

WHAT IS CLAIMED IS:

1. Use of an anti-programmed death 1 (anti-PD-1) antibody, or antigen binding fragment thereof in the manufacture of a medicament for A method of treating cancer in a human patient, comprising subcutaneously administering to the patient wherein about 280 mg to about 5 450 mg of ~~an the~~ anti-PD-1 antibody, or antigen binding fragment thereof is to be administrated subcutaneously to the patient; every approximately three weeks, and wherein the anti-PD-1 antibody or antigen-binding fragment thereof comprises:

(a) light chain (LC) complementarity determining regions (CDRs) LC-CDR1, LC-CDR2 and LC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 1, 2 10 and 3, respectively, and heavy chain (HC) CDRs HC-CDR1, HC-CDR2 and HC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 6, 7 and 8, respectively; or

(b) light chain CDRs LC-CDR1, LC-CDR2 and LC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 11, 12 and 13, respectively and heavy chain 15 CDRs HC-CDR1, HC-CDR2 and HC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 14, 15 and 16, respectively.

2. Use of an anti-PD-1 antibody, or antigen binding fragment thereof in the manufacture of a medicament for A method of treating cancer in a human patient, wherein at 20 least 1.6 times higher than a 200 mg or a 2 mg/kg dose of the anti-PD-1 antibody, or antigen binding fragment thereof is to be administrated comprising subcutaneously to the patient administering to the patient approximately every three weeks ~~a dose of an anti PD-1 antibody, or antigen binding fragment thereof, that is at least 1.6 times higher than a 200 mg or a 2 mg/kg dose of the anti PD-1 antibody, or antigen binding fragment thereof,~~ wherein the anti-PD-1 25 antibody or antigen-binding fragment thereof comprises:

(a) light chain (LC) complementarity determining regions (CDRs) LC-CDR1, LC-CDR2 and LC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 1, 2 30 and 3, respectively, and heavy chain (HC) CDRs HC-CDR1, HC-CDR2 and HC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 6, 7 and 8, respectively; or

(b) light chain CDRs LC-CDR1, LC-CDR2 and LC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 11, 12 and 13, respectively, and heavy chain

CDRs HC-CDR1, HC-CDR2 and HC-CDR3 comprising a sequence of amino acids as set forth in SEQ ID NOs: 14, 15 and 16, respectively.

3. usemethod of claim 1 or 2, wherein the bioavailability of the anti-PD-1 antibody, or antigen binding fragment thereof, is at least 64%.

4. The usemethod of claim 1 or 2, wherein the bioavailability of the anti-PD-1 antibody, or antigen binding fragment thereof, is at least 66%.

5. The usemethod of claim 2, wherein the dose is 1.9 times higher than a 200 mg or a 2 mg/kg dose of the anti-PD-1 antibody, or antigen binding fragment thereof.

6. The usemethod of any of claims 2-5, wherein the subcutaneous administration of the anti-PD-1 antibody, or antigen binding fragment thereof results in a C_{trough} that is the same as, or greater than, the C_{trough} of a 200 mg dose or a 2 mg/kg dose of the anti-PD-1 antibody, or antigen binding fragment thereof, administered by an intravenous (IV) route of administration.

7. The usemethod of ~~any of claims~~ claim 6, wherein the subcutaneous administration of the anti-PD-1 antibody, or antigen binding fragment thereof, results in a ratio of subcutaneous C_{trough} to IV C_{trough} of at least 1.

8. The usemethod of any of claims 6-7, wherein the subcutaneous administration of the ~~an~~-anti-PD-1 antibody, or antigen binding fragment thereof results in a ratio of subcutaneous C_{trough} to IV C_{trough} from 1.0 to 1.6.

9. The usemethod of any of claims 6-8, wherein the dose administered by an IV route of administration is 200 mg.

10. The usemethod of any of claims 1-9, wherein the anti-PD-1 antibody or antigen-binding fragment thereof comprises:

(a) a heavy chain variable region comprising a sequence of amino acids as set forth in SEQ ID NO: 9, or a variant of SEQ ID NO: 9, and

(b) a light chain variable region comprising:

(i) a sequence of amino acids as set forth in SEQ ID NO:4, or a variant of SEQ ID NO:4,

(ii) a sequence of amino acids as set forth in SEQ ID NO:22, or a variant of SEQ ID NO:22, or

5 (iii) a sequence of amino acids as set forth in SEQ ID NO:23, or a variant of SEQ ID NO:23.

11. The ~~usemethod~~ of any of claims 1-10, wherein the anti-PD-1 antibody, or antigen binding fragment thereof, comprises a heavy chain variable region comprising a sequence of
10 amino acids as set forth in SEQ ID NO:9 and a light chain variable region comprising a sequence of amino acids as set forth in SEQ ID NO:4.

12. The ~~usemethod~~ of any of claims 1-10, wherein the anti-PD-l antibody, or antigen binding fragment thereof, is a monoclonal antibody comprising:
15 (a) a heavy chain comprising a sequence of amino acids as set forth in SEQ ID NO: 10, or a variant of SEQ ID NO: 10, and
(b) a light chain comprising a sequence of amino acids as set forth in SEQ ID NO:5, a variant of SEQ ID NO:5, SEQ ID NO:24, a variant of SEQ ID NO:24, SEQ ID NO:25, or a variant of SEQ ID NO:25.

20 13. The ~~usemethod~~ of any of claims 1-12, wherein the anti-PD-l antibody, or antigen-binding fragment thereof, is a monoclonal antibody comprising a heavy chain comprising a sequence of amino acids as set forth in SEQ ID NO: 10 and a light chain comprising a sequence of amino acids as set forth in SEQ ID NO: 5.

25 14. The ~~usemethod~~ of any of claims 1-13, wherein the cancer is selected from the group consisting of: melanoma, non-small cell lung cancer, small cell lung cancer, head and neck cancer, urothelial cancer, breast cancer, ~~gastrointestinal-gastric~~ cancer, gastroesophageal junction adenocarcinoma, multiple myeloma, hepatocellular cancer, non- Hodgkin lymphoma, primary
30 mediastinal large B-cell lymphoma (PMBCL), renal cancer, classical Hodgkin lymphoma, mesothelioma, ovarian cancer, esophageal cancer, anal cancer, biliary tract cancer, colorectal cancer, cervical cancer, endometrial cancer, cutaneous squamous cell cancer, thyroid cancer,

prostate cancer, glioblastoma, ~~Merkel~~merkel cell carcinoma, ~~and~~ salivary cancer, and a cancer characterized by a tumor having a high mutational burden.

15. — ~~The method of any of claims 1-14, wherein the patient has a tumor with a high mutational burden.~~

16. — ~~The method of any of claims 1-14, wherein the patient has a microsatellite instability-high (MSI-H) or mismatch repair deficient solid tumor.~~

17. — ~~The method of any of claims 1-14, wherein the cancer is unresectable or metastatic melanoma.~~

18. — ~~The method of any of claims 1-14, wherein the cancer is metastatic non-small cell lung cancer (NSCLC).~~

19. — ~~The method of claim 18, wherein the patient has a tumor with PD-L1 expression as measured by a tumor proportion score (TPS) of $\geq 1\%$ and was not previously treated with platinum-containing chemotherapy.~~

20. — ~~The method of claim 18, wherein the patient has a tumor with PD-L1 expression as measured by a tumor proportion score (TPS) of $\geq 1\%$ and was previously treated with platinum-containing chemotherapy.~~

21. — ~~The method of any of claims 19-20, wherein the patient's tumor has no EGFR or ALK genomic aberrations.~~

22. — ~~The method of any of claims 18-21, wherein the method further comprises administering pemetrexed and platinum chemotherapy to the patient.~~

23. — ~~The method of claim 22, wherein the patient has nonsquamous non-small cell lung cancer and the pemetrexed is administered to the patient in an amount of 500 mg/m^2 about every 21 days.~~

24. —The method of claim 22 or claim 23, further comprising administering about 400 µg to about 1000 µg of folic acid to the patient once per day, beginning about 7 days prior to administering pemetrexed to the patient and continuing until about 21 days after the patient is administered the last dose of pemetrexed.

25. —The method of any of claims 22-24, further comprising administering about 1 mg of vitamin B₁₂ to the patient about 1 week prior to the first administration of pemetrexed and about every three cycles of pemetrexed administration.

26. —The method of any of claims 22-25, further comprising administering dexamethasone to the patient twice a day on the day before, the day of, and the day after pemetrexed administration.

27. —The method of claim 18, wherein the NSCLC is squamous and the patient is also treated with carboplatin and paclitaxel or nab-paclitaxel.

28. —The method of any of claims 1-14, wherein the cancer is recurrent or metastatic head and neck squamous cell cancer (HNSCC).

29. —The method of any of claims 1-14, wherein: (1) the patient is an adult and the cancer is relapsed or refractory classical Hodgkin lymphoma (cHL), or (2) the patient is a pediatric patient and cancer is refractory cHL, or cHL that has relapsed after 2 or more lines of therapy for cHL.

30. —The method of any of claims 1-14, wherein the cancer is locally advanced or metastatic urothelial carcinoma.

31. —The method of claim 30, wherein the patient's tumor expresses PD-L1 as measured by having a Combined Positive Score (CPS) ≥ 10 .

32. —The method of claim 30, wherein the patient is not eligible for platinum-containing chemotherapy or has disease progression during or following platinum-containing

chemotherapy or within 12 months of neoadjuvant or adjuvant treatment with platinum-containing chemotherapy.

33. — The method of any of claims 1-14, wherein the cancer is locally advanced or metastatic gastric cancer or gastroesophageal junction adenocarcinoma.

34. — The method of any of claims 1-14, wherein the cancer is cervical cancer.

35. — The method of claim 34, wherein the cervical cancer is recurrent or metastatic cervical cancer and the patient had disease progression on or after chemotherapy.

36. — The method of claim 33, 34, or 35, wherein the patient's tumor expresses PD-L1 as measured by a Combined Positive Score (CPS) ≥ 1 .

37. — The method of any of claims 1-14, wherein the cancer is primary mediastinal large B-cell lymphoma (PMBCL).

38. — The method of claim 37, wherein the patient has refractory PMBCL or has relapsed after 2 or more prior lines of therapy.

39. — The method of any of claims 1-14, wherein the cancer is resected stage IIB, IIC, or III melanoma.

40. — The method of any of claims 1-14, wherein the cancer is hepatocellular carcinoma.

41. — The method of any of claims 1-14, wherein the cancer is renal cell carcinoma (RCC).

42. — The method of claim 40, wherein the cancer is advanced clear cell RCC.

43. — The method of any of claims 1-14, wherein the cancer is recurrent, locally advanced or metastatic Merkel cell carcinoma (MCC).

4415. The ~~usemethod~~ of any of claims 1-4314, wherein the anti-PD-l antibody, or antigen-binding fragment thereof, is pembrolizumab.

5 4516. The ~~usemethod~~ of any of claims 1-4314, wherein the anti-PD-1 antibody, or antigen-binding fragment thereof, is a pembrolizumab variant.

4617. The ~~usemethod~~ of any of claims 1-4516, wherein the patient is to be administered from 320 to 420 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.

10 47. — ~~The method of any of claims 1-46, wherein the patient is administered 320 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.~~

15 48. — ~~The method of any of claims 1-46, wherein the patient is administered 340 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.~~

4918. The ~~usemethod~~ of any of claim 1-4617, wherein the patient is to be administered 360 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.

20 5019. The ~~usemethod~~ of any of claims 1-4617, wherein the patient is to be administered 370 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.

25 20. The use of any of claims 1-17, wherein the patient is to be administered 375 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.

5121. The ~~usemethod~~ of any of claims 1-1746, wherein the patient is to be administered 380 mg of the anti-PD-1 antibody or antigen binding fragment thereof.

30 22. The use of any of claims 1-17, wherein the patient is to be administered 385 mg of the anti-PD-1 antibody or antigen binding fragment thereof.

23. The use of any of claims 1-17, wherein the patient is to be administered 390 mg of the anti-PD-1 antibody or antigen-binding fragment thereof.

24. The use of any of claims 1-17, wherein the patient is to be administered 395 mg of the anti-PD-1 antibody or antigen binding fragment thereof.

5 ~~5225~~. The ~~usemethod~~ of any of claims 1-~~4617~~, wherein the patient is to be administered 400 mg of the anti-PD-1 antibody or antigen binding fragment thereof.

~~5326~~. The ~~usemethod~~ of any of claims 1-~~1746~~, wherein the patient is to be administered 420 mg of the anti-PD-1 antibody or antigen binding fragment thereof.

10 ~~5427~~. The ~~usemethod~~ of any of claims 1-~~5326~~, wherein the anti-PD-1 antibody or antigen-binding fragment thereof is to be administered as a composition comprising 130 mg/mL of the anti-PD-1 antibody or antigen-binding fragment thereof.

15 ~~5528~~. The ~~usemethod~~ of any of claims 1-~~5326~~, wherein the anti-PD-1 antibody or antigen-binding fragment thereof is to be administered as a composition comprising 165 mg/mL of the anti-PD-1 antibody or antigen-binding fragment thereof.

20 ~~5629~~. The ~~usemethod~~ of claims ~~54 or 5527 or 28~~, wherein the composition further comprises 10mM L-methionine, 10 mM histidine, pH 5.5, 7% sucrose, and 0.02% polysorbate 80.

~~57. The method of any of claims 2-56, wherein the anti-PD-1 antibody, or antigen binding fragment thereof, is administered to the patient every three weeks.~~

25 ~~5830~~. The ~~usemethod~~ of any of claims 1-~~5729~~, wherein the anti-PD-1 antibody, or antigen binding fragment thereof, is to be administered in one or more injections.

30 31. The use of any of claims 1-30, wherein the anti-PD-1 antibody, or antigen binding fragment thereof, is to be administered in two injections.

59. — ~~The method of any of claims 1-46, 51, 54, and 56-58, wherein 380 mg of anti-PD-1 antibody, or antigen binding fragment thereof, is administered as a composition comprising 130 mg/mL of the anti-PD-1 antibody, or antigen binding fragment thereof, in one injection.~~

5 60. — ~~The method of any of claims 1-46, 51, 54, and 56-58, wherein 380 mg of anti-PD-1 antibody, or antigen binding fragment thereof, is administered as a composition comprising 130 mg/mL of the anti-PD-1 antibody, or antigen binding fragment thereof, in two injections.~~

10 61. — ~~The method of any of claims 1-46, 51, 55, and 56-58, wherein 380 mg of anti-PD-1 antibody, or antigen binding fragment thereof, is administered as a composition comprising 165 mg/mL of the anti-PD-1 antibody, or antigen binding fragment thereof, in one injection.~~

15 62. — ~~The method of any of claims 1-46, 51, 55, and 56-58, wherein 380 mg of anti-PD-1 antibody, or antigen binding fragment thereof, is administered as a composition comprising 165 mg/mL of the anti-PD-1 antibody, or antigen binding fragment thereof, in two injections.~~

63. — ~~The method of claim 62, wherein 190 mg of anti-PD-1 antibody, or antigen binding fragment thereof, is administered in each of the two injections.~~

20 64. — ~~The method of claim 63, wherein 1.15 mL of the composition comprising 165 mg/mL of the anti-PD-1 antibody, or antigen binding fragment thereof, is administered in each of the two injections.~~

25 32. Use of pembrolizumab in the manufacture of a medicament for treating cancer in a human patient, wherein about 280 mg to about 450 mg of pembrolizumab is to be administrated subcutaneously to the patient every approximately three weeks.

33. The use of claim 32, wherein the bioavailability of pembrolizumab is at least 64%.

30 34. The use of claim 32, wherein the bioavailability of pembrolizumab is at least 66%.

35. The use of claim 32, wherein the dose is 1.9 times higher than a 200 mg or a 2 mg/kg dose of pembrolizumab.

36. The use of any of claims 32-35, wherein the subcutaneous administration of pembrolizumab results in a C_{trough} that is the same as, or greater than, the C_{trough} of a 200 mg dose or a 2 mg/kg dose of pembrolizumab administered by an intravenous (IV) route of administration.

37. The use of claim 36, wherein the subcutaneous administration of pembrolizumab results in a ratio of subcutaneous C_{trough} to IV C_{trough} of at least 1.

38. The use of any of claims 36-37, wherein the subcutaneous administration of pembrolizumab results in a ratio of subcutaneous C_{trough} to IV C_{trough} from 1.0 to 1.6.

39. The use of any of claims 36-38, wherein the dose administered by an IV route of administration is 200 mg.

40. The use of any of claims 32-39, wherein the cancer is selected from the group consisting of: melanoma, non-small cell lung cancer, head and neck squamous cell cancer, classical Hodgkin lymphoma, primary mediastinal large B-cell lymphoma, urothelial carcinoma, microsatellite instability-high or mismatch repair deficient cancer, microsatellite instability-high or mismatch repair deficient colorectal cancer, gastric cancer, esophageal cancer, cervical cancer, hepatocellular carcinoma, Merkel cell carcinoma, renal cell carcinoma, endometrial carcinoma, a cancer characterized by a tumor having a high mutational burden, cutaneous squamous cell carcinoma, or triple negative breast cancer.

41. The use of any of claims 32-40, wherein the patient has a tumor with a high mutational burden.

42. The use of any of claims 32-40, wherein the patient has a microsatellite instability-high (MSI-H) or mismatch repair deficient solid tumor.

43. The use of any of claims 32-40, wherein the cancer is unresectable or metastatic melanoma.

44. The use of any of claims 32-40, wherein the cancer is metastatic non-small cell lung cancer (NSCLC).

45. The use of claim 44, wherein the patient has a tumor with PD-L1 expression as measured by a tumor proportion score (TPS) of $\geq 1\%$ and was not previously treated with platinum-containing chemotherapy.

46. The use of claim 44, wherein the patient has a tumor with PD-L1 expression as measured by a tumor proportion score (TPS) of $> 1\%$ and was previously treated with platinum-containing chemotherapy.

47. The use of any of claims 45-46 wherein the patient's tumor has no EGFR or ALK genomic aberrations.

48. The use of any of claims 44-47, further comprising pemetrexed and platinum chemotherapy to be administered to the patient.

49. The use of claim 48, wherein the patient has nonsquamous non-small cell lung cancer and the pemetrexed is to be administered to the patient in an amount of 500 mg/m² about every 21 days.

50. The use of claim 48 or 49, further comprising about 400 μ g to about 1000 μ g of folic acid to be administered to the patient once per day, beginning about 7 days prior to administration of pemetrexed to the patient and to be continued until about 21 days after the administration of the last dose of pemetrexed to the patient.

51. The use of any of claims 48-50, further comprising about 1 mg of vitamin B₁₂ to be administered to the patient about 1 week prior to the first administration of pemetrexed and about every three cycles of pemetrexed administration.

52. The use of any of claims 48-51, further comprising dexamethasone to be administered to the patient twice a day on the day before, the day of, and the day after pemetrexed administration.

53. The use of claim 44, wherein the NSCLC is squamous and the patient is also treated with carboplatin and paclitaxel or nab-paclitaxel.

54. The use of any of claims 32-40, wherein the cancer is recurrent or metastatic head and neck squamous cell cancer (HNSCC).

55. The use of any of claims 32-40, wherein: (1) the patient is an adult and the cancer is relapsed or refractory classical Hodgkin lymphoma (cHL), or (2) the patient is a pediatric patient and cancer is refractory cHL, or cHL that has relapsed after 2 or more lines of therapy for cHL.

56. The use of any of claims 32-40, wherein the cancer is locally advanced or metastatic urothelial carcinoma.

57. The use of claim 56, wherein the patient's tumor expresses PD-L1 as measured by having a Combined Positive Score (CPS) > 10.

58. The use of claim 56, wherein the patient is not eligible for platinum- containing chemotherapy or has disease progression during or following platinum-containing chemotherapy or within 12 months of neoadjuvant or adjuvant treatment with platinum- containing chemotherapy.

59. The use of any of claims 32-40, wherein the cancer is locally advanced or metastatic gastric cancer or gastroesophageal junction adenocarcinoma.

60. The use of any of claims 32-40, wherein the cancer is cervical cancer.

61. The use of claim 60, wherein the cervical cancer is recurrent or metastatic cervical cancer and the patient had disease progression on or after chemotherapy.

62. The use of any of claims 59-61, wherein the patient's tumor expresses PD-L1 as measured by a Combined Positive Score (CPS) >1.

5 63. The use of any of claims 32-40, wherein the cancer is primary mediastinal large B-cell lymphoma (PMBCL).

64. The use of claim 63, wherein the patient has refractory PMBCL or has relapsed after 2 or more prior lines of therapy.

10 65. The use of any of claims 32-40, wherein the cancer is resected stage IIB, IIC, or III melanoma.

66. The use of any of claims 32-40, wherein the cancer is hepatocellular carcinoma.

15 67. The use of any of claims 32-40, wherein the cancer is renal cell carcinoma (RCC).

68. The use of claim 67, wherein the cancer is advanced clear cell RCC.

20 69. The use of any of claims 32-40, wherein the cancer is recurrent, locally advanced or metastatic Merkel cell carcinoma (MCC).

70. The use of any of claims 32-69, wherein the patient is to be administered from 320 to 420 mg of pembrolizumab.

25 ~~65~~71. A kit for treating a patient with cancer, the kit comprising:

(a) a composition for subcutaneous injection comprising about 280 mg to about 450 mg of ~~an anti-PD-1 antibody~~ pembrolizumab, ~~or antigen-binding fragment thereof~~, contained in one or more pre-filled syringes, and

30 (b) instructions for using ~~the anti-PD-1 antibody or antigen-binding fragment thereof~~ pembrolizumab, in the method-use of any of claims ~~32-69~~ 64.

~~66.~~ The kit of claim 65, wherein the anti-PD-1 antibody is pembrolizumab.

6772. The kit of ~~any of claims 65-66~~claim 71, wherein the composition comprises 130 mg/mL of pembrolizumab or 165 mg/mL of pembrolizumab.

5 6873. The kit of any of claims ~~65-67~~71-72, wherein ~~380 mg of~~ pembrolizumab is contained in one pre-filled syringe.

6974. The kit of any of claims ~~65-67~~71-73, wherein ~~380 mg of~~ pembrolizumab is contained in two pre-filled syringes.

10 7075. The kit of claim ~~69~~74, wherein each pre-filled syringe contains 190 mg of pembrolizumab.

7176. ~~Use of the~~ kit ~~of as defined in~~ any of claims ~~65-70~~71-75 for use in treating an individual suffering from cancer.

7277. Use of ~~an anti-PD-1 antibody, or antigen binding fragment thereof~~pembrolizumab, in the manufacture of a medicament for a method of treating cancer, according to any one of claims ~~1-64~~32-69.

20 7378. Use of about 280 to 450 mg of ~~an anti-PD-1 antibody, or antigen binding fragment thereof~~pembrolizumab, in the manufacture of a medicament for a method of treating cancer according to any of claims ~~1-64~~32-69.

25 7479. ~~An anti-PD-1 antibody, or antigen binding fragment thereof~~Pembrolizumab, for use in ~~a method of~~ treating cancer according to any of claims ~~1-64,32-69~~.

30 7780. The kit of claim 76, the use of claim 77 or 78 or the pembrolizumab for use of claim 79, claim 71, wherein the cancer is melanoma, non-small cell lung cancer, head and neck squamous cell cancer, classical Hodgkin lymphoma, primary mediastinal large B-cell lymphoma, urothelial carcinoma, microsatellite instability-high or mismatch repair deficient cancer, microsatellite instability-high or mismatch repair deficient colorectal cancer, gastric cancer, esophageal cancer, cervical cancer, hepatocellular carcinoma, Merkel cell carcinoma, renal cell

carcinoma, endometrial carcinoma, a cancer characterized by a tumor having a high mutational burden, cutaneous squamous cell carcinoma, or triple negative breast cancer.