

CLAIMS

1. An antibody, or antigen binding fragment thereof, that specifically binds to human Cluster of Differentiation 1a (CD1a), comprising a heavy chain complementarity determining region-three (CDR-H3), wherein the CDR-H3 comprises the amino acid sequence of SEQ ID NO: 17, 49, or 52.
2. The antibody, or antigen binding fragment thereof, of claim 1, wherein the antibody, or antigen binding fragment thereof, comprises:
 - (i) a heavy chain complementarity determining region-one (CDR-H1) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 15, 30, 40, 62, and 66, a CDR-H2 comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 16, 31, 41, 48, 59, 63 and 76, a CDR-H3 comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 17, 49 and 52, a light chain complementarity determining region-one (CDR-L1) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 8 and 25, a CDR-L2 comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 9, 26, 37, 44, and 71, and a CDR-L3 comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 10, 27, 34, and 45;
 - (ii) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 15, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 16, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 17, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 8, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 9, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 10;
 - (iii) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 30, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 41, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 17, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 25, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 26, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 27; or
 - (iv) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 40, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 63, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 49, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 25,

a CDR L2 comprising the amino acid sequence of SEQ ID NO: 26, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 27.

3. The antibody, or antigen binding fragment thereof, of any one of claims 1-2, wherein the antibody, or antigen binding fragment thereof, comprises at least one of the following:

(i) a heavy chain variable region (VH) framework sequence derived from a human germline VH sequence selected from the group consisting of IGHV1-2*02, IGHV1-3*01, IGHV1-46*01, IGHV1-69*01, IGHV1-69*02, IGHV1-8*01, IGHV3-7*01, IGHV3-13*01, IGHV3-23*01, IGHV3-23*04, IGHV3-30*01, IGHV3-30*18, IGHV5-10-1*01, IGHV5-10-1*04, and IGHV5-51*01;

(ii) a light chain variable region (VL) framework sequence derived from a human germline VL sequence selected from the group consisting of IGKV1-12*01, IGKV1-13*02, IGKV1-33*01, IGKV1-39*01, IGKV1-5*01, IGKV3-11*01, IGKV3-15*01, IGKV3-20*01, IGKV3D-20*02, and IGKV4-1*01;

(iii) a heavy chain constant domain comprising an IgA (for example IgA₁ or IgA₂), IgD, IgE, IgM, or IgG (for example IgG₁, IgG₂, IgG₃, or IgG₄); and/or

(iv) a human V_κ or V_λ light chain constant domain.

4. The antibody, or antigen binding fragment thereof, of any one of claims 1-3, wherein the antibody, or antigen binding fragment thereof, comprises:

(i) a heavy chain variable region (VH) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 22, 32, 42, 50, 53, 55, 57, 60, 64, 67, 69, 74 and 77, and a light chain variable region (VL) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 12, 28, 35, 38, 46, 72 and 79;

(ii) a VH comprising an amino acid sequence at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to SEQ ID NO: 22, 32, 42, 50, 53, 55, 57, 60, 64, 67, 69, 74 or 77, and a VL comprising an amino acid sequence at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to SEQ ID NO: 12, 28, 35, 38, 46, 72 or 79;

- (iii) a VH comprising the amino acid sequence of SEQ ID NO: 22 and a VL comprising the amino acid sequence of SEQ ID NO: 12;
- (iv) a VH comprising the amino acid sequence of SEQ ID NO: 55 and a VL comprising the amino acid sequence of SEQ ID NO: 28;
- (v) a VH comprising the amino acid sequence of SEQ ID NO: 74 and a VL comprising the amino acid sequence of SEQ ID NO: 28;
- (vi) the CDR H1, CDR H2, and CDR H3 sequences as set forth in SEQ ID NO: 22 and the CDR L1, CDR L2, and CDR L3 sequences as set forth in SEQ ID NO: 12;
- (vii) the CDR H1, CDR H2, and CDR H3 sequences as set forth in SEQ ID NO: 55 and the CDR L1, CDR L2, and CDR L3 sequences as set forth in SEQ ID NO: 28;
- (viii) the CDR H1, CDR H2, and CDR H3 sequences as set forth in SEQ ID NO: 74 and the CDR L1, CDR L2, and CDR L3 sequences as set forth in SEQ ID NO: 28;
- (ix) a heavy chain (HC) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 14, 29, 39, 47, 51, 54, 56, 58, 61, 65, 68, 73, and 75, and a light chain (LC) comprising the amino acid sequence selected from the group consisting of SEQ ID NO: 7, 24, 33, 36, 43, 70 and 78;
- (x) a HC comprising an amino acid sequence at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to SEQ ID NO: 14, 29, 39, 47, 51, 54, 56, 58, 61, 65, 68, 73, and 75, and a LC comprising an amino acid sequence at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to SEQ ID NO: 7, 24, 33, 36, 43, 70 and 78;
- (xi) a HC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 14 and a LC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 7;
- (xii) a HC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 54 and a LC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 24;
- (xiii) a HC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 73 and a LC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 24; or
- (xiv) the amino acid sequence encoded by the insert in the plasmid deposited at the ATCC and having ATCC Accession No. PTA-126810 and comprising the amino acid sequence

encoded by the insert in the plasmid deposited at the ATCC and having ATCC Accession No. PTA-126811.

5. An antibody, or antigen binding fragment thereof, as claimed in any one of claims 1-4, that specifically binds to human CD1a, comprising

- (i) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 30, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 41, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 17, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 25, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 26, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 27; or
 - (ii) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 96, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 97, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 98, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 99, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 100, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 101; or
 - (iii) a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 40, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 63, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 49, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 25, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 26, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 27.
6. The antibody, or antigen binding fragment thereof, of claim 5, comprising a VL comprising the sequence of SEQ ID NO: 28 and a VH comprising the sequence of SEQ ID NO: 55.
7. The antibody, or antigen binding fragment thereof, of claim 5, comprising a VL comprising the sequence of SEQ ID NO: 28 and a VH comprising the sequence of SEQ ID NO: 74.
8. The antibody, or antigen binding fragment thereof, of claim 5, comprising a light chain comprising the amino acid sequence of SEQ ID NO: 24 and a heavy chain comprising the amino acid sequence of SEQ ID NO: 54.

9. The antibody, or antigen binding fragment thereof, of claim 5, comprising either a VL comprising the sequence of SEQ ID NO: 28 and a VH comprising the sequence of SEQ ID NO: 74, or a light chain comprising the amino acid sequence of SEQ ID NO: 24 and a heavy chain comprising the amino acid sequence of SEQ ID NO: 73.

10. An antibody, or antigen binding fragment thereof, that binds an epitope on Cluster of Differentiation 1a (CD1a), wherein the epitope comprises Glu82 and/or His170, according to the numbering of SEQ ID NO: 1, and where the epitope

- (i) optionally further comprises Ile92 and/or Arg93, according to the numbering of SEQ ID NO: 1, and
- (ii) optionally comprises at least one of the following amino acid residues: Glu78, Lys81, Thr85, Ile89, Arg93, Asp173, and Asn177, according to the numbering of SEQ ID NO: 1; and
- (iii) optionally comprises at least one of the following residues: Leu86, Asn146, Asn168, Ile174, His176, Asp181, and Arg185, according to the numbering of SEQ ID NO: 1; and
- (iv) optionally comprises at least one of the following residues: Glu79, Leu83, Glu84, Arg88, Ile92, Gln167, Gln169, Leu178, Ser180, and Thr182 according to the numbering of SEQ ID NO: 1; and
- (v) optionally does not comprise Asn146 and/or Asn168 according to the numbering of SEQ ID NO: 1; and
- (v) optionally comprises the following residues: Glu78, Glu79, Lys81, Glu82, Leu83, Glu84, Thr85, Leu86, Arg88, Ile89, Ile92, Arg93, Asn146, Gln167, Asn168, Gln169, His170, Asp173, Ile174, His176, Asn177, Leu178, Ser180, Asp181, Thr182 and Arg185, according to the numbering of SEQ ID NO: 1.

11. An antibody, or antigen binding fragment thereof, that competes for binding to CD1a with the antibody, or antigen binding fragment thereof, of any one of claims 1-10, or binds substantially the same epitope as the antibody, or antigen binding fragment thereof, of any one of claims 1-10.

12. The antibody, or antigen binding fragment thereof, of any one of claims 1-11, wherein the antibody, or antigen binding fragment thereof comprises one or more of the following characteristics:

- (i) binds CD1a with a K_D about or less than a value selected from the group consisting of about 500 nM, 400 nM, 300 nM, 200 nM, 175 nM, 150 nM, 125 nM, 100 nM, 90 nM, 80 nM, 70 nM, 60 nM, 50 nM, 40 nM, 30 nM, 20 nM, 10 nM, 5 nM, 2 nM, 1 nM, 900pM, 800pM, 700pM, 600pM, 500pM, 400 pM, 300pM, 200 pM, 180pM, 160pM, 140pM, 120pM, 100pM, 80pM, 60pM, 40pM, 20pM and 10pM;
- (ii) binds human CD1a with a K_D value of about 250pM to about 150pM or about 190pM to about 170pM;
- (iii) inhibits CD1a dependent Cluster of Differentiation 69 (CD69) expression with an IC_{50} value of no more than about 50 nM, 40 nM, 20 nM, 10 nM, 5 nM, 4 nM, 3 nM, 2 nM, or 1 nM;
- (iv) inhibits CD1a dependent interleukin 2 (IL-2) production with an IC_{50} value of no more than 5 nM, 4 nM, 3 nM, 2 nM, 1.9 nM, 1.8 nM, 1.7 nM, 1.6 nM, 1.5 nM, 1.4 nM, 1.3 nM, 1.2 nM, 1.1 nM, 1 nM, 0.9 nM, 0.8 nM, 0.7 nM, 0.6 nM, 0.5 nM, 0.4 nM, 0.3 nM, 0.22 nM, 0.2 nM, 0.18 nM, or 0.1 nM;
- (v) reduces dermatitis score in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the dermatitis score in untreated or isotype treated controls;
- (vi) reduces serum IgE levels in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the serum IgE levels in untreated or isotype treated controls;
- (vii) reduces HDM specific IgE antibody titer in a human CD1a transgenic house dust mite HDM induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the serum IgE levels in untreated or isotype treated controls; and

- (viii) reduces expression levels of atopic dermatitis-associated genes in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the expression levels of atopic dermatitis-associated genes in untreated or isotype treated controls.
13. An isolated nucleic acid molecule comprising a nucleic acid sequence encoding the antibody, or antigen binding fragment thereof, of any one of claims 1-12, and optionally wherein said nucleic acid molecule comprises one or more nucleic acid sequences selected from the group consisting of:
- (i) the nucleic acid sequence of SEQ ID NO: 80,
 - (ii) the nucleic acid sequence of SEQ ID NO: 81,
 - (iii) the nucleic acid sequence of SEQ ID NO: 82,
 - (iv) the nucleic acid sequence of SEQ ID NO: 83,
 - (v) the nucleic acid sequence of SEQ ID NO: 84,
 - (vi) the nucleic acid sequence of SEQ ID NO: 85,
 - (vii) the nucleic acid sequence of the insert of the vector deposited as Ab571-VH under ATCC Accession No. PTA-126810, and the nucleic acid sequence of the insert of the vector deposited as Ab571-VL under ATCC Accession No. PTA-126811.
14. A vector comprising the nucleic acid molecule of claim 13.
15. A host cell comprising the nucleic acid molecule of claim 13, or the vector of claim 14.
16. A method of making an antibody or antigen binding fragment thereof, comprising culturing the host cell of claim 15, under a condition wherein said antibody, or antigen binding fragment, is expressed by said host cell.
17. A pharmaceutical composition comprising the antibody, or antigen binding fragment thereof, of any one of claims 1-12, and a pharmaceutically acceptable carrier or excipient.

18. A method of treating and/or preventing a disease, disorder and/or condition associated with, or mediated by, CD1a expression and/or CD1a binding to a ligand, comprising administering to a subject in need thereof a therapeutically effective amount of the antibody, or antigen-binding fragment thereof, of any one of claims 1-12, or the pharmaceutical composition of claim 17.

19. The method of claim 18, wherein the disease, disorder, and/or condition is selected from the group consisting of inflammatory bowel disease, allergies, allergic rhinitis, allergic conjunctivitis, vernal keratoconjunctivitis, a seasonal allergy, pet allergy, asthma, food allergy, peanut allergy, atopic dermatitis, contact dermatitis, chronic rhinosinusitis with nasal polyps (CRSwNP), allergic rhinitis, bronchitis, chronic obstructive pulmonary disease (COPD), viral exacerbations of respiratory disease, viral infection in children and adults, (respiratory syncytial virus (RSV), rhinovirus, influenza), urticarias, eosinophilic esophagitis, chronic fibrosis, liver fibrosis, non-alcoholic steatohepatitis (NASH), chronic kidney disease, idiopathic pulmonary fibrosis (IPF), scleroderma, systemic sclerosis, acute kidney injury, sepsis, pancreatitis, type 1 diabetes, graft-versus-host disease (GVHD), tissue transplant, Alzheimer's, rheumatoid arthritis, irritable bowel syndrome (IBS), Crohn's disease, ulcerative colitis, multiple sclerosis, psoriasis, celiac disease and Raynaud's disease or phenomenon.

20. A method of treating an inflammatory disease, comprising administering to a subject in need thereof a therapeutically effective amount of the antibody, or antigen-binding fragment thereof, of any one of claims 1-12 or the pharmaceutical composition of claim 17.

21. A method of treating atopic dermatitis, comprising administering to a subject in need thereof a therapeutically effective amount of the antibody, or antigen-binding fragment thereof, of any one of claims 1-12, or the pharmaceutical composition of claim 17.

22. A method of treating inflammatory bowel disease (IBD), comprising administering to a subject in need thereof a therapeutically effective amount of the antibody, or antigen-binding fragment thereof, of any one of any one of claims 1-12, or the pharmaceutical composition of claim 17.

23. ~~Use of the antibody, or antigen binding fragment thereof, of any one of claims 1-12, or the pharmaceutical composition of claim 17 in the manufacture of a medicament for treating a disease, disorder or condition associated with, or mediated by, CD1a expression, activity and/or CD1a binding to T-cell receptors.~~

24. ~~The antibody, or antigen binding fragment thereof, of any one of claims 1-12, or the pharmaceutical composition of claim 17, for use in the treatment and/or prevention of at least one sign and/or symptom of an inflammatory disease.~~

25. ~~A kit for the treatment of atopic dermatitis (AD), comprising a therapeutically effective amount of the antibody, or antigen binding fragment thereof, of any one of claims 1-12.~~

Claims

1. An antibody, or antigen binding fragment thereof, that specifically binds to human Cluster of Differentiation 1a (CD1a), comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 30, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 41, a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 17, a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 25, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 26, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 27.
2. The antibody, or antigen-binding fragment thereof, of claim 1, wherein the antibody, or antigen-binding fragment thereof, comprises at least one of the following:
 - (i) a heavy chain variable region (VH) framework sequence derived from a human germline VH sequence selected from the group consisting of IGHV1-2*02, IGHV1-3*01, IGHV1-46*01, IGHV1-69*01, IGHV1-69*02, IGHV1-8*01, IGHV3-7*01, IGHV3-13*01, IGHV3-23*01, IGHV3-23*04, IGHV3-30*01, IGHV3-30*18, IGHV5-10-1*01, IGHV5-10-1*04, and IGHV5-51*01;
 - (ii) a light chain variable region (VL) framework sequence derived from a human germline VL sequence selected from the group consisting of IGKV1-12*01, IGKV1-13*02, IGKV1-33*01, IGKV1-39*01, IGKV1-5*01, IGKV3-11*01, IGKV3-15*01, IGKV3-20*01, IGKV3D-20*02, and IGKV4-1*01;
 - (iii) a heavy chain constant domain comprising an IgA, IgD, IgE, IgM, or IgG; and/or
 - (iv) a human V_κ or V_λ light chain constant domain.
3. The antibody, or antigen-binding fragment thereof, of claim 2, wherein the IgA is IgA₁ or IgA₂.
4. The antibody, or antigen-binding fragment thereof, of claim 2, wherein the IgG is IgG₁, IgG₂, IgG₃, or IgG₄.

5. The antibody, or antigen-binding fragment thereof, of claim 1, wherein the antibody, or antigen-binding fragment thereof, comprises:
- (i) a VH comprising the amino acid sequence of SEQ ID NO: 55 and a VL comprising the amino acid sequence of SEQ ID NO: 28;
 - (ii) a HC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 54 and a LC comprising, or consisting of, the amino acid sequence of SEQ ID NO: 24; or
 - (iii) the amino acid sequence encoded by the insert in the plasmid deposited at the ATCC and having ATCC Accession No. PTA-126810 and comprising the amino acid sequence encoded by the insert in the plasmid deposited at the ATCC and having ATCC Accession No. PTA-126811.
6. The antibody, or antigen binding fragment thereof, of claim 1, comprising a VL comprising the sequence of SEQ ID NO:28 and a VH comprising the sequence of SEQ ID NO: 55.
7. The antibody, or antigen binding fragment thereof, of claim 1, comprising a light chain comprising the amino acid sequence of SEQ ID NO: 24 and a heavy chain comprising the amino acid sequence of SEQ ID NO: 54.
8. The antibody, or antigen-binding fragment thereof, of claim 1 that binds an epitope on Cluster of Differentiation 1a (CD1a), wherein the epitope comprises Glu82 and/or His170, according to the numbering of SEQ ID NO: 1.
9. The antibody, or antigen-binding fragment thereof, of claim 8, wherein the epitope has a feature(s) selected from any of one or more of the follows.
- (i) further comprises Ile92 and/or Arg93, according to the numbering of SEQ ID NO: 1;
 - (ii) comprises at least one of the following amino acid residues: Glu78, Lys81, Thr85, Ile89, Arg93, Asp173, and Asn177, according to the numbering of SEQ ID NO: 1;
 - (iii) comprises at least one of the following residues: Leu86, Asn168, Ile174, His176, Asp181, and Arg185, according to the numbering of SEQ ID NO: 1;

- (iv) comprises at least one of the following residues: Glu79, Leu83, Glu84, Arg88, Ile92, Gln169, Leu178, Ser180, and Thr182 according to the numbering of SEQ ID NO: 1; and
- (v) does not comprise Asn146 and/or Asn168 according to the numbering of SEQ ID NO: 1.

10. The antibody, or antigen-binding fragment thereof, of claim 1, wherein the antibody, or antigen binding fragment thereof comprises one or more of the following characteristics:

- (i) binds CD1a with a K_D about or less than a value selected from the group consisting of about 500 nM, 400 nM, 300 nM, 200 nM, 175 nM, 150 nM, 125 nM, 100 nM, 90 nM, 80 nM, 70 nM, 60 nM, 50 nM, 40 nM, 30 nM, 20 nM, 10 nM, 5 nM, 2 nM, 1 nM, 900pM, 800pM, 700pM, 600pM, 500pM, 400 pM, 300pM, 200 pM, 180pM, 160pM, 140pM, 120pM, 100pM, 80pM, 60pM, 40pM, 20pM and 10pM;
- (ii) binds human CD1a with a K_D value of about 250pM to about 150pM or about 190pM to about 170pM;
- (iii) inhibits CD1a-dependent Cluster of Differentiation 69 (CD69) expression with an IC_{50} value of no more than about 50 nM, 40 nM, 20 nM, 10 nM, 5 nM, 4 nM, 3 nM, 2 nM, or 1 nM;
- (iv) inhibits CD1a-dependent interleukin-2 (IL-2) production with an IC_{50} value of no more than 5 nM, 4 nM, 3 nM, 2 nM, 1.9 nM, 1.8 nM, 1.7 nM, 1.6 nM, 1.5 nM, 1.4 nM, 1.3 nM, 1.2 nM, 1.1 nM, 1 nM, 0.9 nM, 0.8 nM, 0.7 nM, 0.6 nM, 0.5 nM, 0.4 nM, 0.3 nM, 0.22 nM, 0.2 nM, 0.18 nM, or 0.1 nM;
- (v) reduces dermatitis score in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the dermatitis score in untreated or isotype treated controls;
- (vi) reduces serum IgE levels in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the serum IgE levels in untreated or isotype treated controls;

- (vii) reduces HDM-specific IgE antibody titer in a human CD1a transgenic house dust mite HDM induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the serum IgE levels in untreated or isotype treated controls; and
 - (viii) reduces expression levels of atopic dermatitis-associated genes in a human CD1a transgenic house dust mite (HDM) induced dermatitis mouse model by at least 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 95%, 98%, or 100% as compared to the expression levels of atopic dermatitis-associated genes in untreated or isotype treated controls.
11. An isolated nucleic acid molecule comprising a nucleic acid sequence encoding the antibody, or antigen binding fragment thereof, of any one of claims 1-10.
12. The isolated nucleic acid molecule of claim 11, wherein said nucleic acid molecule comprises one or more nucleic acid sequences selected from the group consisting of:
- (i) the nucleic acid sequence of SEQ ID NO: 80,
 - (ii) the nucleic acid sequence of SEQ ID NO: 81,
 - (iii) the nucleic acid sequence of SEQ ID NO: 82,
 - (iv) the nucleic acid sequence of SEQ ID NO: 83, or
 - (v) the nucleic acid sequence of the insert of the vector deposited as Ab571-VH under ATCC Accession No. PTA-126810, and the nucleic acid sequence of the insert of the vector deposited as Ab571-VL under ATCC Accession No. PTA-126811.
13. A vector comprising the nucleic acid molecule of claim 11 or 12.
14. A host cell comprising the nucleic acid molecule of claim 11 or 12, or the vector of claim 13.
15. A method of making an antibody or antigen-binding fragment thereof, comprising culturing the host cell of claim 14, under a condition wherein said antibody, or antigen-binding fragment, is expressed by said host cell.

16. A pharmaceutical composition comprising the antibody, or antigen-binding fragment thereof, of any one of claims 1-10, and a pharmaceutically acceptable carrier or excipient.

17. Use of the antibody, or antigen-binding fragment thereof, of any one of claims 1-10, or the pharmaceutical composition of claim 16 in the manufacture of a medicament for treating and/or preventing a disease, disorder and/or condition associated with, or mediated by, CD1a expression and/or CD1a binding to a ligand.

18. The use of claim 17, wherein the disease, disorder, and/or condition is selected from the group consisting of inflammatory bowel disease, allergies, allergic rhinitis, allergic conjunctivitis, vernal keratoconjunctivitis, asthma, atopic dermatitis, contact dermatitis, chronic rhinosinusitis with nasal polyps (CRSwNP), bronchitis, chronic obstructive pulmonary disease (COPD), viral exacerbations of respiratory disease, viral infection in children and adults, urticarias, eosinophilic esophagitis, chronic fibrosis, liver fibrosis, non-alcoholic steatohepatitis (NASH), chronic kidney disease, idiopathic pulmonary fibrosis (IPF), scleroderma, systemic sclerosis, acute kidney injury, sepsis, pancreatitis, type 1 diabetes, graft-versus-host disease (GVHD), tissue transplant, Alzheimer's, rheumatoid arthritis, irritable bowel syndrome (IBS), Crohn's disease, ulcerative colitis, multiple sclerosis, psoriasis, celiac disease and Raynaud's disease or phenomenon.

19. The use of claim 18, wherein the allergies is a seasonal allergy, pet allergy, or food allergy.

20. The use of claim 19, wherein the food allergy is peanut allergy.

21. The use of claim 18, wherein the viral infection in children and adults is respiratory syncytial virus (RSV), rhinovirus, or influenza.

22. Use of the antibody, or antigen-binding fragment thereof, of any one of claims 1-10 or the pharmaceutical composition of claim 16 in the manufacture of a medicament for treating an inflammatory disease.
23. Use of the antibody, or antigen-binding fragment thereof, of any one of claims 1-10, or the pharmaceutical composition of claim 16 in the manufacture of a medicament for treating atopic dermatitis.
24. Use of the antibody, or antigen-binding fragment thereof, of any one of any one of claims 1-10, or the pharmaceutical composition of claim 16 in the manufacture of a medicament for treating inflammatory bowel disease (IBD).
25. Use of the antibody, or antigen-binding fragment thereof, of any one of claims 1-10, or the pharmaceutical composition of claim 16 in the manufacture of a medicament for treating a disease, disorder or condition associated with, or mediated by, CD1a expression, activity and/or CD1a binding to T-cell receptors.
26. Use of the antibody, or antigen binding fragment thereof, of any one of claims 1-10, or the pharmaceutical composition of claim 16 in the manufacture of a medicament for the treatment and/or prevention of at least one sign and/or symptom of an inflammatory disease.
27. A kit for the treatment of atopic dermatitis (AD), comprising a therapeutically effective amount of the antibody, or antigen binding fragment thereof, of any one of claims 1-10.