CLAIMS

1. An antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

(a) a heavy chain variable (VH) region comprising a heavy chain complementarity determining region 1 (CDR-H1), a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:6; and a light chain variable (VL) region comprising a light chain complementarity determining region 1 (CDR-L1), a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:23;

(b) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:1; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:17;

(c) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:2; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:18;

(d) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:3; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:19;

(e) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:4; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:19;

(f) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH

region amino acid sequence set forth in SEQ ID NO:5; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:20;

(g) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:1; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:21;

(h) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:2; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:22;

(i) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:7; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:24;

(j) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:8; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:25;

(k) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:9; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:26;

(l) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:10; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:27;

(m) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:11; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:28;

(n) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:12; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:29;

(o) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:13; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:30;

(p) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:14; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:31;

(q) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:15; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:32;

(r) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH region amino acid sequence set forth in SEQ ID NO:12; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:33; or

(s) a VH region comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, comprising a CDR-H1, a CDR-H2, and a CDR-H3, respectively, contained within the VH

region amino acid sequence set forth in SEQ ID NO:16; and a VL region comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, comprising a CDR-L1, a CDR-L2, and a CDR-L3, respectively, contained within the VL region amino acid sequence set forth in SEQ ID NO:34.

2. The antibody or antigen-binding fragment of claim 1, wherein:

(a) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248;

(b) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:40, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:41, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:37; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:210, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:211, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:212;

(c) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:52, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:53, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:37; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:218, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:211, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:212;

(d) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:63, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:64, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:60; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:221, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:222, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:223;

(e) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:75, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:76, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:60; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:229, a CDR-

L2 comprising the amino acid sequence set forth in SEQ ID NO:222, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:223;

(f) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:40, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:41, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:37; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:233, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:234, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:235;

(g) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:52, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:53, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:37; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:241, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:234, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:242;

(h) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:98, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:99, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:254, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:255;

(i) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:108, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:109, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:105; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:258, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:259, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:260;

(j) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:121, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:122, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:118; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:265, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:266, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:267;

(k) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:134, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:135, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:131; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:273, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:274;

(l) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:147, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:148, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:144; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:278, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:279, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:280;

(m)the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:160, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:161, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:157; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:286, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:287, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:288;

(n) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:173, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:174, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:170; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:294, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:234, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:295;

(o) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:185, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:186, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:182; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:299, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:300, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:301;

(p) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:173, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:174, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:193; and the VL

region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:306, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:234, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:307;

(q) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:160, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:161, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:157; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:311, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:312, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:313; or

(r) the VH region comprises a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:202, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:203, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:199; and the VL region comprises a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:319, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:320, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:321.

3. The antibody or antigen-binding fragment of claim 1 or claim 2, wherein:

(a) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:6 or comprises the amino acid sequence set forth in SEQ ID NO:6; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:23 or comprises the amino acid sequence set forth in SEQ ID NO:23;

(b) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:1 or comprises the amino acid sequence set forth in SEQ ID NO:1; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:17 or comprises the amino acid sequence set forth in SEQ ID NO:17;

(c) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:2 or comprises the amino acid sequence set forth in SEQ ID NO:2; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:18 or comprises the amino acid sequence set forth in SEQ ID NO:18;

(d) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:3 or comprises the amino acid sequence set forth in SEQ ID NO:3; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:19 or comprises the amino acid sequence set forth in SEQ ID NO:19;

(e) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:4 or comprises the amino acid sequence set forth in SEQ ID NO:4; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:19 or comprises the amino acid sequence set forth in SEQ ID NO:19;

(f) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:5 or comprises the amino acid sequence set forth in SEQ ID NO:5; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:20 or comprises the amino acid sequence set forth in SEQ ID NO:20;

(g) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:1 or comprises the amino acid sequence set forth in SEQ ID NO:1; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:21 or comprises the amino acid sequence set forth in SEQ ID NO:21;

(h) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:2 or comprises the amino acid sequence set forth in SEQ ID NO:2; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:22 or comprises the amino acid sequence set forth in SEQ ID NO:22;

(i) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:7 or comprises the amino acid sequence set forth in SEQ ID NO:7; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:24 or comprises the amino acid sequence set forth in SEQ ID NO:24;

(j) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:8 or comprises the amino acid sequence set forth in SEQ ID NO:8; and the VL region comprises an amino acid sequence that has at least

95% sequence identity to the amino acid sequence set forth in SEQ ID NO:25 or comprises the amino acid sequence set forth in SEQ ID NO:25;

(k) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:9 or comprises the amino acid sequence set forth in SEQ ID NO:9; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:26 or comprises the amino acid sequence set forth in SEQ ID NO:26;

(l) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:10 or comprises the amino acid sequence set forth in SEQ ID NO:10; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:27 or comprises the amino acid sequence set forth in SEQ ID NO:27;

(m)the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:11 or comprises the amino acid sequence set forth in SEQ ID NO:11; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:28 or comprises the amino acid sequence set forth in SEQ ID NO:28;

(n) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:12 or comprises the amino acid sequence set forth in SEQ ID NO:12; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:29 or comprises the amino acid sequence set forth in SEQ ID NO:29;

(o) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:13 or comprises the amino acid sequence set forth in SEQ ID NO:13; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:30 or comprises the amino acid sequence set forth in SEQ ID NO:30;

(p) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:14 or comprises the amino acid sequence set forth in SEQ ID NO:14; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:31 or comprises the amino acid sequence set forth in SEQ ID NO:31;

(q) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:15 or comprises the amino acid sequence set forth in SEQ ID NO:15; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:32 or comprises the amino acid sequence set forth in SEQ ID NO:32;

(r) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:12 or comprises the amino acid sequence set forth in SEQ ID NO:12; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:33 or comprises the amino acid sequence set forth in SEQ ID NO:33; or

(s) the VH region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:16 or comprises the amino acid sequence set forth in SEQ ID NO:16; and the VL region comprises an amino acid sequence that has at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO:34 or comprises the amino acid sequence set forth in SEQ ID NO:34.

4. The antibody or antigen-binding fragment of any one of claims 1-3, wherein the antibody or antigen-binding fragment is a recombinant, monoclonal, human, chimeric, or humanized antibody or antigen-binding fragment.

5. The antibody or antigen-binding fragment of any one of claims 1-4, wherein the antibody or antigen binding fragment comprises an Fc region of a human immunoglobulin and/or human antibody framework regions.

6. The antibody or antigen-binding fragment of any one of claims 1-5, wherein the antibody or antigen binding fragment is a single chain antibody fragment, a single domain antibody, or a whole or intact antibody.

7. The antibody or antigen-binding fragment of any one of claims 1-6, that is a bispecific antibody that further specifically binds to a second antigen, optionally wherein the second antigen is an antigen expressed on a tumor cell or an immune cell.

8. The antibody or antigen-binding fragment of any one of claims 1-7, wherein the antibody or antigen-binding fragment thereof comprises:

an Fc region that exhibits one or more Fc-mediated effector function(s);

an Fc region that lacks Fc-mediated effector function(s);

an Fc region that exhibits substantially reduced Fc-mediated effector function(s); or

an Fc region that does not exhibit substantial Fc-mediated effector function(s).

9. A conjugate, comprising the antibody or antigen-binding fragment of any one of claims 1-8 and a heterologous molecule or moiety.

10. The conjugate of claim 9, wherein the heterologous molecule or moiety is a protein, peptide, nucleic acid, dye, or small molecule, optionally a cytotoxic agent, a toxin, a radioisotope, a chemotherapeutic agent, a lytic peptide, a cytokine, or a photoactivatable dye.

11. The conjugate of claim 10, wherein the photoactivatable dye is a Si-phthalocyanine dye.

12. A conjugate, comprising:

a) an antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

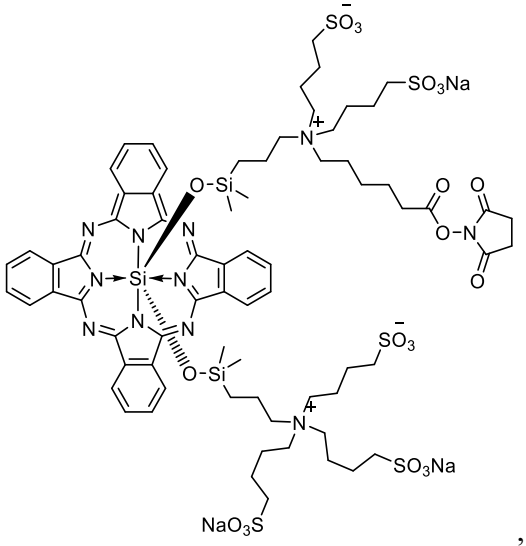
i) a VH region comprising a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and

ii) a VL region comprising a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248; and

b) a heterologous molecule or moiety that is a Si-phthalocyanine dye.

13. The conjugate of claim 11 or claim 12, wherein the Si-phthalocyanine dye is IR700.

14. The conjugate of any one of claims 11-13, wherein the Si-phthalocyanine dye has the structure of Formula (I):



, or is a salt, stereoisomer, or tautomer thereof.

15. The conjugate of any one of claims 11-14, wherein the conjugate is activated by illumination at a wavelength between at or about 600 nm and at or about 850 nm to effect cell killing.

16. The conjugate of claim 15, wherein the activated conjugate affects tumor growth inhibition or killing at a higher level, activity, or potency than the unconjugated antibody.

17. A polynucleotide encoding the antibody or antigen-binding fragment of any one of claims 1-8 or the antibody or antigen-binding fragment of the conjugate of any of claims 9-16.

18. A vector, comprising the polynucleotide of claim 17.

19. An engineered cell comprising the vector of claim 18.

20. An engineered cell expressing the antibody or antigen binding fragment of any one of claims 1-8 or comprising the conjugate of any one of claims 9-16.

21. A composition comprising the antibody or antigen-binding fragment thereof of any one of claims 1-8, or the conjugate of any one of claims 9-16, optionally further comprising a pharmaceutically acceptable excipient.

22. Use of the antibody or antigen-binding fragment thereof of any of claims 1-8, or the conjugate of any of claims 9-16, or the composition of claim 21 in the manufacture of a medicament for treatment of a tumor or a cancer.

23. Use of the conjugate of any of claims 9-16 or the composition of claim 21 in the manufacture of a medicament for treating a tumor or a lesion in a subject, wherein:

a) the conjugate or the composition is to be administered to the subject; and

b) a target area within the subject is to be illuminated with a wavelength of between at or about 600 nm and at or about 850 nm, and at a dose of from at or about 25 J/cm^2 to at or about 400 J/cm^2 or from at or about 2 J/cm fiber length to at or about 500 J/cm fiber length, thereby activating the conjugate;

whereby the growth, volume or dimensions of the tumor or the lesion is to be reduced or inhibited.

24. The use of claim 22 or claim 23, wherein a first tumor or lesion is to be treated, the growth of the first tumor or lesion is to be inhibited, and/or the size of the first tumor or lesion is to be reduced; and the appearance, growth or establishment of one or more second tumors or lesions, located distally to the first tumor or lesion, is to be inhibited, delayed or prevented.

25. Use of the conjugate of any one of claims 9-16 or the composition of claim 21 in the manufacture of a medicament for immunizing a subject having a first tumor or lesion, wherein:

(a) the conjugate or the composition is to be administered to the subject having a tumor or lesion; and

(b) a target area within the first tumor or lesion is to be illuminated at a wavelength of at or about 600 nm to at or about 850 nm and at a dose of from at or about 25 J/cm^2 to at or about 400 J/cm^2 or from at or about 2 J/cm fiber length to at or about 500 J/cm fiber length;

wherein the first tumor or lesion is to be inhibited in growth and/or reduced in size; and the appearance, growth or establishment of one or more second tumors or lesions, located distally to the treated first tumor or lesion, is to be inhibited, delayed or prevented.

26. The use of any one of claims 22, 23, or 25, wherein the tumor, lesion or cancer is associated with a cancer selected from the group consisting of colon cancer, colorectal cancer, pancreatic cancer, breast cancer, skin cancer, lung cancer, non-small cell lung carcinoma, renal cell carcinoma, thyroid cancer, prostate cancer, head and neck cancer, gastrointestinal cancer, stomach cancer, cancer of the small intestine, spindle cell neoplasm, hepatic carcinoma, liver cancer, cancer of peripheral nerve, brain cancer, cancer of skeletal muscle, cancer of smooth muscle, bone cancer, cancer of adipose tissue, cervical cancer, uterine cancer, cancer of genitals, lymphoma, and multiple myeloma.

27. The use of any one of claims 22, 23, or 25, wherein the medicament further comprises an additional therapeutic agent or anti-cancer treatment or is to be administered in combination with an additional therapeutic agent or anti-cancer treatment.

28. An antibody or antigen-binding fragment thereof of any one of claims 1-8, a conjugate of any one of claims 9-16, or a composition of claim 21, for use as a medicament.

29. A conjugate comprising:

a) an antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

(i) a VH region comprising a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and

(ii) a VL region comprising a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248; and

b) a Si-phthalocyanine dye that is IR700,

for use as a medicament.

30. Use of a conjugate in the manufacture of a medicament for killing a PD-L1 expressing cell in a subject, wherein:

1) a conjugate is to be administered to the subject, wherein the conjugate comprises:

a) an antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

(i) a VH region comprising a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and

(ii) a VL region comprising a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248; and

b) a Si-phthalocyanine dye that is IR700; and

2) a target area, comprising the PD-L1-expressing cell to be killed, within the subject is to be illuminated with a wavelength of 690 ± 40 nm, to activate the conjugate;

whereby a PD-L1-expressing cell is killed.

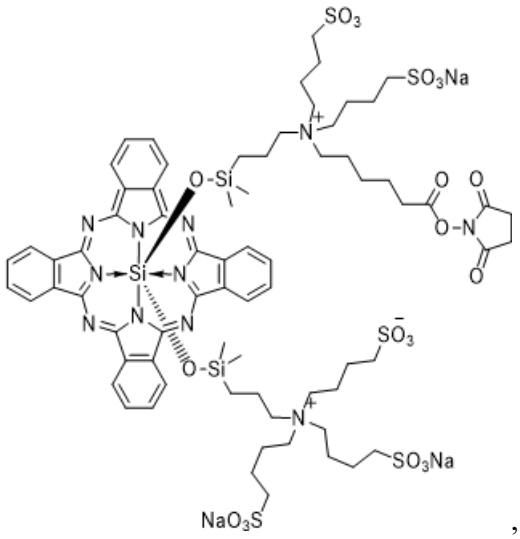
31. A conjugate comprising:

a) an antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

(i) a VH region comprising a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and

(ii) a VL region comprising a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248; and

b) a Si-phthalocyanine dye that has the structure of Formula (I):



, or is a salt, stereoisomer, or tautomer thereof, for use as a medicament.

32. Use of a conjugate in the manufacture of a medicament for killing a PD-L1 expressing cell in a subject, wherein:

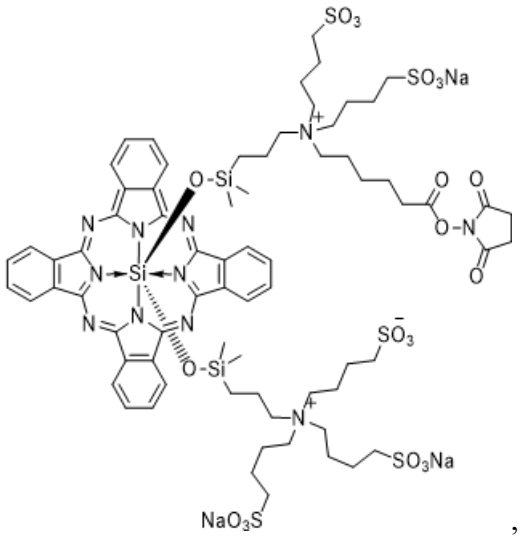
1) a conjugate is to be administered to the subject, the conjugate comprising:

a) an antibody or antigen-binding fragment that specifically binds a Programmed Death-Ligand (PD-L1) protein, wherein the antibody or antigen-binding fragment comprises:

(i) a VH region comprising a CDR-H1 comprising the amino acid sequence set forth in SEQ ID NO:87, a CDR-H2 comprising the amino acid sequence set forth in SEQ ID NO:88, and a CDR-H3 comprising the amino acid sequence set forth in SEQ ID NO:84; and

(ii) a VL region comprising a CDR-L1 comprising the amino acid sequence set forth in SEQ ID NO:246, a CDR-L2 comprising the amino acid sequence set forth in SEQ ID NO:247, and a CDR-L3 comprising the amino acid sequence set forth in SEQ ID NO:248; and

b) a Si-phthalocyanine dye that has the structure of Formula (I):



, or is a salt, stereoisomer, or tautomer thereof; and

2) a target area, comprising the PD-L1-expressing cell to be killed, within the subject is to be illuminated with a wavelength of 670 ± 50 nm, to activate the conjugate;

whereby a PD-L1 expressing cell is killed.