

enough to detect endogenous podocyte APOL1, and some of which are able to distinguish APOL1 from APOL2 and other apolipoprotein family members such as APOL3, APOL4, and APOL6. In some aspects, these antibodies may be used in detecting APOL1 localized on podocytes, which can be used in detection methods such as immunofluorescence microscopy and immunohistochemistry.

[004] Antibodies herein were also generated to different regions of the APOL1 molecule, which allow for information about portions of APOL1 that are exposed on podocytes but that are, for example, buried in APOL1 found in serum HDL particles. Such antibodies may be useful, for example, in distinguishing APOL1 found on cells such as podocytes, endothelial cells and hepatocytes from APOL1 found in serum such as on HDL particles. In addition, such antibodies may allow for targeting of other molecules such as drugs specifically to APOL1-expressing cells such as podocyte cells, endothelial cells and hepatocytes.

SUMMARY

[005] The disclosure herein relates to certain anti-apolipoprotein L1 antibodies. Exemplary ~~embodiment~~examples include an isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody comprises:

- (a) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 3, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 4, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 5; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 6, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 7, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 8;
- (b) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 13, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 14, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 15; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 16, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 17, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 18;
- (c) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 23, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 24, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 25; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 26, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 27, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 28;

acid sequence of SEQ ID NO: 186, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 187, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 188;

(t) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 193, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 194, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 195; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 196, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 197, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 198; or

(u) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 203, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 204, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 205; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 206, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 207, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 208.

[005a] In one aspect, the disclosure provides an isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody comprises:

a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 113, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 114, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 115; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 116, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 117, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 118.

[006] In some embodimentexamples, the antibody comprises:

the CDRs of embodimentexample (a) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 9 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 10;

the CDRs of embodimentexample (b) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 19 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 20;

the CDRs of embodimentexample (c) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 29 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 30;

the CDRs of embodimentexample (d) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 39 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 40;

the CDRs of embodimentexample (e) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 49 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 50;

the CDRs of embodimentexample (f) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 59 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 60;

the CDRs of embodimentexample (g) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 69 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 70;

the CDRs of embodimentexample (h) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 79 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 80;

the CDRs of embodimentexample (i) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 89 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 90;

the CDRs of embodimentexample (j) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 99 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 100;

the CDRs of embodimentexample (k) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 109 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 110;

the CDRs of embodimentexample (l) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 119 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 120;

the CDRs of embodimentexample 1(m) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO:

129 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 130;

the CDRs of embodimentexample (n) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 139 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 140;

the CDRs of embodimentexample (o) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 149 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 150;

the CDRs of embodimentexample (p) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 159 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 160;

the CDRs of embodimentexample (q) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 169 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 170;

the CDRs of embodimentexample (r) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 179 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 180;

the CDRs of embodimentexample (s) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 189 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 190;

the CDRs of embodimentexample (t) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 199 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 200; or

the CDRs of embodimentexample (u) above and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 209 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 210.

[007] In some embodimentexample, as described above, the antibody comprises:
the CDRs of embodimentexample (a) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 9;
the CDRs of embodimentexample (b) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 19;
the CDRs of embodimentexample (c) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 29;
the CDRs of embodimentexample (d) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 39;
the CDRs of embodimentexample (e) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 49;
the CDRs of embodimentexample (f) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 59;
the CDRs of embodimentexample (g) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 69;
the CDRs of embodimentexample (h) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 79;
the CDRs of embodimentexample (i) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 89;
the CDRs of embodimentexample 1(j) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 99;
the CDRs of embodimentexample (k) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 109;
the CDRs of embodimentexample (l) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 119;
the CDRs of embodimentexample (m) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 129;
the CDRs of embodimentexample (n) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 139;
the CDRs of embodimentexample (o) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 149;
the CDRs of embodimentexample (p) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 159;

the CDRs of embodimentexample (q) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 169;

the CDRs of embodimentexample (r) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 179;

the CDRs of embodimentexample (s) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 189;

the CDRs of embodimentexample (t) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 199; or

the CDRs of embodimentexample (u) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 209.

[008] In some cases, the antibody comprises:

the CDRs of embodimentexample (a) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 10;

the CDRs of embodimentexample (b) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 20;

the CDRs of embodimentexample (c) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 30;

the CDRs of embodimentexample (d) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 40;

the CDRs of embodimentexample (e) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 50;

the CDRs of embodimentexample (f) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 60;

the CDRs of embodimentexample (g) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 70;

the CDRs of embodimentexample (h) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 80;

the CDRs of embodimentexample (i) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 90;

the CDRs of embodimentexample (j) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 100;

the CDRs of embodimentexample (k) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 110;

the CDRs of embodimentexample (l) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 120;

the CDRs of embodimentexample (m) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 130;

the CDRs of embodimentexample (n) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 140;

the CDRs of embodimentexample (o) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 150;

the CDRs of embodimentexample (p) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 160;

the CDRs of embodimentexample (q) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 170;

the CDRs of embodimentexample (r) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 180;

the CDRs of embodimentexample (s) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 190;

the CDRs of embodimentexample (t) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 200; or

the CDRs of embodimentexample (u) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 210.

[009] In some aspectexamples, the antibody comprises:

a VH comprising the amino acid sequence of SEQ ID NO: 9 and a VL comprising the amino acid sequence of SEQ ID NO: 10;

a VH comprising the amino acid sequence of SEQ ID NO: 19 and a VL comprising the amino acid sequence of SEQ ID NO: 20;

a VH comprising the amino acid sequence of SEQ ID NO: 29 and a VL comprising the amino acid sequence of SEQ ID NO: 30;

a VH comprising the amino acid sequence of SEQ ID NO: 39 and a VL comprising the amino acid sequence of SEQ ID NO: 40;

a VH comprising the amino acid sequence of SEQ ID NO: 49 and a VL comprising the amino acid sequence of SEQ ID NO: 50;

a VH comprising the amino acid sequence of SEQ ID NO: 59 and a VL comprising the amino acid sequence of SEQ ID NO: 60;

a VH comprising the amino acid sequence of SEQ ID NO: 69 and a VL comprising the amino acid sequence of SEQ ID NO: 70;

a VH comprising the amino acid sequence of SEQ ID NO: 79 and a VL comprising the amino acid sequence of SEQ ID NO: 80;

a VH comprising the amino acid sequence of SEQ ID NO: 89 and a VL comprising the amino acid sequence of SEQ ID NO: 90;

a VH comprising the amino acid sequence of SEQ ID NO: 99 and a VL comprising the amino acid sequence of SEQ ID NO: 100;

a VH comprising the amino acid sequence of SEQ ID NO: 109 and a VL comprising the amino acid sequence of SEQ ID NO: 110;

a VH comprising the amino acid sequence of SEQ ID NO: 119 and a VL comprising the amino acid sequence of SEQ ID NO: 120;

a VH comprising the amino acid sequence of SEQ ID NO: 129 and a VL comprising the amino acid sequence of SEQ ID NO: 130;

a VH comprising the amino acid sequence of SEQ ID NO: 139 and a VL comprising the amino acid sequence of SEQ ID NO: 140;

a VH comprising the amino acid sequence of SEQ ID NO: 149 and a VL comprising the amino acid sequence of SEQ ID NO: 150;

a VH comprising the amino acid sequence of SEQ ID NO: 159 and a VL comprising the amino acid sequence of SEQ ID NO: 160;

a VH comprising the amino acid sequence of SEQ ID NO: 169 and a VL comprising the amino acid sequence of SEQ ID NO: 170;

a VH comprising the amino acid sequence of SEQ ID NO: 179 and a VL comprising the amino acid sequence of SEQ ID NO: 180;

a VH comprising the amino acid sequence of SEQ ID NO: 189 and a VL comprising the amino acid sequence of SEQ ID NO: 190;

a VH comprising the amino acid sequence of SEQ ID NO: 199 and a VL comprising the amino acid sequence of SEQ ID NO: 200; or

a VH comprising the amino acid sequence of SEQ ID NO: 209 and a VL comprising the amino acid sequence of SEQ ID NO: 210.

[0010] In some cases, the antibody comprises

the CDRs of [embodimentexample](#) (a) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 11 and a light chain (LC) comprising an amino

acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 12;

the CDRs of [embodimentexample](#) (b) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 21 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 22;

the CDRs of [embodimentexample](#) (c) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 31 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 32;

the CDRs of [embodimentexample](#) (d) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 41 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 42;

the CDRs of [embodimentexample](#) (e) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 51 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 52;

the CDRs of [embodimentexample](#) (f) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 61 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 62;

the CDRs of [embodimentexample](#) (g) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 71 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 72;

the CDRs of [embodimentexample](#) (h) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to

the amino acid sequence of SEQ ID NO: 81 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 82;

the CDRs of [embodimentexample](#) (i) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 91 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 92;

the CDRs of [embodimentexample](#) (j) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 101 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 102;

the CDRs of [embodimentexample](#) (k) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 111 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 112;

the CDRs of [embodimentexample](#) (l) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 121 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 122;

the CDRs of [embodimentexample](#) (m) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 131 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 132;

the CDRs of [embodimentexample](#) (n) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 141 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 142;

the CDRs of embodimentexample (o) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 151 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 152;

the CDRs of embodimentexample (p) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 161 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 162;

the CDRs of embodimentexample (q) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 171 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 172;

the CDRs of embodimentexample (r) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 181 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 182;

the CDRs of embodimentexample (s) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 191 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 192;

the CDRs of embodimentexample (t) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 201 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 202; or

the CDRs of embodimentexample (u) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 211 and a light chain (LC) comprising an

amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 212.

[0011] In some embodiment examples, the antibody comprises:

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 11 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 12;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 21 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 22;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 31 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 32;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 41 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 42;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 51 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 52;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 61 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 62;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 71 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 72;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 81 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 82;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 91 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 92;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 101 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 102;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 111 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 112;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 121 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 122;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 131 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 132;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 141 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 142;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 151 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 152;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 161 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 162;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 171 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 172;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 181 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 182;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 191 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 192;

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 201 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 202; or

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 211 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 212.

[0012] The disclosure also includes an isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody: specifically binds to a region of APOL1 corresponding to amino acids 61-103 of APOL1 G0 (SEQ ID NO: 2); and/or specifically binds to a region of APOL1 corresponding to amino acids 111-150 of APOL1 G0 (SEQ ID NO: 2); and further wherein the antibody preferentially recognizes APOL1 expressed on podocytes over APOL1 found in serum. In some such cases, the antibody comprises:

- (a) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 173, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 174, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 175; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 176, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 177, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 178; or
- (b) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 183, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 184, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 185; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 186, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 187, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 188.

[0013] ~~Embodiment~~**Example** herein also include an isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody: specifically binds to a region of APOL1

and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 76, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 77, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 78;

(f) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 133, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 134, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 135; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 136, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 137, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 138;

(g) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 143, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 144, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 145; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 146, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 147, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 148; or

(h) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 123, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 124, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 125; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 126, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 127, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 128.

[0014] ~~Embodiment~~Example herein also include isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody: specifically binds to a region of APOL1 corresponding to amino acids 260-314 of APOL1 G0 (SEQ ID NO: 2); and further wherein the antibody preferentially recognizes APOL1 found in serum over APOL1 expressed on podocytes. In some such cases, the antibody comprises:

(a) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 33, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 34, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 35; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid

(APOL2 or APOL3), and/or (b) does not significantly bind to apolipoprotein L2 or L6 (APOL2 or APOL6), wherein the antibody comprises:

(a) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 163, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 164, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 165; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 166, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 167, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 168;

(b) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 103, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 104, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 105; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 106, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 107, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 108; or

(c) a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 23, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 24, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 25; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 26, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 27, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 28.

[0017] In any of the above embodiment examples, the antibody can be optionally humanized or chimeric. The antibody may also be an IgG antibody, such as an IgG1, IgG2, IgG3, or IgG4. In some embodiment examples, the antibody is a full length antibody. In other embodiment examples, the antibody is an antibody fragment, such as an Fv, single-chain Fv (scFv), Fab, Fab', or (Fab')₂. In some embodiment examples, the antibody can be a bispecific or multispecific antibody or can be conjugated covalently or noncovalently to at least one other molecule. In some embodiment examples, the antibody is conjugated covalently or noncovalently to at least one other molecule, wherein the at least one other molecule comprises a detection label and/or a pharmaceutical agent. In some embodiment examples, the antibody specifically binds to a polypeptide comprising the amino acid sequence of SEQ ID NO: 2, SEQ ID NO: 213, and/or SEQ ID NO: 214.

[0018] The present disclosure also includes an isolated nucleic acid encoding an antibody described herein. In one aspect, the disclosure provides an isolated nucleic acid encoding the antibody described herein. The disclosure also encompasses an isolated vector comprising one

or more nucleic acids encoding the heavy chain and the light chain of an antibody herein. In another aspect, the disclosure provides an isolated vector comprising one or more nucleic acids encoding the heavy chain and the light chain of the antibody described herein. The present disclosure also encompasses an isolated host cell comprising a nucleic acid or a set of nucleic acids encoding an antibody herein. In another aspect, the disclosure provides an isolated host cell comprising the nucleic acid described herein or the vector described herein. Furthermore, the disclosure contemplates methods of producing an antibody that binds to APOL1 comprising culturing a host cell comprising a nucleic acid or set of nucleic acids encoding an antibody herein under conditions suitable for the expression of the antibody. In yet another aspect, the disclosure provides a method of producing an antibody that binds to APOL1 comprising culturing the host cell described herein under conditions suitable for the expression of the antibody. In some cases, the method further comprises recovering the antibody from the host cell. The present disclosure also includes an antibody produced by those methods. In one aspect, the disclosure provides an antibody produced by the method described herein.

[0019] The disclosure herein also encompasses methods of detecting apolipoprotein L1 (APOL1) in a sample, comprising, for example, providing a sample comprising at least one of APOL1, APOL2, APOL3, APOL4, or APOL6; contacting the sample with an anti-APOL1 antibody according to the disclosure; and detecting the presence of the APOL1 protein in the sample based on recognition of the protein by the anti-APOL1 antibody. Optionally, the sample comprises human kidney cells, human podocyte cells, human endothelial cells, or optionally wherein the sample is a human serum or blood sample. In one aspect, the disclosure provides a method of detecting apolipoprotein L1 (APOL1) in a sample, comprising: providing a sample comprising at least one of APOL1, APOL2, APOL3, APOL4, or APOL6; contacting the sample with an anti-APOL1 antibody described herein; and detecting the presence of the APOL1 protein in the sample based on recognition of the protein by the anti-APOL1 antibody; optionally, wherein the sample comprises human kidney cells, human podocyte cells, human endothelial cells, or optionally wherein the sample is a human serum or blood sample.

[0020] The present application further discloses methods of distinguishing endogenous apolipoprotein L1 (APOL1) from apolipoprotein L2 (APOL2), apolipoprotein L3 (APOL3), apolipoprotein L4 (APOL4), and apolipoprotein L6 (APOL6) comprising: providing a sample that may contain at least one of APOL1, APOL2, APOL3, APOL4, and APOL6, contacting the sample with an anti-APOL1 antibody, and detecting binding of the antibody to the sample, wherein the antibody is specifically binds to APOL1 but does not significantly bind to one or more of APOL2, APOL3, APOL4, and APOL6. In one aspect, the disclosure provides a method of distinguishing endogenous apolipoprotein L1 (APOL1) from apolipoprotein L2 (APOL2), apolipoprotein L3 (APOL3), apolipoprotein L4 (APOL4), and apolipoprotein L6 (APOL6) comprising: providing a sample that may contain at least one of APOL1, APOL2, APOL3, APOL4, and APOL6, contacting the sample with an anti-APOL1 antibody described herein, and detecting binding of the antibody to the sample, wherein the antibody is specifically binds to APOL1 but does not significantly bind to one or more of APOL2, APOL3, APOL4, and APOL6. In some such cases, the antibody comprises the VH CDR1, CDR2, and CDR3 and the VL CDR1, CDR2, and CDR3 of antibody 5.17D12, such as comprising SEQ ID Nos: 163-168. In some cases, the methods further comprise contacting the sample with an anti-APOL1 antibody that is capable of distinguishing the G0 and G1 forms of APOL1 from the G2 form, such as an antibody comprising the VH CDR1, CDR2, and CDR3 and the VL CDR1, CDR2, and CDR3 of antibody 4.11A10 (comprising SEQ ID Nos: 133-138), 4.12E5 (comprising SEQ ID Nos: 123-128), or 4.11H11 (comprising SEQ ID Nos: 143-148).

[0021] In some embodiment examples, the disclosure provides methods of distinguishing apolipoprotein L1 (APOL1) G0 and G1 forms from APOL1 G2 form, comprising providing a sample that may contain at least one of the G0, G1, and G2 forms, contacting the sample with an anti-APOL1 antibody according to the disclosure, and detecting binding of the antibody to the sample, wherein the antibody preferentially binds to the G0 and G1 forms of APOL1 over the G2 form of APOL1. In some cases, the sample comprises human kidney cells, human podocyte cells, or human endothelial cells.

[0022] The present disclosure also contemplates methods of specifically detecting podocyte cells expressing apolipoprotein L1 (APOL1), comprising providing a sample comprising podocyte cells, contacting the sample with an anti-APOL1 antibody herein, and detecting binding of the antibody to the sample, wherein the antibody (a) preferentially binds to APOL1 found on podocyte cells over APOL1 found in serum, (b) the antibody does not significantly bind to APOL2, and/or (c) the antibody does not significantly bind to APOL6. In some cases, the methods comprise at least one of: (a) contacting the sample with a control antibody that recognizes APOL1 found on both podocytes and serum and/or that recognizes APOL1 found in serum (e.g. in HDL particles), and/or (b) contacting the sample with an anti-APOL1 antibody that is capable of distinguishing the G0 and G1 forms of APOL1 from the G2 form. In one aspect, the disclosure provides a method of specifically detecting podocyte cells expressing apolipoprotein L1 (APOL1), comprising providing a sample comprising podocyte cells, contacting the sample with an anti-APOL1 antibody described herein, and detecting binding of the antibody to the sample, wherein the antibody (a) preferentially binds to APOL1 found on podocyte cells over APOL1 found in serum, (b) the antibody does not significantly bind to APOL2, and/or (c) the antibody does not significantly bind to APOL6.

BRIEF DESCRIPTION OF THE FIGURES

[0023] **Figs. 1A-C** show APOL1 constructs and domain specificities of anti-APOL1 antibodies. **Fig. 1A** shows a schematic representation of full length and truncated *iAPOL1* constructs used to domain-map the antibodies on CHO cells: Signal sequence (ss), Pore Forming Domain (PFD, black), Membrane Addressing Domain (MAD, spotty), Serum Resistance Associated-Interacting domain (SRA-ID, hatched) are indicated, with the intervening linker domain (L) shown as a white rectangle. Wild type full length (aa 28-398) native *APOL1-G0* (*iAPOL1*-CHO; construct a, with its native signal sequence (ss, white)), and *G0* (aa 61-398; construct b), with an N-terminal anti-gD epitope tag (gD) (which includes its own efficient signal sequence for secretion) as a positive control, and a C-terminal GPI anchor to ensure membrane attachment (both grey in constructs b-e) were created (gD-*iAPOL1*-GPI-CHO), since it had not yet been established whether APOL1 was a cell surface protein. Truncation mutants (constructs c-e) are shown: gD-*PFD-MAD*-GPI (construct c), gD-*MAD-SRA-ID*-GPI (construct d), and gD-*SRA-ID*-GPI (construct e). All constructs were stably expressed in CHO cells under a doxycycline-inducible promoter. Amino acid numbers indicate the domain boundaries as defined by Pays et al (see Example 1, reference 1). The MAD alone was predicted to be unstable, hence it was expressed jointly with the PFD or SRA-ID. Our mapping constructs b and c started at amino acid 61 since our immunogen started at aa 61.

[0024] **Fig. 1B** provides examples of flow cytometry results leading to domain mapping. Stably transfected live (not fixed or permeabilized) CHO cells expressing the gD-*iAPOL1*-GPI constructs indicated in (A) after induction with 5 µg/ml dox for 48 h, showing differential antibody binding at 5 µg/ml. Antibodies binding to cells expressing PFD-MAD, but not to MAD-SRA-ID, were marked as having PFD epitopes (aa 61-235); those binding MAD-SRA-ID

WHAT IS CLAIMED IS:

1. An isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody comprises:

~~(a) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 3, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 4, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 5; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 6, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 7, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 8;~~

~~(b) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 13, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 14, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 15; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 16, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 17, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 18;~~

~~(c) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 23, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 24, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 25; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 26, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 27, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 28;~~

~~(d) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 33, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 34, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 35; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 36, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 37, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 38;~~

~~(e) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 43, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 44, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 45; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 46, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 47, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 48;~~

(f) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 53, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 54, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 55; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 56, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 57, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 58;~~

(g) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 63, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 64, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 65; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 66, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 67, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 68;~~

(h) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 73, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 74, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 75; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 76, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 77, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 78;~~

(i) ~~—heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 83, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 84, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 85; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 86, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 87, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 88;~~

(j) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 93, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 94, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 95; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 96, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 97, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 98;~~

(k) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 103, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 104, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 105; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ~~

~~ID NO: 106, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 107, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 108;~~

~~(l) — a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 113, a CDR-H2 comprising the amino acid sequence of SEQ ID NO: 114, and a CDR-H3 comprising the amino acid sequence of SEQ ID NO: 115; and a light chain variable region (VL) comprising a CDR-L1 comprising the amino acid sequence of SEQ ID NO: 116, a CDR-L2 comprising the amino acid sequence of SEQ ID NO: 117, and a CDR-L3 comprising the amino acid sequence of SEQ ID NO: 118;~~

~~(m) — a heavy chain variable region (VH) comprising a CDR-H1 comprising the amino acid sequence of SEQ ID NO: 123, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 124, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 125; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 126, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 127, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 128;~~

~~(n) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 133, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 134, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 135; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 136, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 137, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 138;~~

~~(o) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 143, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 144, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 145; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 146, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 147, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 148;~~

~~(p) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 153, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 154, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 155; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 156, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 157, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 158;~~

~~(q) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 163, a CDR H2 comprising the amino acid sequence of SEQ ID~~

NO: 164, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 165; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 166, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 167, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 168;

(r) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 173, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 174, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 175; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 176, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 177, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 178;

(s) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 183, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 184, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 185; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 186, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 187, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 188;

(t) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 193, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 194, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 195; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 196, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 197, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 198; or

(u) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 203, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 204, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 205; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 206, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 207, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 208.

2. The antibody of claim 1, wherein the antibody:

(a) comprises the CDRs of claim 1(a) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 9 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 10;

~~(b) comprises the CDRs of claim 1(b) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 19 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 20;~~

~~(c) comprises the CDRs of claim 1(c) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 29 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 30;~~

~~(d) comprises the CDRs of claim 1(d) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 39 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 40;~~

~~(e) comprises the CDRs of claim 1(e) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 49 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 50;~~

~~(f) comprises the CDRs of claim 1(f) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 59 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 60;~~

~~(g) comprises the CDRs of claim 1(g) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 69 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 70;~~

~~(h) comprises the CDRs of claim 1(h) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 79 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 80;~~

~~(i) comprises the CDRs of claim 1(i) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 89 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 90;~~

~~(j) comprises the CDRs of claim 1(j) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 99~~

~~and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 100;~~

~~(k) comprises the CDRs of claim 1(k) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 109 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 110;~~

~~(l) comprises the CDRs of claim 1(l) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 119 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 120;~~

~~(m) comprises the CDRs of claim 1(m) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 129 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 130;~~

~~(n) comprises the CDRs of claim 1(n) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 139 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 140;~~

~~(o) comprises the CDRs of claim 1(o) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 149 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 150;~~

~~(p) comprises the CDRs of claim 1(p) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 159 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 160;~~

~~(q) comprises the CDRs of claim 1(q) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 169 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 170;~~

~~(r) comprises the CDRs of claim 1(r) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 179 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 180;~~

~~(s) comprises the CDRs of claim 1(s) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 189 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 190;~~

~~(t) comprises the CDRs of claim 1(t) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 199 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 200; or~~

~~(u) comprises the CDRs of claim 1(u) and further comprises a VH that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 209 and/or a VL that is at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 210.~~

3. The antibody of claim 1 or 2, wherein the antibody comprises:

~~the CDRs of claim 1(a) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 9;~~

~~the CDRs of claim 1(b) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 19;~~

~~the CDRs of claim 1(c) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 29;~~

~~the CDRs of claim 1(d) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 39;~~

~~the CDRs of claim 1(e) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 49;~~

~~the CDRs of claim 1(f) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 59;~~

~~the CDRs of claim 1(g) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 69;~~

~~the CDRs of claim 1(h) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 79;~~

~~the CDRs of claim 1(i) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 89;~~

~~the CDRs of claim 1(j) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 99;~~

~~the CDRs of claim 1(k) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 109;~~

the CDRs of claim 1(h) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 119;

~~the CDRs of claim 1(m) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 129;~~

~~the CDRs of claim 1(n) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 139;~~

~~the CDRs of claim 1(o) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 149;~~

~~the CDRs of claim 1(p) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 159;~~

~~the CDRs of claim 1(q) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 169;~~

~~the CDRs of claim 1(r) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 179;~~

~~the CDRs of claim 1(s) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 189;~~

~~the CDRs of claim 1(t) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 199; or~~

~~the CDRs of claim 1(u) and further comprises a VH comprising the amino acid sequence of SEQ ID NO: 209.~~

4. The antibody of claim 1 or 2, wherein the antibody comprises:

~~the CDRs of claim 1(a) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 10;~~

~~the CDRs of claim 1(b) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 20;~~

~~the CDRs of claim 1(c) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 30;~~

~~the CDRs of claim 1(d) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 40;~~

~~the CDRs of claim 1(e) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 50;~~

~~the CDRs of claim 1(f) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 60;~~

~~the CDRs of claim 1(g) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 70;~~

~~the CDRs of claim 1(h) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 80;~~

~~the CDRs of claim 1(i) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 90;~~

~~the CDRs of claim 1(j) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 100;~~

~~the CDRs of claim 1(k) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 110;~~

the CDRs of claim 1(~~h~~) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 120;

~~the CDRs of claim 1(m) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 130;~~

~~the CDRs of claim 1(n) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 140;~~

~~the CDRs of claim 1(o) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 150;~~

~~the CDRs of claim 1(p) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 160;~~

~~the CDRs of claim 1(q) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 170;~~

~~the CDRs of claim 1(r) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 180;~~

~~the CDRs of claim 1(s) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 190;~~

~~the CDRs of claim 1(t) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 200; or~~

~~the CDRs of claim 1(u) and further comprises a VL comprising the amino acid sequence of SEQ ID NO: 210.~~

5. The antibody of claim 1 or 2, wherein the antibody comprises:

~~-a VH comprising the amino acid sequence of SEQ ID NO: 9 and a VL comprising the amino acid sequence of SEQ ID NO: 10;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 19 and a VL comprising the amino acid sequence of SEQ ID NO: 20;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 29 and a VL comprising the amino acid sequence of SEQ ID NO: 30;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 39 and a VL comprising the amino acid sequence of SEQ ID NO: 40;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 49 and a VL comprising the amino acid sequence of SEQ ID NO: 50;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 59 and a VL comprising the amino acid sequence of SEQ ID NO: 60;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 69 and a VL comprising the amino acid sequence of SEQ ID NO: 70;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 79 and a VL comprising the amino acid sequence of SEQ ID NO: 80;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 89 and a VL comprising the amino acid sequence of SEQ ID NO: 90;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 99 and a VL comprising the amino acid sequence of SEQ ID NO: 100;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 109 and a VL comprising the amino acid sequence of SEQ ID NO: 110;~~

a VH comprising the amino acid sequence of SEQ ID NO: 119 and a VL comprising the amino acid sequence of SEQ ID NO: 120;

~~-a VH comprising the amino acid sequence of SEQ ID NO: 129 and a VL comprising the amino acid sequence of SEQ ID NO: 130;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 139 and a VL comprising the amino acid sequence of SEQ ID NO: 140;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 149 and a VL comprising the amino acid sequence of SEQ ID NO: 150;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 159 and a VL comprising the amino acid sequence of SEQ ID NO: 160;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 169 and a VL comprising the amino acid sequence of SEQ ID NO: 170;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 179 and a VL comprising the amino acid sequence of SEQ ID NO: 180;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 189 and a VL comprising the amino acid sequence of SEQ ID NO: 190;~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 199 and a VL comprising the amino acid sequence of SEQ ID NO: 200; or~~

~~-a VH comprising the amino acid sequence of SEQ ID NO: 209 and a VL comprising the amino acid sequence of SEQ ID NO: 210.~~

6. The antibody of any one of claims 1-5, wherein the antibody comprises:

~~-the CDRs of claim 1(a) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the amino acid sequence of SEQ ID NO: 11 and/or a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 12;~~

~~-the CDRs of claim 1(b) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 21 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 22;~~

~~-the CDRs of claim 1(c) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 31 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 32;~~

~~-the CDRs of claim 1(d) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 41 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 42;~~

~~-the CDRs of claim 1(e) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 51 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 52;~~

~~-the CDRs of claim 1(f) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 61 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 62;~~

~~the CDRs of claim 1(g) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 71 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 72;~~

~~the CDRs of claim 1(h) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 81 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 82;~~

~~the CDRs of claim 1(i) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 91 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 92;~~

~~the CDRs of claim 1(j) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 101 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 102;~~

~~the CDRs of claim 1(k) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 111 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 112;~~

the CDRs of claim 1(+) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 121 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 122;

~~the CDRs of claim 1(m) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 131 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 132;~~

~~the CDRs of claim 1(n) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 141 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 142;~~

~~the CDRs of claim 1(o) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID~~

~~NO: 151 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 152;~~

~~-the CDRs of claim 1(p) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 161 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 162;~~

~~-the CDRs of claim 1(q) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 171 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 172;~~

~~-the CDRs of claim 1(r) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 181 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 182;~~

~~-the CDRs of claim 1(s) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 191 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 192;~~

~~-the CDRs of claim 1(t) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 201 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 202; or~~

~~-the CDRs of claim 1(u) and further comprises a heavy chain (HC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 211 and a light chain (LC) comprising an amino acid sequence at least 90%, at least 95%, at least 97%, or at least 99% identical to the SEQ ID NO: 212.~~

7. The antibody of claim 1, wherein the antibody comprises:

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 11 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 12;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 21 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 22;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 31 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 32;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 41 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 42;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 51 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 52;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 61 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 62;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 71 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 72;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 81 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 82;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 91 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 92;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 101 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 102;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 111 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 112;~~

a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 121 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 122;

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 131 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 132;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 141 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 142;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 151 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 152;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 161 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 162;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 171 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 172;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 181 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 182;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 191 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 192;~~

~~-a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 201 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 202; or~~

~~a heavy chain (HC) comprising the amino acid sequence of SEQ ID NO: 211 and a light chain (LC) comprising the amino acid sequence of SEQ ID NO: 212.~~

8. ~~An isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody:~~

~~a) —specifically binds to a region of APOL1 corresponding to amino acids 61-103 of APOL1 G0 (SEQ ID NO: 2); and/or~~

~~b) —specifically binds to a region of APOL1 corresponding to amino acids 111-150 of APOL1 G0 (SEQ ID NO: 2); and further~~

~~wherein the antibody preferentially recognizes APOL1 expressed on podocytes over APOL1 found in serum.~~

9. ~~The antibody of claim 8, wherein the antibody comprises:~~

~~(a) —a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 173, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 174, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 175; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 176, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 177, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 178; or~~

~~(b) —a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 183, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 184, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 185; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 186, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 187, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 188.~~

10. ~~An isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody:~~

~~specifically binds to a region of APOL1 corresponding to amino acids 103-111 of APOL1 G0 (SEQ ID NO: 2);~~

~~specifically binds to a region of APOL1 corresponding to amino acids 150-172 of APOL1 G0 (SEQ ID NO: 2);~~

~~specifically binds to a region of APOL1 corresponding to amino acids 314-333 of APOL1 G0 (SEQ ID NO: 2); and/or~~

~~specifically binds to a region of APOL1 corresponding to amino acids 376-398 of APOL1 G0 (SEQ ID NO: 2); and further~~

wherein the antibody recognizes both APOL1 expressed on podocytes and APOL1 found in serum;

11. — The isolated antibody of claim 10, wherein the antibody comprises:

(a) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 3, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 4, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 5; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 6, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 7, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 8;

(b) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 53, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 54, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 55; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 56, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 57, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 58;

(c) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 63, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 64, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 65; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 66, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 67, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 68;

(d) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 83, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 84, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 85; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 86, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 87, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 88;

(e) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 73, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 74, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 75; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 76, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 77, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 78;

(f) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 133, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 134, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 135; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 136, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 137, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 138;~~

(g) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 143, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 144, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 145; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 146, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 147, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 148; or~~

(h) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 123, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 124, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 125; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 126, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 127, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 128.~~

12. An isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody:

~~specifically binds to a region of APOL1 corresponding to amino acids 260-314 of APOL1-G0 (SEQ ID NO: 2); and further~~

~~wherein the antibody preferentially recognizes APOL1 found in serum over APOL1 expressed on podocytes.~~

13. ~~—The antibody of claim 12, wherein the antibody comprises:~~

(a) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 33, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 34, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 35; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 36, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 37, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 38; or~~

(b) ~~—a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 43, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 44, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 45; and a light~~

chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 46, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 47, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 48.

14. — An isolated antibody that specifically binds to apolipoprotein L1 (APOL1), wherein the antibody preferentially binds to the G0 and G1 forms of APOL1 over the G2 form of APOL1.

15. — The antibody of claim 14, wherein the antibody comprises:

(a) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 143, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 144, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 145; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 146, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 147, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 148;

(b) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 123, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 124, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 125; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 126, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 127, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 128; or

(c) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 133, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 134, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 135; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 136, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 137, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 138;

16. — An isolated antibody that specifically binds to apolipoprotein L1 (APOL1) and that (a) does not significantly bind to apolipoprotein L2 or L3 (APOL2 or APOL3), and/or (b) does not significantly bind to apolipoprotein L2 or L6 (APOL2 or APOL6), wherein the antibody comprises:

(a) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 163, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 164, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 165; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ

~~ID NO: 166, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 167, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 168;~~

~~(b) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 103, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 104, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 105; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 106, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 107, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 108; or~~

~~(c) — a heavy chain variable region (VH) comprising a CDR H1 comprising the amino acid sequence of SEQ ID NO: 23, a CDR H2 comprising the amino acid sequence of SEQ ID NO: 24, and a CDR H3 comprising the amino acid sequence of SEQ ID NO: 25; and a light chain variable region (VL) comprising a CDR L1 comprising the amino acid sequence of SEQ ID NO: 26, a CDR L2 comprising the amino acid sequence of SEQ ID NO: 27, and a CDR L3 comprising the amino acid sequence of SEQ ID NO: 28.~~

~~178.~~ The antibody of any one of claims 1 to ~~57~~57~~or 8 to 16~~, wherein the antibody is humanized or chimeric.

~~189.~~ The antibody of any one of claims 1 to ~~57~~57~~or 8 to 16~~, which is an IgG antibody, such as an IgG1, IgG2, IgG3, or IgG4.

~~1910.~~ The antibody of any one of claims 1 to ~~189~~189, which is a full length antibody.

~~2011.~~ The antibody of any one of claims 1 to ~~57~~57~~or 8 to 16~~, which is an antibody fragment, such as an Fv, single-chain Fv (scFv), Fab, Fab', or (Fab')₂.

~~2412.~~ The antibody of any one of claims 1 to ~~2011~~2011, which is a bispecific or multispecific antibody or wherein the antibody is conjugated covalently or noncovalently to at least one other molecule.

~~2213.~~ The antibody of claim ~~2412~~2412, wherein the antibody is conjugated covalently or noncovalently to at least one other molecule, wherein the at least one other molecule comprises a detection label and/or a pharmaceutical agent.

~~2314.~~ The antibody of any one of claims 1-~~2213~~2213, wherein the antibody specifically binds to a polypeptide comprising the amino acid sequence of SEQ ID NO: 2, SEQ ID NO: 213, and/or SEQ ID NO: 214.

~~2415.~~ An isolated nucleic acid encoding the antibody of any of claims 1 to ~~2314~~2314.

~~25~~16. An isolated vector comprising one or more nucleic acids encoding the heavy chain and the light chain of the antibody of any one of claims 1 to ~~23~~14.

~~26~~17. An isolated host cell comprising the nucleic acid of claim ~~24~~15 or the vector of claim ~~25~~16.

~~27~~18. A method of producing an antibody that binds to APOL1 comprising culturing the host cell of claim ~~26~~17 under conditions suitable for the expression of the antibody.

~~28~~19. The method of claim ~~27~~18, further comprising recovering the antibody from the host cell.

~~29~~20. An antibody produced by the method of claim ~~28~~19.

~~30~~21. A method of detecting apolipoprotein L1 (APOL1) in a sample, comprising:

- providing a sample comprising at least one of APOL1, APOL2, APOL3, APOL4, or APOL6;

- contacting the sample with an anti-APOL1 antibody according to any one of claims 1-~~23~~14; and

- detecting the presence of the APOL1 protein in the sample based on recognition of the protein by the anti-APOL1 antibody;

optionally, wherein the sample comprises human kidney cells, human podocyte cells, human endothelial cells, or optionally wherein the sample is a human serum or blood sample.

~~31~~22. A method of distinguishing endogenous apolipoprotein L1 (APOL1) from apolipoprotein L2 (APOL2), apolipoprotein L3 (APOL3), apolipoprotein L4 (APOL4), and apolipoprotein L6 (APOL6) comprising: providing a sample that may contain at least one of APOL1, APOL2, APOL3, APOL4, and APOL6, contacting the sample with an anti-APOL1 antibody according to any one of claims ~~16~~1 to ~~23~~14, and detecting binding of the antibody to the sample, wherein the antibody is specifically binds to APOL1 but does not significantly bind to one or more of APOL2, APOL3, APOL4, and APOL6.

~~32~~. The method of claim ~~30~~ or ~~31~~, wherein the antibody comprises the VH CDR1, CDR2, and CDR3 and the VL CDR1, CDR2, and CDR3 of antibody 5.17D12, such as comprising SEQ ID Nos: ~~163-168~~.

~~33~~23. The method of claim ~~30~~21 or ~~31~~22 or ~~32~~, further comprising contacting the sample with an anti-APOL1 antibody that is capable of distinguishing the G0 and G1 forms of APOL1 from the G2 form, such as an antibody comprising the VH CDR1, CDR2, and CDR3

and the VL CDR1, CDR2, and CDR3 of antibody 4.11A10 (comprising SEQ ID Nos: 133-138), 4.12E5 (comprising SEQ ID Nos: 123-128), or 4.11H11 (comprising SEQ ID Nos: 143-148).

~~34. A method of distinguishing apolipoprotein L1 (APOL1) G0 and G1 forms from APOL1 G2 form, comprising providing a sample that may contain at least one of the G0, G1, and G2 forms, contacting the sample with an anti-APOL1 antibody according to any one of claims 14, 15, or 17 to 23, and detecting binding of the antibody to the sample, wherein the antibody preferentially binds to the G0 and G1 forms of APOL1 over the G2 form of APOL1.~~

~~35. The method of any one of claims 30-34, wherein the sample comprises human kidney cells, human podocyte cells, or human endothelial cells.~~

~~36~~24. A method of specifically detecting podocyte cells expressing apolipoprotein L1 (APOL1), comprising providing a sample comprising podocyte cells, contacting the sample with an anti-APOL1 antibody according to any one of claims 1 to ~~11 or 17 to 23~~14, and detecting binding of the antibody to the sample, wherein the antibody (a) preferentially binds to APOL1 found on podocyte cells over APOL1 found in serum, (b) the antibody does not significantly bind to APOL2, and/or (c) the antibody does not significantly bind to APOL6.

~~37~~25. The method of claim ~~36~~24, further comprising at least one of: (a) contacting the sample with a control antibody that recognizes APOL1 found on both podocytes and serum and/or that recognizes APOL1 found in serum (e.g. in HDL particles), and/or (b) contacting the sample with an anti-APOL1 antibody that is capable of distinguishing the G0 and G1 forms of APOL1 from the G2 form.