SEQ ID NO:7<S239C heavy chain CH1 - CH3;PRT/1;homo sapiens>
ASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVH
TFPAVLQSSGLYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKS
CDKTHTCPPCPAPELLGGPCVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKC
KVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVF
SCSVMHEALHNHYTQKSLSLSPGK

SEQ ID NO:8<S239C heavy chain CH1 - CH3 (no c-term K);PRT/1;homo sapiens>
ASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVH
TFPAVLQSSGLYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKS
CDKTHTCPPCPAPELLGGPCVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKC
KVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVF
SCSVMHEALHNHYTQKSLSLSPG

SEQ ID NO:9<hLIV-1 mAb HA;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTFTDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYAPTFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYCARHDAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:10<hLIV-1 mAb HB;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTIEDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYAPTFQGRVTMTRDTSINTAYMELSRLRSDDTAVYYCARHDAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:11<hLIV-1 mAb HC;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTFTDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYAPTFQGKATMTADTSISTAYMELSRLRSDDTAVYYCARHDAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:12<hLIV-1 mAb HD;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGFTFTDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYAPTFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYC~~AR~~NVHD
AHYGTWFAYWGQGTLVTVSS

CDKTHTCPPCPAPELLGGPCVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKC
KVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVF
SCSVMHEALHNHYTQKSLSLSPG

SEQ ID NO:47<hLiv1 mAb2 HA;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTFTDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYGPKFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYCARHNAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:48<hLiv1 mAb2 HB;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTIEDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYGPKFQGRVTMTRDTSINTAYMELSRLRSDDTAVYYCARHNAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:49<hLiv1 mAb2 HC;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGYTFTDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYGPKFQGKATMTADTSISTAYMELSRLRSDDTAVYYCARHNAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:50<hLiv1 mAb2 HD;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGFLTFTDYYMHWVRQAPGQGLEWMGW
IDPENGDTEYGPKFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYCTVHNA
HYGTWFAYWGQGTLVTVSS

SEQ ID NO:51<hLiv1 mAb2 HE;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGFTLNIEDYYMHWVRQAPGQGLEWIG
WIDPENGDTEYGPKFQGKATMTADTSINTAYMELSRLRSDDTAVYYCTVHN
AHYGTWFAYWGQGTLVTVSS

SEQ ID NO:52<hLiv1 mAb2 HF;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGLTIEDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYGPKFQGRVTMTRDTSISTAYMELSRLRSDDTAVYYCAVHNAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:53<hLiv1 mAb2 HG;PRT/1;artificial>
QVQLVQSGAEVKKPGASVKVSCKASGLTIEDYYMHWVRQAPGQGLEWMGWI
DPENGDTEYGPKFQGRVTMTRDTSINTAYMELSRLRSDDTAVYYCAVHNAH
YGTWFAYWGQGTLVTVSS

SEQ ID NO:54<hLiv1 mAb2 LA;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWFQQRPGQSPRR
LIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYT
FGGGTKVEIKR

SEQ ID NO:55<hLiv1 mAb2 LB;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWYQQRPGQSPRR
LIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYT
FGGGTKVEIKR

SEQ ID NO:56<hLiv1 mAb2 LC;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWFLQRPGQSPRR
LIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYT
FGGGTKVEIKR

SEQ ID NO:57<hLiv1 mAb2 LD;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWFQQRPGQSPKR
LIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYT
FGGGTKVEIKR

SEQ ID NO:58<hLiv1 mAb2 LE;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWFQQRPGQSPR~~L~~
PLIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPY
TFGGGTKVEIKR

SEQ ID NO:59<hLiv1 mAb2 LF;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWYLQ~~K~~RPGQSPK
~~L~~PLIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVP
YTFGGGTKVEIKR

SEQ ID NO:60<hLiv1 mAb2 LG;PRT/1;artificial>
DVVMTQSPLSLPVTLGQPASISCRSSQSLLHSSGNTYLEWYQQRPGQSPRP
LIYKISTRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYT
FGGGTKVEIKR

WHAT IS CLAIMED IS:

1. A humanized antibody comprising a mature heavy chain variable region having an amino acid sequence at least 90% identical to SEQ ID NO:53 provided that position H27 is occupied by L, position H29 is occupied by I, H30 by E and H94 by V and a mature light chain variable region at least 90% identical to SEQ ID NO:60 provided position L36 is occupied by Y and position L46 by P.

2. The humanized antibody of claim 1, comprising three CDRs of SEQ ID NO:53 and three CDRs of SEQ ID NO:60.

3. The humanized antibody of claim 1 or 2, further provided position H76 is occupied by N.

4. The humanized antibody of any of claims 1-3, comprising a mature heavy chain variable region having an amino acid sequence at least 95% identical to SEQ ID NO:53 and a mature light chain variable region at least 95% identical to SEQ ID NO:60.

5. The humanized antibody of any of claims 1-4 wherein the mature heavy chain variable region is fused to a heavy chain constant region and the mature light chain variable region is fused to a light chain constant region.

6. The humanized antibody of any of claims 1-5, wherein the heavy chain constant region is a mutant form of natural human constant region which has reduced binding to an Fcgamma receptor relative to the natural human constant region.

7. The humanized antibody of any of claims 1-6, wherein the heavy chain constant region is of IgG1 isotype.

8. The humanized antibody of any of claims 1-5 or 7, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:44 and the light chain constant region has an amino acid sequence comprising SEQ ID NO:42.

9. The humanized antibody of any of claims 1-7, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:46 (S239C) and the light chain constant region has an amino acid sequence comprising SEQ ID NO:42.

10. The humanized antibody of any of claims 1-9, provided any differences in CDRs of the mature heavy chain variable region and mature light variable region from SEQ ID NOS. 52 and 60 respectively reside in positions H60-H65.

11. The humanized antibody of any of claim 1-10, wherein the mature heavy chain variable region has an amino acid sequence designated SEQ ID NO:52 or 53 and the mature light chain variable region has an amino acid sequence designated SEQ ID NO: 59 or 60.

12. The humanized antibody of any of claims 1-11, wherein the mature heavy chain variable region has an amino acid sequence designated SEQ ID NO:53 and the mature light chain variable region has an amino acid sequence designated SEQ ID NO:60.

13. The humanized antibody of any of claims 1-12, wherein the antibody is conjugated to a cytotoxic or cytostatic agent.

14. The humanized antibody of any of claims 1-13 having an association constant for human or cynomolgus monkey LIV-1 of 0.5 to 2 x 10^9 M^{-1}.

15. A humanized antibody comprising a mature heavy chain variable region comprising the three Kabat CDRs of SEQ ID NO:52, wherein position H27 is occupied by L, position H29 is occupied by I, H30 by E, H76 by N, and H94 by V and a mature light

chain variable region comprising the three Kabat CDRs of SEQ ID NO:60 provided position L36 is occupied by Y and position L46 by P.

16. A nucleic acid encoding a mature heavy chain variable region and/or a mature light chain variable region as defined by any of claims 1-15.

17. A method of treating a patient having or at risk of cancer, comprising administering to the patient an effective regime of a humanized antibody of any of claims 1-15.

18. The method of claim 17, wherein the cancer is a breast cancer, a prostate cancer, a cervical cancer or a melanoma.

19. A pharmaceutical composition comprising a humanized antibody of any of claims 1-5.

20. A humanized antibody comprising a mature heavy chain variable region having an amino acid sequence at least 90% identical to HB (SEQ ID NO:10) and a mature light chain variable region at least 90% identical to LB (SEQ ID NO:15).

21. The humanized antibody of claim 20, comprising a mature heavy chain variable region having an amino acid sequence at least 95% identical to HB and a mature light chain variable region at least 95% identical to LB.

22. The humanized antibody of claim 20 or 21, provided that position H29, H30 and H76 are occupied by I, E and N, and L36 is occupied by Y.

23. The humanized antibody of any of claims 20-22, provided that any difference in the variable region frameworks of the mature heavy chain variable region and SEQ ID NO:10 are selected from the group consisting of H27 occupied by F, H28 occupied by N, H48 occupied by I, H66 occupied by K, H67 occupied by A, H71 occupied by A, H76

occupied by N, H93 occupied by N, H94 occupied by V, L37 occupied by L, L39 occupied by K, L45 occupied by K, and L46 occupied by L.

24. The humanized antibody of any of claims 20-23, wherein the 3 CDRs of the mature heavy chain variable region are those of SEQ ID NO. 10 and the 3 CDRs of the mature light chain variable region are those of SEQ ID NO:15.

25. The humanized antibody of any of claims 20-24, wherein the mature heavy chain variable region is fused to a heavy chain constant region and the mature light chain variable region is fused to a light chain constant region.

26. The humanized antibody of any of claims 20-25, wherein the heavy chain constant region is a mutant form of natural human constant region which has reduced binding to an Fcgamma receptor relative to the natural human constant region.

27. The humanized antibody of any of claims 20-26, wherein the heavy chain constant region is of IgG1 isotype.

28. The humanized antibody of any of claims 20-25 or 27, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:6 and the light chain constant region has an amino acid sequence comprising SEQ ID NO:4.

29. The humanized antibody of any of claims 20-26, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:8 (S239C) and the light chain constant region has an amino acid sequence comprising SEQ ID NO:4.

30. The humanized antibody of any of claims 20-29 provided any differences in CDRs of the mature heavy chain variable region and mature light variable region from SEQ ID NOS. 10 and 15 respectively reside in positions H60-H65.

31. The humanized antibody of any of claims 20-30, wherein the mature heavy chain variable region has an amino acid sequence comprising SEQ ID NO:10 and the mature light chain variable region has an amino acid sequence comprising SEQ ID NO:15.

32. The humanized antibody of any of claims 20-31, wherein the antibody is conjugated to a cytotoxic or cytostatic agent.

33. A humanized antibody comprising a mature heavy chain variable region comprising the 3 CDRs of SEQ ID NO:10 and wherein positions H29, H30 and H76 are occupied by I, E and N respectively, and a mature light chain variable region comprising the 3 CDRs of SEQ ID NO:15, and wherein position L36 is occupied by Y.

34. The humanized antibody of any of claims 20-33 having greater affinity for human LIV-1 than the antibody BR2-14a.

35. The humanized antibody of any of claims 20-33, having an association constant for human or cynomolgus monkey LIV-1 of 0.5 to 2 x 10^9 M^{-1}.

36. A nucleic acid encoding a mature heavy chain variable region and/or a mature light chain variable region as defined by any of claims 20-35.

37. A method of treating a patient having or at risk of cancer, comprising administering to the patient an effective regime of a humanized antibody of any of claims 20-35.

38. The method of claim 37, wherein the cancer is breast cancer, prostate cancer, cervical cancer, or melanoma.

39. A pharmaceutical composition comprising a humanized antibody of any preceding claim.

40. A method of treating a patient having or at risk of triple negative breast cancer, comprising administering to the patient an effective regime of an antibody that specifically binds to LIV-1.

41. The method of claim 20, wherein the antibody is conjugated to a cytotoxic or cytostatic agent.

42. An isolated polypeptide having an amino acid sequence comprising SEQ ID NO:85 provided residues 1-28 can be omitted, or a nucleic acid encoding the same.

WHAT IS CLAIMED IS:

1. A humanized antibody that specifically binds human LIV-1 comprising a mature heavy chain variable region comprising three CDRs of SEQ ID NO:53 and having an amino acid sequence at least 95% identical to SEQ ID NO:53 provided that position H27 is occupied by L, position H29 is occupied by I, H30 by E and H94 by V and a mature light chain variable region comprising three CDRs of SEQ ID NO:60 at least 95% identical to SEQ ID NO:60 provided position L36 is occupied by Y and position L46 by P.

2. The humanized antibody of claim 1 , further provided position H76 is occupied by N.

3. The humanized antibody of claim 1 wherein the mature heavy chain variable region is fused to a heavy chain constant region and the mature light chain variable region is fused to a light chain constant region.

4. The humanized antibody of claim 3, wherein the heavy chain constant region is a mutant form of a natural human constant region which has reduced binding to an Fcgamma receptor relative to the natural human constant region.

5. The humanized antibody of claim 3, wherein the heavy chain constant region is of IgG1 isotype.

6. The humanized antibody of claim 3, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:44 and the light chain constant region has an amino acid sequence comprising SEQ ID NO:42.

7. The humanized antibody of claim 3, wherein the heavy chain constant region has an amino acid sequence comprising SEQ ID NO:46 (S239C) and the light chain constant region has an amino acid sequence comprising SEQ ID NO:42.

8. The humanized antibody of claim 1, wherein the mature heavy chain variable region has an amino acid sequence designated SEQ ID NO:52 or 53 and the

mature light chain variable region has an amino acid sequence designated SEQ ID NO: 59 or 60.

9. The humanized antibody of claim 1, wherein the mature heavy chain variable region has an amino acid sequence designated SEQ ID NO:53 and the mature light chain variable region has an amino acid sequence designated SEQ ID NO:60.

10. The humanized antibody of claim 1, wherein the antibody is conjugated to a cytotoxic or cytostatic agent.

11. The humanized antibody of claim 1, having an association constant for human or cynomolgus monkey LIV-1 of 0.5 to 2 x 10^9 M^{-1}.

12. A nucleic acid encoding a mature heavy chain variable region and/or a mature light chain variable region as defined by claim 1.

13. A pharmaceutical composition comprising a humanized antibody of claim 1.