

CLAIMS

1. A method of treating or preventing cancer comprising administering to a subject in need thereof an effective amount of a CCR5 binding agent.
2. The method according to claim 1, wherein the cancer comprises CCR5-positive metastatic breast cancer.
3. The method according to claim 1, wherein the cancer comprises CCR5-positive melanoma, brain cancer, glioblastoma, throat cancer, lung cancer, stomach cancer, colon cancer, colon carcinoma, breast cancer, testicular cancer, ovarian cancer, uterine cancer, pancreatic cancer, bladder cancer, esophageal cancer, appendix cancer, or prostate cancer.
4. The method according to any one of the preceding claims, wherein the CCR5 binding agent competes with CCL5 for binding to the CCR5 cell receptor.
5. The method according to any one of the preceding claims, wherein the CCR5 binding agent comprises the monoclonal antibody PA14, leronlimab, or CCR5mAb004, or a binding fragment thereof.
6. The method according to any one of the preceding claims, wherein the CCR5 binding agent is administered in combination with another cancer therapy.
7. The method of claim 1, wherein the CCR5 binding agent comprises an antibody comprising:
 - (a) a heavy chain variable region (VH) comprising a heavy chain complementary determining region 1 (HCDR1) of SEQ ID NO:12, a heavy chain complementary determining region 2 (HCDR2) of SEQ ID NO:13, and a heavy chain complementary determining region 3 (HCDR3) of SEQ ID NO:14; and

(b) a light chain variable region (VL) comprising a light chain complementary determining region 1 (LCDR1) of SEQ ID NO:9, a light chain complementary determining region 2 (LCDR2) of SEQ ID NO:10, and a light chain complementary determining region 3 (LCDR3) of SEQ ID NO:11.

8. The method according to any one of the preceding claims, wherein the CCR5 binding agent comprises leronlimab.

9. The method according to any one of the preceding claims, wherein the metastatic breast cancer is metastatic triple negative metastatic breast cancer.

10. The method according to any one of claims 1-8, wherein the cancer is metastatic HER2-positive breast cancer.

11. The method according to any one of the preceding claims, wherein preventing the cancer comprises slowing the growth of the cancer.

12. The method according to any one of the preceding claims, wherein preventing the cancer comprises preventing the formation of a tumor.

13. The method according to any one of the preceding claims, wherein preventing the cancer comprises preventing the formation of tumor metastases.

14. The method according to any one of the preceding claims, wherein preventing the cancer comprises limiting or reducing the size of a tumor.

15. The method according to claim 14, wherein preventing the cancer comprises limiting or reducing the size of a metastatic tumor.

16. The method according to claim 15, wherein limiting or reducing the size of a metastatic tumor comprises at least a 50% reduction in tumor volume.
17. The method according to any one of the preceding claims, wherein preventing the cancer comprises reducing the number of circulating tumor cells in the subject.
18. The method according to any one of the preceding claims, wherein preventing the cancer comprises reducing the number of epithelial mesenchymal transition cells in the subject.
19. The method according to any one of the preceding claims, wherein preventing the cancer comprises reducing the number of cancer associated macrophage-like cells in the subject.
20. The method according to any one of the preceding claims, wherein treating comprises causing the cancer progression to become stable.
21. The method according to any one of the preceding claims, further comprising administering to the subject a cellular therapy, a chemotherapeutic agent, a small molecule, or an inhibitor of CCR5/CCL5 signaling.
22. The method according to claim 21, wherein the chemotherapeutic agent comprises carboplatin.
23. The method according to claim 21, wherein the chemotherapeutic agent comprises one or more of taxotere, herceptin, and pertuzumab.

24. The method according to claim 21, wherein the inhibitor of CCR5/CCL5 signaling comprises maraviroc, vicriviroc, aplaviroc, SCH-C, TAK-779, PA14 antibody, 2D7 antibody, RoAb13 antibody, RoAb14 antibody, or 45523 antibody.

25. A method for reducing tumor burden in a subject having a CCR5+ cancer, comprising:

selecting a cancer patient suitable for treatment with a CCR5 binding agent comprising establishing that the patient has a cancer type typically known to be characterized by an elevated CCR5+ expression level or measuring a tumor biopsy from said patient for CCR5+ expression; and

administering the monoclonal antibody PA14, leronlimab, or CCR5mAb004, or a binding fragment thereof.

26. The method of claim 25, wherein the monoclonal antibody PA14, leronlimab, or CCR5mAb004, or a binding fragment thereof, is administered in weekly injections of 700mg.

27. The method of claim 25 or claim 26, further comprising eliminating detectable brain metastasis.

28. The method of any of claims 25-27, further comprising reducing a number of brain lesions detectable by MRI.

29. The method of any of claims 25-28, further comprising reducing the tumor volume of at least one brain tumor by greater than 50%.

30. The method of any of claims 25-29, further comprising, reducing the subjects CTC or EMT counts to zero.

31. A composition for treating CCR5+ cancer comprising the monoclonal antibody PA14, leronlimab, or CCR5mAb004, or a binding fragment thereof.