight/volume (w/v).

7. The formulation of any one of claims 1-5, wherein the non-reducing dissacharide is sucrose which is present at about 7% w/v.

8. The formulation of any one of claims 1-7, wherein the non-ionic surfactant is polysorbate 80, 60, 40 or 20.

9. The formulation of claim 8, wherein the non-ionic surfactant is present at approximately 0.005-0.02% w/v.

10. The formulation of claim 9, wherein the non-ionic surfactant is present at approximately 0.02% w/v.

11. The formulation of any one of claims 1-10, wherein the anti-oxidant is L-methionine, or a pharmaceutically acceptable salt thereof.

12. The formulation of any of claims 1-10, wherein the anti-oxidant is L-methionine, or a pharmaceutically acceptable salt thereof, which is present at a concentration of about 5 mM to about 20 mM.

13. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is from about 100~~100~~ mg/mL to about 17~~8~~5 mg/mL.

~~14. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is from about 50 mg/mL to about 175 mg/mL.~~

1~~4~~5. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is from about 75 mg/mL to about 175 mg/mL.

1~~5~~6. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is about 50, 75, 150, 165 or ~~185~~175 mg/mL.

1~~6~~7. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody or antigen binding fragment thereof is about 130 mg/mL.

1~~7~~8. The formulation of any one of claims 1-12, wherein the concentration of the anti-human PD-1 antibody or antigen binding fragment thereof is about 165 mg/mL.

1~~8~~9. The formulation of any one of claims 1-1~~7~~8, wherein the concentration of the PH20 variant or fragment thereof is about 0.006 mg/mL or 1000 U/ml.

19~~20~~. The formulation of any one of claims 1-1~~7~~8, wherein the concentration of the PH20 variant or fragment thereof is about 0.009 mg/mL or 1500 U/ml.

20~~1~~. The formulation of any one of claims 1-1~~7~~8, wherein the concentration of the PH20 variant or fragment thereof is about 0.012 mg/mL or 2000 U/ml.

21~~2~~. The formulation of any one of claims 1-1~~7~~8, wherein the concentration of the PH20 variant or fragment thereof is about 750, 1000, 1500, 3000, 5000, or 6000 U/mL.

22~~3~~. The formulation of claim 1 comprising:

a) about 75~~100~~ mg/mL to about 17~~8~~5 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.006 – 0.04 mg/ml of PH20 variant or fragment thereof;

c) about 5 mM to about 20 mM histidine buffer;

d) about 6% to about 8% w/v sucrose;

e) about 0.01 % to about 0.04% w/v polysorbate 80; and optionally

f) about 5 mM to about 20 mM L-methionine, or a pharmaceutically acceptable salt thereof.

234. The formulation of claim 1 comprising:

a) about 50~~100~~ mg/mL to about 176~~5~~ mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.006 – 0.030 mg/ml of PH20 variant or fragment thereof;

c) about 5 mM to about 20 mM histidine buffer;

d) about 6% to about 8% w/v sucrose;

e) about 0.01 % to about 0.04% w/v polysorbate 80; and optionally

f) about 5 mM to about 20 mM L-methionine, or a pharmaceutically acceptable salt thereof.

245. The formulation of claim 1, comprising:

a) about 100 to about 165 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.006-0.030 mg/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

256. The formulation of claim 1, comprising:

a) about 130 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.006 mg/ml or 1000 U/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

267. The formulation of claim 1, comprising:

a) about 130 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.009 mg/ml or 1500 U/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

278. The formulation of claim 1, comprising:

a) about 130 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 2000 U/ml or 0.012 mg/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

289. The formulation of claim 1, comprising:

a) about 165 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.006 mg/ml or 1000 U/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

2930. The formulation of claim 1, comprising:

a) about 165 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 0.009 mg/ml or 1500 U/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

301. The formulation of claim 1, comprising:

a) about 165 mg/mL of an anti-human PD-1 antibody~~, or antigen binding fragment thereof~~;

b) about 2000 U/ml or 0.012 mg/ml of PH20 variant or fragment thereof;

c) about 10 mM histidine buffer;

d) optionally, about 10 mM L-methionine, or a pharmaceutically acceptable salt thereof;

e) about 7% w/v sucrose; and

f) about 0.02 % w/v polysorbate 80.

312. The formulation of ~~any one of~~ claim~~s~~ 23~~-31~~, wherein the concentration of the anti-human PD-1 antibody~~, or antigen binding fragment thereof,~~ is from about 1050 mg/mL to about 1675 mg/mL.

~~33. The formulation of any one of claims 23-31, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is from about 75 mg/mL to about 175 mg/mL.~~

324. The formulation of any one of claims 1-21 and 2323-31, wherein the concentration of the anti-human PD-1 antibody, or antigen binding fragment thereof, is about 50, 75, 150, 165 or 170 or 185 mg/mL.

335. The formulation of any one of claims 1-324 that is a liquid.

346. The formulation of any one of claims 1-334 that is a reconstituted solution from a lyophilized formulation.

357. The formulation of any one of claims 1-346, wherein the formulation is contained in a glass vial or injection device.

368. The formulation of any one of claims 1-357, wherein the formulation is for subcutaneous administration.

379. The formulation of claim 368, wherein the viscosity of the formulation is in the range of 7-90 cP at 5 °C.

3840. The formulation of claim 368, wherein the viscosity of the formulation is in the range of 7-30 cP at 5 °C.

3941. The formulation of claim 368, wherein the viscosity of the formulation is in the range of 7-50 cP at 20 °C.

402. The formulation of claim 368, wherein the viscosity of the formulation is in the range of 7-20 cP at 20 °C.

413. The formulation of any one of claims 1-402, wherein after storage of the formulation at 5 °C for 3 months, the % HMW as measured by HP-SEC is less than 2%.

~~44. The formulation of any of claims 1-43, wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises a light chain variable region comprising three light chain CDRs comprising CDRL1 of SEQ ID NO:1, CDRL2 SEQ ID NO:2 and~~

~~CDRL3 of SEQ ID NO:3 and a heavy chain variable region comprising three heavy chain CDRs of CDRH1 of SEQ ID NO:6, CDRH2 of SEQ ID NO:7 and CDRH3 SEQ ID NO:8.~~

425. The formulation of any one of claims 1-413, wherein the anti-human PD-1 antibody or antigen binding fragment thereof comprises a light chain variable region which comprises the amino acid sequence set forth in SEQ ID NO:4, and a heavy chain variable region comprising the amino acid sequence set forth in SEQ ID NO:9.

436. The formulation of any one of claims 1-413, wherein the anti-human PD-1 antibody comprises a light chain comprising the amino acid sequence set forth in SEQ ID NO:5 and a heavy chain comprising the amino acid sequence set forth in SEQ ID NO:10.

447. The formulation of any one of claims 1-413, wherein the anti-human PD-1 antibody is pembrolizumab.

458. The formulation of any one of claims 1-413, wherein the anti-human PD-1 antibody is a pembrolizumab variant.

469. The formulation of any one of claims 1-458, wherein the PH20 variant or fragment thereof further comprises one or more amino acid residue substitutions selected from the group consisting of T341A, T341C, T341D, T341G, T341S, L342W, S343E, I344N and N363G.

4750. The formulation of any one of claims 1-468, wherein the PH20 variant or fragment thereof has amino acid residue substitutions selected from the following amino acid residue substitution groups:

(a) T341S, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(b) L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(c) M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D, I361T and N363G;

(d) T341G, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(e) T341A, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(f) T341C, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(g) T341D, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T;

(h) I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T; and

(i) S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T.

4851. The formulation of any one of claims 1-468, wherein the PH20 variant or fragment thereof has amino acid residue substitutions consisting of T341S, L342W, S343E, I344N, M345T, S347T, M348K, K349E, L352Q, L353A, L354I, D355K, N356E, E359D and I361T.

4952. The formulation of any one of claims 1-4851, that comprises a PH20 variant fragment that has an N-terminus deletion of amino acid residues 1-36, 1-37, 1-38, 1-39, or 1-40 of SEQ ID NO: 21.

5053. The formulation of any one of claims 1-4951, that comprises a PH20 variant fragment that has a C-terminus deletion of amino acid residues 455-509, 458-509, 461-509, 464-509, 465-509, 466-509, 467-509, 468-509, 470-509, 471-509, 472-509, 473-509, 474-509, 475-509, 476-509, 478-509, 480-509, 482-509, 484-509, 486-509, 488-509, or 490-509, wherein the numbering is in reference to SEQ ID NO: 21.

514. The formulation of any of claims 1-4953, that comprises a PH20 variant fragment that has a C-terminus deletion of amino acid residues 468-509, wherein the numbering is in reference to SEQ ID NO: 21.

525. The formulation of any one of claims 1-458 that comprises a PH20 variant fragment consisting of the amino acid sequence set forth in SEQ ID NO: 23.

~~56. A method of treating chronic infection in a human patient in need thereof comprising: administering an effective amount of the formulation of any one of claims 1-55 to the patient.~~

537. Use of ~~A method of treating cancer in a human patient in need thereof, the method comprising administering an effective amount of~~ the formulation of any one of claims 1-525 ~~to the patient,~~ in the manufacture of a medicament for the treatment of cancer.

548. The use ~~method~~ of claim 537, wherein the cancer is melanoma, non-small cell lung cancer, head and neck cancer, urothelial cancer, breast cancer, gastric cancer, gastroesophageal junction adenocarcinoma, multiple myeloma, hepatocellular cancer, merkel cell carcinoma, renal cell carcinoma, endometrial carcinoma, cutaneous squamous cell carcinoma, non-Hodgkin lymphoma, Hodgkin lymphoma, mesothelioma, ovarian cancer, small cell lung cancer, esophageal cancer, anal cancer, biliary tract cancer, colorectal cancer, cervical cancer, thyroid cancer, salivary cancer, prostate cancer, glioblastoma, Tumor Mutational Burden-High or MSI-H cancer.

~~59. The method of claim 58, wherein the cancer is breast cancer which is triple negative breast cancer or ER+/HER2- breast cancer.~~

~~60. The method of claim 58, wherein the cancer is non-Hodgkin lymphoma which is primary mediastinal B-cell lymphoma or diffuse large B-cell lymphoma.~~

~~61. The method of claim 58 or 59, wherein the cancer is a microsatellite instability-high (MSI-H) or mismatch repair deficient solid tumor.~~

~~62. The method of claim 58, wherein the cancer is urothelial cancer, head and neck cancer, gastric cancer, cervical cancer, or esophageal cancer.~~

~~63. The method of any one of claims 58-62, wherein the patient has a tumor with PD-L1 expression CPS ≥1%.~~

~~64. The method of claim 58, wherein the cancer is metastatic non-small cell lung cancer (NSCLC).~~

~~65. The method of claim 64, wherein the patient has a tumor with high PD-L1 expression [(Tumor Proportion Score (TPS) ≥50%)] and was not previously treated with platinum-containing chemotherapy.~~

~~66. The method of claim 64, wherein the patient has a tumor with PD-L1 expression TPS ≥1% and was previously treated with platinum-containing chemotherapy.~~

~~67. The method of any of claims 64-66, wherein, the patient's tumor has no EGFR or ALK genomic aberrations.~~

~~68. The method of claim 64, wherein the method further comprises administering pemetrexed and carboplatin to the patient.~~

~~69. The method of any of claims 56-68, wherein the effective amount comprises a dose of anti-human PD-1 antibody selected from the group consisting of about 1.0, 3.0, and 10 mg/kg patient body weight.~~

~~70. The method of any of claims 56-68, wherein the effective amount of the formulation comprises a dose of anti-human PD-1 antibody of 200 to 400 mg.~~

~~71. The method of any of claims 56-68, wherein the formulation is administered by subcutaneous administration.~~

55~~72~~. ~~Use of t~~The formulation of any one of claims 1-5~~25~~ for use in the treatment of cancer in a human patient.

56~~73~~. The formulation for use of claim 55~~72~~, wherein the cancer is melanoma, non-small cell lung cancer, head and neck cancer, urothelial cancer, breast cancer, gastric cancer, gastroesophageal junction adenocarcinoma, multiple myeloma, hepatocellular cancer, merkel cell carcinoma, renal cell carcinoma, endometrial carcinoma, cutaneous squamous cell

carcinoma, non-Hodgkin lymphoma, Hodgkin lymphoma, mesothelioma, ovarian cancer, small cell lung cancer, esophageal cancer, anal cancer, biliary tract cancer, colorectal cancer, cervical cancer, thyroid cancer, salivary cancer, prostate cancer, glioblastoma, Tumor Mutational Burden-High or MSI-H cancer.

5