

WHAT IS CLAIMED IS:

1. An isolated anti-cluster of differentiation 24 (CD24) antibody or an antigen-binding fragment thereof, comprising:
 - heavy chain CDR1 amino acid sequence of SEQ ID NO:25;
 - heavy chain CDR2 amino acid sequence of SEQ ID NO: 30;
 - heavy chain CDR3 amino acid sequence of SEQ ID NO: 28;
 - light chain CDR1 amino acid sequence of SEQ ID NO: 29;
 - light chain CDR2 amino acid sequence of SEQ ID NO: 22; and
 - light chain CDR3 amino acid sequence of SEQ ID NO: 31.
2. The antibody or antigen-binding fragment thereof of claim 1, comprising:
 - a heavy chain variable region comprising an amino acid sequence selected from the group consisting of: SEQ ID NOs: 74, 177, 178, and 179 and a light chain variable region comprising an amino acid sequence selected from the group consisting of: SEQ ID NOs: 76, 180, 181, 182, and 183.
3. The antibody or antigen-binding fragment thereof of any of the preceding claims, further comprising an immunoglobulin constant region, optionally a constant region of human Ig, or optionally a constant region of human IgG, or preferably wherein the constant region comprises a constant region of human IgG1, IgG2, IgG3, or IgG4.
4. The antibody or antigen-binding fragment thereof of any one of the preceding claims, which is a chimeric or humanized, or preferably which is selected from the group consisting of: a diabody, a Fab, a Fab', a F(ab')₂, a Fd, an Fv fragment, a disulfide stabilized Fv fragment (dsFv), a (dsFv)₂, a bispecific dsFv (dsFv-dsFv'), a disulfide stabilized diabody (ds diabody), a single-chain antibody molecule (scFv), an scFv dimer (bivalent diabody), a multispecific antibody.
5. The antibody or antigen-binding fragment thereof of claim 4, which is bispecific.
6. The antibody or antigen-binding fragment thereof of claim 5, which is capable of specifically binding to a first and a second epitope of CD24, or capable of specifically binding to CD24 and a second antigen.

7. The antibody or antigen-binding fragment thereof of claim 5 or 6, which binds CD24 via a Fab and binds the second antigen via a scFv.
8. The antibody or antigen-binding fragment thereof of any one of claims 5-7, wherein the second antigen-binding scFv is operably linked to the C terminus of the heavy chain constant region following the CD24-binding Fab.
9. The antibody or antigen-binding fragment thereof of any one of claims 5-8, wherein the bispecific antibody molecule comprises a heavy chain in the format of: VH(anti-CD24)-CH1-Hinge-CH2-CH3-spacer-second antigen-binding scFv, associated with a light chain in the format of VL(anti-CD24)-CL.
10. The antibody or antigen-binding fragment thereof of any one of claims 5-9, wherein the second antigen is selected from the group consisting of: PD-L1, PD-L2, PD-1, CLTA-4, TIM-3, LAG3, CD160, 2B4, TGF β , VISTA, BTLA, TIGIT, LAIR1, OX40, CD2, CD27, ICAM-1, NKG2C, SLAMF7, NKp80, CD160, B7-H3, LFA-1, ICOS, 4-1BB, GITR, CD30, CD40, BAFFR, HVEM, CD7, LIGHT, IL-2, IL-15, CD3, CD16, SIRP α , Siglec 10, LILRB2, Clever-1, MARCO, LILRB4, Siglec15, CSF1R, PSGL-1, VSIG-4, B2M, CD83, CA-125, gangliosides G(D2), G(M2) and G(D3), CD19, CD20, CD33, CD47, CD52, Ep-CAM, CEA, CLDN18.2, bombesin-like peptides, PSA, HER2/neu, epidermal growth factor receptor (EGFR), erbB2, erbB3/HER3, erbB4, CD44v6, CD44v9, Ki-67, cancer-associated mucin, VEGF, VEGFRs (e.g., VEGFR3), estrogen receptors, Lewis-Y antigen, TGF β 1, IGF-1 receptor, EGFR α , c-Kit receptor, transferrin receptor, IL-2R, CDH6, CEA, FOLR1, TROP2, PTK7, SLITRK6, CD142, NECTIN-4, ROR1, ROR2, CD142, CD123, CD22, CD79b, DLL3, SLC family or CO17-1A.
11. The antibody or antigen-binding fragment thereof of claim 10, wherein the tumor antigen is CD47.
12. The antibody or antigen-binding fragment thereof of claim 11, wherein the antibody or antigen-binding fragment thereof comprises a heavy chain in the format of: VH(anti-CD24)-CH1-Hinge-CH2-CH3-spacer-scFv(anti-CD47), associated with a light chain in the format of VL(anti-CD24)-CL.
13. The antibody or antigen-binding fragment thereof of any one of the preceding

claims, wherein the antibody or antigen-binding fragment is linked to one or more conjugates, optionally, wherein the conjugate is covalently attached either directly or via a linker, or preferably wherein the conjugate comprises a clearance-modifying agent, a chemotherapeutic agent, a toxin, a radioactive isotope, a lanthanide, a luminescent label, a fluorescent label, an enzyme-substrate label, a DNA-alkylators, a topoisomerase inhibitor, a tubulin-binders, or other anticancer drugs, or preferably wherein the antibody or antigen-binding fragment is capable of specifically binding to CD24, and optionally wherein the CD24 are derived from human or cynomolgus monkey, and optionally wherein the CD24 is a recombinant CD24 or a CD24 expressed on a cell surface.

14. A pharmaceutical composition comprising the antibody or antigen-binding fragment thereof of any one of the preceding claims, and a pharmaceutically acceptable carrier.
15. The pharmaceutical composition of claim 14, wherein the pharmaceutical composition further comprises a second therapeutic agent.
16. The pharmaceutical composition of claim 15, wherein the second therapeutic agent is an antagonist against one or more immunoinhibitory molecules, an anti-cancer agent (e.g., Oxaliplatin, Atezolizumab, Rituximab), or a CD47 antagonist, wherein the CD47 antagonist is a SIRP α -Fc fusion protein or variant thereof, or an anti-CD47 antibody or antigen-binding fragment thereof.
17. An isolated polynucleotide encoding the antibody or antigen-binding fragment thereof of any one of claims 1-13.
18. A vector comprising the isolated polynucleotide of claim 17.
19. A host cell comprising the vector of claim 18.
20. A method of expressing the antibody or antigen-binding fragment thereof of any one of claims 1-3, comprising culturing the host cell of claim 19 under the condition at which the vector of claim 18 is expressed.
21. The antibody or antigen-binding fragment thereof of any of claims 1-13 or the pharmaceutical composition of any of claims 14-16 for use in a method of treating cancer in a subject that would benefit from modulation of CD24 activity.

22. The antibody or antigen-binding fragment thereof or the pharmaceutical composition for the use of claim 21, wherein the cancer is lung cancer, bronchial cancer, bone cancer, liver and bile duct cancer, pancreatic cancer, breast cancer, liver cancer, ovarian cancer, testicle cancer, kidney cancer, bladder cancer, head and neck cancer, spine cancer, brain cancer, cervix cancer, uterine cancer, endometrial cancer, colon cancer, colorectal cancer, rectal cancer, anal cancer, esophageal cancer, gastrointestinal cancer, skin cancer, prostate cancer, pituitary cancer, stomach cancer, vagina cancer, thyroid cancer, glioblastoma, astrocytoma, melanoma, myelodysplastic syndrome, sarcoma, teratoma, adenocarcinoma, leukemia, myeloma and lymphoma, B-cell lymphomas, Hodgkin's lymphoma, non-Hodgkin's lymphoma (NHL), acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), chronic myelogenous leukemia (CML), multiple myeloma (MM), diffuse large B cell lymphoma (DLBCL), Marginal zone B-cell lymphoma (MZL), Mantle cell lymphoma (MCL), Richter's syndrome, Burkitt's lymphoma or follicular lymphoma.
23. The antibody or antigen-binding fragment thereof or the pharmaceutical composition for the use of claim 21 or 22, wherein the cancer is breast cancer, bladder cancer, leukemia, colorectal cancer, ovarian cancer, lung cancer, B-cell lymphomas, or liver cancer.
24. The antibody or antigen-binding fragment thereof or the pharmaceutical composition for the use of any one of claims 21-23, wherein the subject is human, wherein the administration is via oral, nasal, intravenous, subcutaneous, sublingual, or intramuscular administration.
25. The antibody or antigen-binding fragment thereof of any one of claims 1-13 for use in a method of detecting presence or amount of CD24 in a sample, wherein the antibody or antigen-binding fragment thereof is to be contacted with the sample, and the presence or the amount of CD24 in the sample is to be determined.
26. A kit comprising the antibody or antigen-binding fragment thereof of any of claims 1-13, useful in detecting CD24, wherein the CD24 is recombinant CD24, CD24 expressed on cell surface, or CD24-expressing cells.

27. A chimeric antigen receptor (CAR) comprising an antigen binding domain, a transmembrane domain, a costimulatory signaling region, and a TCR signaling domain, wherein the antigen binding domain specifically binds to CD24 and comprises the antigen binding fragment of any one of claims 1-13.
28. A cell genetically modified to express the CAR of claim 27, wherein the cell is immune cell, wherein the immune cell is T lymphocyte or NK cell, monocyte, macrophage or NKT lymphocyte.
29. The cell of claim 28 for use in a method of treating a mammal having a CD24 related disease or condition, wherein an effective amount of the cell is to be administered to the mammal, wherein the CD24 related disease or condition is cancer.