

Patent Claims

1. An isolated antibody that binds to human LAG3, wherein the antibody comprises
 - 5 A) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:1;
(b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:2;
(c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:3;
(d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:4;
(e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:5;
10 and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:6; or
 - B) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:9;
(b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:10; (c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:11; (d) HVR-L1 comprising the amino acid sequence of
15 SEQ ID NO:12; (e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:13; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:14; or
 - C) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:17; (b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:18; (c) HVR-H3 comprising the amino acid sequence of
20 SEQ ID NO:19; (d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:20; (e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:21; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:22; or
 - 25 D) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:25; (b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:26; (c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:27; (d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:28; (e) HVR-L2 comprising the amino acid sequence of
30 SEQ ID NO:29; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:30; or
 - E) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:33; (b) HVR-H2 comprising the amino acid sequence of SEQ

5 ID NO:34; (c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:35; (d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:36; (e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:37; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:38.

2. The antibody according to claim 1, wherein the antibody comprises

10 A) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:1; (b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:2; (c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:3; (d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:4; (e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:5; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:6; or

15 B) (a) HVR-H1 comprising the amino acid sequence of SEQ ID NO:33; (b) HVR-H2 comprising the amino acid sequence of SEQ ID NO:34; (c) HVR-H3 comprising the amino acid sequence of SEQ ID NO:35; (d) HVR-L1 comprising the amino acid sequence of SEQ ID NO:36; (e) HVR-L2 comprising the amino acid sequence of SEQ ID NO:37; and (f) HVR-L3 comprising the amino acid sequence of SEQ ID NO:38.

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3. An isolated antibody that binds to human LAG3, wherein the antibody comprises

25 A) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:1, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:2, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:3; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:4; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:5 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:6; or

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B) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:9, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:10, and (iii) HVR-H3 comprising an amino

- acid sequence selected from SEQ ID NO:11; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:12; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:13 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:14; or
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- C) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:17, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:18, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:19; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:20; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:21 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:22; or
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- D) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:25, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:26, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:27; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:28; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:29 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:30; or
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- E) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:33, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:34, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:35; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:36; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:37 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:38.
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4. The antibody according to claim 3, wherein the antibody comprises
- A) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:1, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:2, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:3; and (b) a VL domain

comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:4; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:5 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:6; or

- 5 B) (a) a VH domain comprising (i) HVR-H1 comprising the amino acid sequence of SEQ ID NO:33, (ii) HVR-H2 comprising the amino acid sequence of SEQ ID NO:34, and (iii) HVR-H3 comprising an amino acid sequence selected from SEQ ID NO:35; and (b) a VL domain comprising (i) HVR-L1 comprising the amino acid sequence of SEQ ID NO:36; (ii) HVR-L2 comprising the amino acid sequence of SEQ ID NO:37 and (iii) HVR-L3 comprising the amino acid sequence of SEQ ID NO:38.
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5. An isolated antibody that binds to human LAG3, wherein the antibody
- 15 i) comprises a VH sequence of SEQ ID NO:7 and a VL sequence of SEQ ID NO:8;
- ii) comprises a VH sequence of SEQ ID NO:15 and a VL sequence of SEQ ID NO:16;
- iii) comprises a VH sequence of SEQ ID NO:23 and a VL sequence of SEQ ID NO:24;
- 20 iv) comprises a VH sequence of SEQ ID NO:31 and a VL sequence of SEQ ID NO:32; or
- v) comprises a VH sequence of SEQ ID NO:39 and a VL sequence of SEQ ID NO:40.
6. The antibody according to claim 5, wherein the antibody
- 25 i) comprises a VH sequence of SEQ ID NO:7 and a VL sequence of SEQ ID NO:8; or
- ii) comprises a VH sequence of SEQ ID NO:39 and a VL sequence of SEQ ID NO:40.

7. An isolated antibody that binds to human LAG3, wherein the antibody:
- i) competes for binding to LAG3 with an anti-LAG3 antibody comprising the VH with the amino acid sequence of SEQ ID NO:7 and VL with the amino acid sequence of SEQ ID NO:8, and/ or
 - 5 ii) binds to a human and cynomolgus LAG3; and/ or
 - iii) inhibits binding of MHC-II expressed on human A375 tumor cells; and/ or
 - iv) enhances granzyme B or IL-2 release in a mixed lymphocyte reaction (mMLR) assay.
- 10 8. The antibody according to any of the preceding claims, which is a human, humanized, or chimeric antibody.
9. The antibody according to any one of the preceding claims, which is a full length IgG1 antibody with mutations L234A, L235A and P329G (numbering according to the EU index of Kabat).
- 15 10. Isolated nucleic acid encoding the antibody according to any one of the preceding claims.
11. A host cell comprising the nucleic acid of claim 10.
12. A method of producing an antibody comprising culturing the host cell of claim 11 so that the antibody is produced.
- 20 13. The method of claim 12; further comprising recovering the antibody from the host cell.
14. A pharmaceutical formulation comprising the antibody according any one of claims 1 to 9 and a pharmaceutically acceptable carrier.
15. The antibody according any one of claims 1 to 9 for use in treating cancer.
- 25 16. The antibody according any one of claims 1 to 9 for use as a medicament.
17. The antibody according any one of claims 1 to 9 for use in treating cancer.

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18. Use of the antibody according any one of claims 1 to 9 in the manufacture of a medicament.
19. The use of claim 18 wherein the medicament is for treatment of cancer.
20. A method of treating an individual having cancer the method comprising
5 administering to the individual an effective amount of the antibody of claim 1.