e) Ab–GGLLQGA (SEQ ID NO: 92)- (AcLys-VC-PABC)-0101; and

f) Ab–GGLLQGA (SEQ ID NO: 92)-(AcLys-VC-PABC)-MMAD.

38. The antibody-drug conjugate of claim 37, wherein Ab is an antibody or antigen-binding fragment thereof comprising a VH region comprising CDRs of SEQ ID NOs: 107, 162 and 112 and a VL region comprising CDRs of SEQ ID NOs: 144, 145 and 139.

39. A pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen binding fragment thereof of any one of claims 1-24 or the conjugate of any one of claims 25-38 and a pharmaceutically acceptable carrier.

40. An isolated polynucleotide comprising a nucleotide sequence encoding the antibody or antigen binding fragment thereof of any one of claims 1-24.

41. A vector comprising the polynucleotide of claim 40.

42. An isolated host cell that recombinantly produces the antibody or antigen binding fragment thereof of any one of claims 1-24.

43. A method of producing an antibody or antigen binding fragment thereof, comprising culturing the host cell of claim 42 under conditions that result in production of the antibody or antigen binding fragment thereof, and isolating the antibody or antigen binding fragment thereof from the host cell or culture medium.

44. A method of treating a disorder associated with CXCR4 function or expression in a subject comprising administering to a subject in need thereof an effective amount of the pharmaceutical composition of claim 39.

45. The method of claim 44, wherein the disorder is a cancer.

46. The method of claim 45, wherein the cancer is a hematological cancer.

47. The method of claim 45, wherein the cancer is a B cell or a T cell maligancy.

48. The method of claim 44, wherein the cancer is selected from the group consisting of acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), small lymphocytic lymphoma (SLL), multiple myeloma

(MM), non-Hodgkin's lymphoma (NHL), Hodgkin's lymphoma, mantle cell lymphoma (MCL), follicular lymphoma, Waldenstrom's macroglobulinemia (WM), B-cell lymphoma and diffuse large B-cell lymphoma (DLBCL).

49. The method of claim 45, wherein the cancer is selected from the group consisting of bladder, breast, cervical, choriocarcinoma, colon, esophageal, gastric, glioblastoma, head and neck, kidney, lung, oral, ovarian, pancreatic, prostate, and skin cancer.

50. A method of decreasing tumor growth or progression in a subject who has a CXCR4 expressing tumor, comprising administering to the subject in need thereof an effective amount of the pharmaceutical composition of claim 39. .

51. A method of decreasing metastasis of CXCR4 expressing cancer cells in a subject, comprising administering to the subject in need thereof an effective amount of the pharmaceutical composition of claim 39.

52. A method of inducing tumor regression in a subject who has a CXCR4 expressing tumor, comprising administering to the subject in need thereof an effective amount of the pharmaceutical composition of claim 39.

53. An isolated antibody or antigen binding fragment thereof of any one of claims 1-24 or the antibody-drug conjugate of any one of claims 25-38 for use in detecting, diagnosing and/or treating a disorder associated with expression of CXCR4.

54. Use of an isolated antibody of any one of claims 1-24 or the antibody-drug conjugate of any one of claims 25-38 in the manufacture of a medicament for treating a disorder associated with expression of CXCR4.

e) Ab–GGLLQGA (SEQ ID NO: 92)- (AcLys-VC-PABC)-0101; and

f) Ab–GGLLQGA (SEQ ID NO: 92)-(AcLys-VC-PABC)-MMAD.

38. The antibody-drug conjugate of claim 37, wherein Ab is an antibody or antigen-binding fragment thereof comprising a VH region comprising CDRs of SEQ ID NOs: 107, 162 and 112 and a VL region comprising CDRs of SEQ ID NOs: 144, 145 and 139.

39. A pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen binding fragment thereof of any one of claims 1-24 or the conjugate of any one of claims 25-38 and a pharmaceutically acceptable carrier.

40. An isolated polynucleotide comprising a nucleotide sequence encoding the antibody or antigen binding fragment thereof of any one of claims 1-24.

41. A vector comprising the polynucleotide of claim 40.

42. An isolated host cell that recombinantly produces the antibody or antigen binding fragment thereof of any one of claims 1-24.

43. A method of producing an antibody or antigen binding fragment thereof, comprising culturing the host cell of claim 42 under conditions that result in production of the antibody or antigen binding fragment thereof, and isolating the antibody or antigen binding fragment thereof from the host cell or culture medium.

44. An effective amount of the pharmaceutical composition of claim 39 for use in the treatment of a disorder associated with CXCR4 function or expression.

45. The composition of claim 44, wherein the disorder is a cancer.

46. The composition of claim 45, wherein the cancer is a hematological cancer.

47. The composition of claim 45, wherein the cancer is a B cell or a T cell maligancy.

48. The composition of claim 44, wherein the cancer is selected from the group consisting of acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), small lymphocytic lymphoma (SLL), multiple myeloma (MM), non-Hodgkin's lymphoma (NHL), Hodgkin's lymphoma, mantle cell lymphoma (MCL), follicular lymphoma, Waldenstrom's macroglobulinemia (WM), B-cell lymphoma and diffuse large B-cell lymphoma (DLBCL).

49. The composition of claim 45, wherein the cancer is selected from the group consisting of bladder, breast, cervical, choriocarcinoma, colon, esophageal, gastric, glioblastoma, head and neck, kidney, lung, oral, ovarian, pancreatic, prostate, and skin cancer.

50. An effective amount of the pharmaceutical composition of claim 39 for use in decreasing tumor growth or progression in a subject who has a CXCR4 expressing tumor.

51. An effective amount of the pharmaceutical composition of claim 39 for use in decreasing metastasis of CXCR4 expressing cancer cells in a subject.

52. An effective amount of the pharmaceutical composition of claim 39 for use in inducing tumor regression in a subject who has a CXCR4 expressing tumor.

53. Use of an effective amount of the pharmaceutical composition of claim 39 in the manufacture of a medicament for the treatment of a disorder associated with CXCR4 function or expression.

54. The use of claim 53, wherein the disorder is a cancer.

55. The use of claim 54, wherein the cancer is a hematological cancer.

56. The use of claim 54, wherein the cancer is a B cell or a T cell maligancy.

57. The use of claim 53, wherein the cancer is selected from the group consisting of acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), small lymphocytic lymphoma (SLL), multiple

myeloma (MM), non-Hodgkin's lymphoma (NHL), Hodgkin's lymphoma, mantle cell lymphoma (MCL), follicular lymphoma, Waldenstrom's macroglobulinemia (WM), B-cell lymphoma and diffuse large B-cell lymphoma (DLBCL).

58. The use of claim 54, wherein the cancer is selected from the group consisting of bladder, breast, cervical, choriocarcinoma, colon, esophageal, gastric, glioblastoma, head and neck, kidney, lung, oral, ovarian, pancreatic, prostate, and skin cancer.

59. Use of an effective amount of the pharmaceutical composition of claim 39 in the manufacture of a medicament for decreasing tumor growth or progression in a subject who has a CXCR4 expressing tumor.

60. Use of an effective amount of the pharmaceutical composition of claim 39 in the manufacture of a medicament for decreasing metastasis of CXCR4 expressing cancer cells in a subject.

61. Use of an effective amount of the pharmaceutical composition of claim 39 in the manufacture of a medicament for inducing tumor regression in a subject who has a CXCR4 expressing tumor.

62. An isolated antibody or antigen binding fragment thereof of any one of claims 1-24 or the antibody-drug conjugate of any one of claims 25-38 for use in detecting, diagnosing and/or treating a disorder associated with expression of CXCR4.

63. Use of an isolated antibody of any one of claims 1-24 or the antibody-drug conjugate of any one of claims 25-38 in the manufacture of a medicament for treating a disorder associated with expression of CXCR4.