CLAIMS

What is claimed is:

1. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, and SEQ ID NO: 4; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 6, SEQ ID NO: 7, and SEQ ID NO: 8.

2. The antigen binding protein of Claim 1 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

3. The antigen binding protein of Claim 2 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 2, the CDR amino acid sequence shown in SEQ ID NO: 3, and the CDR amino acid sequence shown in SEQ ID NO: 4; and a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 6, the CDR amino acid sequence shown in SEQ ID NO: 7, and the CDR amino acid sequence shown in SEQ ID NO: 8.

4. The antigen binding protein of Claim 3 which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

5. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 27, SEQ ID NO: 28, and SEQ ID NO: 29.

6. The antigen binding protein of Claim 5 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

7. The antigen binding protein of Claim 6 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 23, the CDR amino acid sequence shown in SEQ ID NO: 24, and the CDR amino acid sequence shown in SEQ ID NO: 25; and/or a

light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 27, the CDR amino acid sequence shown in SEQ ID NO: 28, and the CDR amino acid sequence shown in SEQ ID NO: 29.

8. The antigen binding protein of Claim 7 which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

9. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 45, SEQ ID NO: 46, and SEQ ID NO: 47; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 49, SEQ ID NO: 50, and SEQ ID NO: 51.

10. The antigen binding protein of Claim 9 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

11. The antigen binding protein of Claim 10 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 45, the CDR amino acid sequence shown in SEQ ID NO: 46, and the CDR amino acid sequence shown in SEQ ID NO: 47; and/or a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 49, the CDR amino acid sequence shown in SEQ ID NO: 50, and the CDR amino acid sequence shown in SEQ ID NO: 51.

12. The antigen binding protein of Claim 11 which specifically binds to a peptide chain domain comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

13. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 31, SEQ ID NO: 32, and SEQ ID NO: 33; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 35, SEQ ID NO: 36, and SEQ ID NO: 37.

14. The antigen binding protein of Claim 13 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

15. The antigen binding protein of Claim 14 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 31, the CDR amino acid sequence shown in SEQ ID NO: 32, and the CDR amino acid sequence shown in SEQ ID NO: 33; and a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 35, the CDR amino acid sequence shown in SEQ ID NO: 36, and the CDR amino acid sequence shown in SEQ ID NO: 37.

16. The antigen binding protein of Claim 15 which specifically binds to a peptide chain domain comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

17. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 10, SEQ ID NO: 11, and SEQ ID NO: 12; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 12, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20.

18. The antigen binding protein of Claim 17 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

19. The antigen binding protein of Claim 18 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 10, the CDR amino acid sequence shown in SEQ ID NO: 11, and the CDR amino acid sequence shown in SEQ ID NO: 12; and either a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 12, the CDR amino acid sequence shown in SEQ ID NO: 7, and the CDR amino acid sequence shown in SEQ ID NO: 8 or a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 18, the CDR amino acid sequence shown in SEQ ID NO: 19, and the CDR amino acid sequence shown in SEQ ID NO: 20.

20. The antigen binding protein of Claim 19 which inhibits formation of a dimer comprising the amino acid sequence shown in SEQ ID NO: 21.

21. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 1 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 5.

22. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 22 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 26.

23. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 44 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 48.

24. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 30 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 34.

25. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 9 and a light chain variable region sequence selected from the group consisting of the amino acid sequence shown in SEQ ID NO: 13 and the amino acid sequence shown in SEQ ID NO: 17.

26. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 30 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 57.

27. An isolated nucleic acid encoding the antigen binding protein of Claim 1.

28. The isolated nucleic acid of Claim 27 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 38 and the nucleic acid sequence shown in SEQ ID NO: 39.

29. The isolated nucleic acid of Claim 27 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 59 and the nucleic acid sequence shown in SEQ ID NO: 60.

30. An isolated nucleic acid encoding the antigen binding protein of Claim 5.

31. The isolated nucleic acid of Claim 30 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 41.

32. An isolated nucleic acid encoding the antigen binding protein of Claim 9.

33. The isolated nucleic acid of Claim 32 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 52 and the nucleic acid sequence shown in SEQ ID NO: 53.

34. The isolated nucleic acid of Claim 32 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 61 and the nucleic acid sequence shown in SEQ ID NO: 62.

35. An isolated nucleic acid encoding the antigen binding protein of Claim 13.

36. The isolated nucleic acid of Claim 35 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 42 and the nucleic acid sequence shown in SEQ ID NO: 43.

37. An isolated nucleic acid encoding the antigen binding protein of Claim 26.

38. The isolated nucleic acid of Claim 37 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 42 and the nucleic acid sequence shown in SEQ ID NO: 58.

39. An isolated nucleic acid encoding the antigen binding protein of Claim 17.

40. The isolated nucleic acid of Claim 39 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 54, the nucleic acid sequence shown in SEQ ID NO: 55 and the nucleic acid sequence shown in SEQ ID NO: 56.

41. The isolated nucleic acid of Claim 39 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 63, the nucleic acid sequence shown in SEQ ID NO: 64 and the nucleic acid sequence shown in SEQ ID NO: 65.

42. An expression vector comprising the isolated nucleic acid as in any one of Claims 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41.

43. A recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41.

44. A method for the production of an antigen binding protein comprising the step of culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41; and recovering the antigen binding protein.

45. A pharmaceutical composition comprising the antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26; and a pharmaceutically acceptable carrier.

46. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 for use in treating cancer in a subject.

47. The antigen binding protein of Claim 22 for use in treating cancer in a subject, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

48. The antigen binding protein of Claim 47, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

49. The antigen binding protein of Claim 48 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

50. The antigen binding protein of Claim 24 for use in treating cancer in a subject, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

51. The antigen binding protein of Claim 50, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

52. The antigen binding protein of Claim 51 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

53. Use of the antigen binding protein as in any one of claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 in the manufacture of a medicament for the treatment of condition selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

54. Use of the antigen binding protein of Claim 22 in the manufacture of a medicament for treating cancer, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma and wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

55. The use of Claim 54, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

56. Use of the antigen binding protein of Claim 24 in the manufacture of a medicament for treating cancer, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma and wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

57. The use of Claim 56, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

58. An antigen binding protein which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

59. The antigen binding protein of Claim 58 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

60. An antigen binding protein which specifically binds to a peptide chain domain comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

61. The antigen binding protein of Claim 60 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

62. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims 29, 35 and 38, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and

b) recovering the antigen binding protein;

whereby the antigen binding protein is produced.

63. The method of Claim 62 wherein the recombinant host cell is a CHOK1SV cell.

64. An antigen binding protein produced by the method of Claim 62.

65. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims 29, 35 and 38 wherein the expression vector comprises a Fc nucleic acid sequence encoding a chimeric Fc domain having both IgG1 and IgG3 Fc domain amino acid residues; and

b) recovering the antigen binding protein;
whereby the antigen binding protein is produced.

66. The method of Claim 65 wherein the Fc nucleic acid sequence is fused in frame to a nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 42.

67. An antigen binding protein produced by the method of Claim 66.

68. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell containing an expression vector containing an isolated nucleic acid as in any one of Claims 29, 35 and 38, said expression vector further comprising a Fc nucleic acid sequence encoding a chimeric Fc domain having both IgG1 and IgG3 Fc domain amino acid residues, and wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and

b) recovering the antigen binding protein;
whereby the antigen binding protein is produced.

69. The method of Claim 68 wherein the Fc nucleic acid sequence is fused in frame to a nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 42.

70. The method of Claim 69, wherein the recombinant host cell is a CHOK1SV cell.

71. An antigen binding protein produced by the method of Claim 68.

72. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 for use in treating a pre-cancerous condition in a subject.

73. The antigen binding protein of Claim 22 for use in treating a pre-cancerous condition in a subject, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

74. The antigen binding protein of Claim 73 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

75. The antigen binding protein of Claim 24 for use in treating a pre-cancerous condition in a subject, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

76. The antigen binding protein of Claim 75 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

77. Use of the antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 in the manufacture of a medicament for treating a pre-cancerous condition in a subject.

78. The use of Claim 77, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

79. The use of Claim 78, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

80. Use of the antigen binding protein of Claim 24 in the manufacture of a medicament for treating a pre-cancerous condition in a subject, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

81. The use of Claim 80 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

82. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH3 having the amino acid sequence shown in SEQ ID NO: 2.

83. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 2, CDRH2 having the amino acid sequence shown in SEQ ID NO: 3, CDRH3 having the amino acid sequence shown in SEQ ID NO: 4, CDRL1 having the amino acid sequence shown in SEQ ID NO: 6, CDRL2

having the amino acid sequence shown in SEQ ID NO: 7, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 8.

84. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 23, CDRH2 having the amino acid sequence shown in SEQ ID NO: 24, CDRH3 having the amino acid sequence shown in SEQ ID NO: 25, CDRL1 having the amino acid sequence shown in SEQ ID NO: 27, CDRL2 having the amino acid sequence shown in SEQ ID NO: 28, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 29.

85. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 31, CDRH2 having the amino acid sequence shown in SEQ ID NO: 32, CDRH3 having the amino acid sequence shown in SEQ ID NO: 33, CDRL1 having the amino acid sequence shown in SEQ ID NO: 35, CDRL2 having the amino acid sequence shown in SEQ ID NO: 36, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 37.

86. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 45, CDRH2 having the amino acid sequence shown in SEQ ID NO: 46, CDRH3 having the amino acid sequence shown in SEQ ID NO: 47, CDRL1 having the amino acid sequence shown in SEQ ID NO: 49, CDRL2 having the amino acid sequence shown in SEQ ID NO: 50, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 51.

87. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 10, CDRH2 having the amino acid sequence shown in SEQ ID NO: 11, CDRH3 having the amino acid sequence shown in SEQ ID NO: 12, CDRL1 having the amino acid sequence shown in SEQ ID NO: 14, CDRL2 having the amino acid sequence shown in SEQ ID NO: 15, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 16.

88. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 10, CDRH2 having the amino acid sequence shown in SEQ ID NO: 11, CDRH3 having the amino acid sequence

shown in SEQ ID NO: 12, CDRL1 having the amino acid sequence shown in SEQ ID NO: 18, CDRL2 having the amino acid sequence shown in SEQ ID NO: 19, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 20.

89. The pharmaceutical composition according to claim 45 for use in medicine.

90. The pharmaceutical composition according to claim 45 for use in the treatment of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

91. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 for use in treating cancer in a mammal.

92. The antigen binding protein of Claim 91 wherein the mammal is a human.

93. The antigen binding protein of either Claim 91 or Claim 92 wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

94. Use of the antigen binding protein as in any one of Claims 1, 5, 9, 13, 17, 21, 22, 23, 24, 25 and 26 in the manufacture of a medicament for treating cancer in a mammal.

95. The use of Claim 94, wherein the mammal is a human.

96. The use of either Claim 91 or Claim 92, wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

97. An antigen binding protein comprising a heavy chain sequence having amino acid residues 20 to 466 of the amino acid sequence shown in SEQ ID NO: 100 and a light chain sequence having amino acid residues 20 to 238 of the amino acid sequence shown in SEQ ID NO: 104.

98. The antigen binding protein of Claim 97 comprising fucosylated glycans.

99. The antigen binding protein of Claim 98 wherein the fucosylated glycans are selected from the group consisting of G0, G2, G0F, G2F, G1, Man5, G1F and G1F'.

100. The antigen binding protein of Claim 97 comprising non-fucosylated glycans.

101. The antigen binding protein of Claim 100 wherein the non-fucosylated glycans are selected from the group consisting of G0, G2, G1 and Man5.

102. An antigen binding protein comprising a heavy chain sequence having amino acid residues 20 to 466 of the amino acid sequence shown in SEQ ID NO: 102 and a light chain sequence having amino acid residues 20 to 238 of the amino acid sequence shown in SEQ ID NO: 104.

103. The antigen binding protein of Claim 102 comprising fucosylated glycans.

104. The antigen binding protein of Claim 103 wherein the fucosylated glycans are selected from the group consisting of G0, G2, G0F, G2F, G1, Man5, G1F and G1F'.

105. The antigen binding protein of Claim 102 comprising non-fucosylated glycans.

106. The antigen binding protein of Claim 105 wherein the non-fucosylated glycans are selected from the group consisting of G0, G2, G1 and Man5.

107. An isolated nucleic acid encoding amino acid residues 20 to 466 of the amino acid sequence shown in SEQ ID NO: 100.

108. The isolated nucleic acid of Claim 107 comprising the nucleic acid sequence shown in SEQ ID NO: 101.

109. An isolated nucleic acid encoding amino acid residues 20 to 238 of the amino acid sequence shown in SEQ ID NO: 104.

110. The isolated nucleic acid of Claim 109 comprising the nucleic acid sequence shown in SEQ ID NO: 105.

111. An isolated nucleic acid encoding amino acid residues 20 to 466 of the amino acid sequence shown in SEQ ID NO: 102.

112. The isolated nucleic acid of Claim 111 comprising the nucleic acid sequence shown in SEQ ID NO: 103.

113. An expression vector comprising the isolated nucleic acid as in any one of Claims 97, 98, 99, 100, 101 and 102.

114. A recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims 107, 108, 109, 110, 111 and 112.

115. The recombinant host cell of Claim 114 wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase is present.

116. The recombinant host cell of Claim 115 that is a CHOK1 cell.

117. The recombinant host cell of Claim 114 wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated.

118. The recombinant host cell of Claim 117 that is a CHOK1SV cell.

119. A pharmaceutical compositing comprising the antigen binding protein as in any one of Claims97, 98, 99, 100, 101, 102, 103, 104, 105 and 106; and a pharmaceutically acceptable carrier.

120. The antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 for use in treating cancer in a subject.

121. The antigen binding protein of claim 120, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer,

pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

122. The antigen binding protein of Claim 121, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

123. The antigen binding protein of Claim 122 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

124. Use of the antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 in the manufacture of a medicament for the treatment of condition selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

125. Use of the antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 in the manufacture of a medicament for treating cancer in a subject.

126. The use of claim 125, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

127. The use of Claim 126, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

128. The antigen binding protein of Claim 127, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

129. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising an isolated nucleic acid as in Claim 97 or Claim 98 and comprising an isolated nucleic acid as in Claim 97 or Claim 100, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase is active in the recombinant host cell; and

b) recovering the antigen binding protein;
whereby the antigen binding protein is produced.

130. The method of Claim 129 wherein the recombinant host cell is a CHOK1 cell.

131. An antigen binding protein produced by the method of Claim 129.

132. A method for the production of an antigen binding protein comprising the steps of:
a) culturing a recombinant host cell comprising an expression vector comprising an isolated nucleic acid as in Claim 97 or Claim 98 and comprising an isolated nucleic acid as in Claim 97 or Claim 100, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and
b) recovering the antigen binding protein;
whereby the antigen binding protein is produced.

133. The method of Claim 132 wherein the recombinant host cell is a CHOK1SV cell.

134. An antigen binding protein produced by the method of Claim 132.

135. A method for the production of an antigen binding protein comprising the steps of:
a) culturing a recombinant host cell comprising an expression vector comprising an isolated nucleic acid as in Claim 99 or Claim 100 and comprising an isolated nucleic acid as in Claim 101 and Claim 102, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase is active in the recombinant host cell; and
b) recovering the antigen binding protein;
whereby the antigen binding protein is produced.

136. The method of Claim 135 wherein the recombinant host cell is a CHOK1 cell.

137. An antigen binding protein produced by the method of Claim 135.

138. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising an isolated nucleic acid as in Claim 99 or Claim 100 and comprising an isolated nucleic acid as in Claim 101 and Claim 102, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and

b) recovering the antigen binding protein;

whereby the antigen binding protein is produced.

139. The method of Claim 138 wherein the recombinant host cell is a CHOK1SV cell.

140. An antigen binding protein produced by the method of Claim 138.

141. The antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 for use in treating a pre-cancerous condition in a subject.

142. The antigen binding protein of Claim 141 further comprising a fluid.

142. The antigen binding protein of Claim 142, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

143. The antigen binding protein of Claim 142 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

144. Use of the antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 in the manufacture of a medicament for treating a pre-cancerous condition in a subject.

145. The use of Claim 144, wherein the antigen binding protein further comprising a fluid.

146. The use of Claim 145, wherein the cancer expresses a protein comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

147. The use of Claim 146, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

148. The pharmaceutical composition according to claim 119 for use in medicine.

149. The pharmaceutical composition according to claim 119 for use in the treatment of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

150. The antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 for use in treating cancer in a mammal.

151. The antigen binding protein of Claim 150 wherein the mammal is a human.

152. The antigen binding protein of either Claim 150 or Claim 151 wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

153. Use of the antigen binding protein as in any one of Claims 97, 98, 99, 100, 101, 102, 103, 104, 105 and 106 in the manufacture of a medicament in treating cancer in a mammal.

154. The use of Claim 153, wherein the mammal is a human.

155. The use of either Claim 153 or Claim 154, wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

156. The antigen binding protein according to any preceding claim for use in treatment of a condition selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

CLAIMS

What is claimed is:

1. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, and SEQ ID NO: 4; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 6, SEQ ID NO: 7, and SEQ ID NO: 8.

2. The antigen binding protein of Claim 1 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

3. The antigen binding protein of Claim 2 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 2, the CDR amino acid sequence shown in SEQ ID NO: 3, and the CDR amino acid sequence shown in SEQ ID NO: 4; and a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 6, the CDR amino acid sequence shown in SEQ ID NO: 7, and the CDR amino acid sequence shown in SEQ ID NO: 8.

4. The antigen binding protein of Claim 3 which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

5. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 23, SEQ ID NO: 24, and SEQ ID NO: 25; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 27, SEQ ID NO: 28, and SEQ ID NO: 29.

6. The antigen binding protein of Claim 5 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

7. The antigen binding protein of Claim 6 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 23, the CDR amino acid sequence shown in SEQ ID NO: 24, and the CDR amino acid sequence shown in SEQ ID NO: 25; and/or a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 27, the

CDR amino acid sequence shown in SEQ ID NO: 28, and the CDR amino acid sequence shown in SEQ ID NO: 29.

8. The antigen binding protein of Claim 7 which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

9. An antigen binding protein comprising a heavy chain variable region having at least one CDR with greater than 75% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 10, SEQ ID NO: 11, and SEQ ID NO: 12; and/or a light chain variable region having at least one CDR with 75% or greater sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO: 12, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 18, SEQ ID NO: 19, and SEQ ID NO: 20.

10. The antigen binding protein of Claim 9 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

11. The antigen binding protein of Claim 10 comprising a heavy chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 10, the CDR amino acid sequence shown in SEQ ID NO: 11, and the CDR amino acid sequence shown in SEQ ID NO: 12; and either a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 12, the CDR amino acid sequence shown in SEQ ID NO: 7, and the CDR amino acid sequence shown in SEQ ID NO: 8 or a light chain variable region having the CDR amino acid sequence shown in SEQ ID NO: 18, the CDR amino acid sequence shown in SEQ ID NO: 19, and the CDR amino acid sequence shown in SEQ ID NO: 20.

12. The antigen binding protein of Claim 11 which inhibits formation of a dimer comprising the amino acid sequence shown in SEQ ID NO: 21.

13. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 1 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 5.

14. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 22 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 26.

15. An antigen binding protein comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 9 and a light chain variable region sequence selected from the group consisting of the amino acid sequence shown in SEQ ID NO: 13 and the amino acid sequence shown in SEQ ID NO: 17.

16. An isolated nucleic acid encoding the antigen binding protein of Claim 1.

17. The isolated nucleic acid of Claim 16 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 38 and the nucleic acid sequence shown in SEQ ID NO: 39.

18. The isolated nucleic acid of Claim 16 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 59 and the nucleic acid sequence shown in SEQ ID NO: 60.

19. An isolated nucleic acid encoding the antigen binding protein of Claim 5.

20. The isolated nucleic acid of Claim 19 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 41.

21. An isolated nucleic acid encoding the antigen binding protein of Claim 9.

22. The isolated nucleic acid of Claim 21 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 54, the nucleic acid sequence shown in SEQ ID NO: 55 and the nucleic acid sequence shown in SEQ ID NO: 56.

23. The isolated nucleic acid of Claim 21 comprising at least one nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 63, the nucleic acid sequence shown in SEQ ID NO: 64 and the nucleic acid sequence shown in SEQ ID NO: 65.

24. An expression vector comprising the isolated nucleic acid as in any one of Claims 16, 17, 18, 19, 20, 21, 22 and 23.

25. A recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims16, 17, 18, 19, 20, 21, 22 and 23.

26. A method for the production of an antigen binding protein comprising the step of culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in any one of Claims16, 17, 18, 19, 20, 21, 22 and 23; and recovering the antigen binding protein.

27. A pharmaceutical composition comprising the antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15; and a pharmaceutically acceptable carrier.

28. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15 for use in treating cancer in a subject.

29. The antigen binding protein of Claim 14 for use in treating cancer in a subject, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

30. The antigen binding protein of Claim 29, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

31. The antigen binding protein of Claim 30 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

32. Use of the antigen binding protein as in any one of claims 1, 5, 9, 13, 14 and 15 in the manufacture of a medicament for the treatment of condition selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

33. Use of the antigen binding protein of Claim 14 in the manufacture of a medicament for treating cancer, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma and wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

34. The use of Claim 33, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

35. An antigen binding protein which specifically binds to a peptide chain domain comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

36. The antigen binding protein of Claim 35 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

37. An antigen binding protein which specifically binds to a peptide chain domain comprising amino acid residues 330 to 495 of SEQ ID NO: 21.

38. The antigen binding protein of Claim 37 wherein the antigen binding protein is selected from the group consisting of a chimeric antibody and a humanized antibody.

39. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in Claim 18, wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and

b) recovering the antigen binding protein;

whereby the antigen binding protein is produced.

40. The method of Claim 39 wherein the recombinant host cell is a CHOK1SV cell.

41. An antigen binding protein produced by the method of Claim 39.

42. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell comprising an expression vector comprising the isolated nucleic acid as in Claim 18, wherein the expression vector comprises a Fc nucleic acid sequence encoding a chimeric Fc domain having both IgG1 and IgG3 Fc domain amino acid residues; and

b) recovering the antigen binding protein;

whereby the antigen binding protein is produced.

43. The method of Claim 42 wherein the Fc nucleic acid sequence is fused in frame to a nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 42.

44. An antigen binding protein produced by the method of Claim 43.

45. A method for the production of an antigen binding protein comprising the steps of:

a) culturing a recombinant host cell containing an expression vector containing an isolated nucleic acid as in Claim 18, said expression vector further comprising a Fc nucleic acid sequence encoding a chimeric Fc domain having both IgG1 and IgG3 Fc domain amino acid residues, and wherein the FUT8 gene encoding alpha-1,6-fucosyltransferase has been inactivated in the recombinant host cell; and

b) recovering the antigen binding protein;

whereby the antigen binding protein is produced.

46. The method of Claim 45 wherein the Fc nucleic acid sequence is fused in frame to a nucleic acid selected from the group consisting of the nucleic acid sequence shown in SEQ ID NO: 40 and the nucleic acid sequence shown in SEQ ID NO: 42.

47. The method of Claim 46, wherein the recombinant host cell is a CHOK1SV cell.

48. An antigen binding protein produced by the method of Claim 45.

49. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15 for use in treating a pre-cancerous condition in a subject.

50. The antigen binding protein of Claim 14 for use in treating a pre-cancerous condition in a subject, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

51. The antigen binding protein of Claim 50 wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

52. Use of the antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15 in the manufacture of a medicament for treating a pre-cancerous condition in a subject.

53. The use of Claim 52, wherein the cancer expresses a protein comprising amino acid residues 184 to 329 of SEQ ID NO: 21.

54. The use of Claim 53, wherein the protein expressed by the cancer comprises the amino acid sequence shown in SEQ ID NO: 21.

55. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH3 having the amino acid sequence shown in SEQ ID NO: 2.

56. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 2, CDRH2 having the amino acid sequence shown in SEQ ID NO: 3, CDRH3 having the amino acid sequence shown in SEQ ID NO: 4, CDRL1 having the amino acid sequence shown in SEQ ID NO: 6, CDRL2 having the amino acid sequence shown in SEQ ID NO: 7, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 8.

57. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 23, CDRH2 having the amino acid sequence shown in SEQ ID NO: 24, CDRH3 having the amino acid sequence shown in SEQ ID NO: 25, CDRL1 having the amino acid sequence shown in SEQ ID NO: 27, CDRL2 having the amino acid sequence shown in SEQ ID NO: 28, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 29.

58. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 10, CDRH2 having the amino acid sequence shown in SEQ ID NO: 11, CDRH3 having the amino acid sequence shown in SEQ ID NO: 12, CDRL1 having the amino acid sequence shown in SEQ ID NO: 14, CDRL2 having the amino acid sequence shown in SEQ ID NO: 15, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 16.

59. An antigen binding protein which specifically binds a HER3 receptor and comprises CDRH1 having the amino acid sequence shown in SEQ ID NO: 10, CDRH2 having the amino acid sequence shown in SEQ ID NO: 11, CDRH3 having the amino acid sequence shown in

SEQ ID NO: 12, CDRL1 having the amino acid sequence shown in SEQ ID NO: 18, CDRL2 having the amino acid sequence shown in SEQ ID NO: 19, and CDRL3 having the amino acid sequence shown in SEQ ID NO: 20.

60. The pharmaceutical composition according to claim 27 for use in medicine.

61. The pharmaceutical composition according to claim 27 for use in the treatment of breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

62. The antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15 for use in treating cancer in a mammal.

63. The antigen binding protein of Claim 62 wherein the mammal is a human.

64. The antigen binding protein of either Claim 62 or Claim 63 wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.

65. Use of the antigen binding protein as in any one of Claims 1, 5, 9, 13, 14 and 15 in the manufacture of a medicament for treating cancer in a mammal.

66. The use of Claim 65, wherein the mammal is a human.

67. The use of either Claim 62 or Claim 63, wherein the cancer is selected from breast cancer, lung cancer, ovarian cancer, prostate cancer, bladder cancer, pancreatic cancer, skin cancer, gastric cancer, colon cancer, head and neck cancer, hepatocellular cancer and melanoma.