CLAIMS

1. A nucleic acid molecule comprising a polynucleotide sequence encoding an antibody or antigen-binding fragment thereof, comprising variable heavy chain CDR1, CDR2, and CDR3 and variable light chain CDR1, CDR2, and CDR3 amino acid sequences selected from the group consisting of:

(a) SEQ ID NOs:3-8, respectively;
(b) SEQ ID NOs:9-14, respectively;
(c) SEQ ID NOs:15-20, respectively;
(d) SEQ ID NOs:21-26, respectively;
(e) SEQ ID NOs: 3-5 and SEQ ID NOs: 59, 7, and 8, respectively;
(f) SEQ ID NOs: 3, 60, and 5 and SEQ ID NOs: 6-8, respectively;
(g) SEQ ID NOs: 3, 61, and 5 and SEQ ID NOs: 6-8, respectively;
(h) SEQ ID NOs: 3, 60, and 5 and SEQ ID NOs: 59, 7, and 8, respectively; and
(i) SEQ ID NOs: 3, 61, and 5 and SEQ ID NOs: 59, 7, and 8, respectively.

2. The nucleic acid molecule of claim 1, wherein the antibody or antigen-binding fragment comprises a variable heavy chain (VH) and a variable light chain (VL) comprising amino acid sequences selected from the group consisting of:

(a) SEQ ID NO:27 and SEQ ID NO:28, respectively;
(b) SEQ ID NO:29 and SEQ ID NO:30, respectively;
(c) SEQ ID NO:31 and SEQ ID NO:32, respectively;
(d) SEQ ID NO:62 and SEQ ID NO:63 or SEQ ID NO:64, respectively; and
(e) SEQ ID NO:65 and SEQ ID NO:66 or SEQ ID NO:67, respectively.

3. The nucleic acid molecule of claim 1 or claim 2, wherein the polynucleotide sequence encodes a variable heavy chain (VH) and a variable light chain (VL), wherein the VH and VL are encoded by sequences selected from the group consisting of:

(a) SEQ ID NO:39 and SEQ ID NO:40, respectively;

(b) SEQ ID NO:41 and SEQ ID NO:42, respectively;

(c) SEQ ID NO:43 and SEQ ID NO:44, respectively;

(d) SEQ ID NO:70 and SEQ ID NO:72 or SEQ ID NO:73, respectively; and

(e) SEQ ID NO:71 and SEQ ID NO:74 or SEQ ID NO:75, respectively.

4. The nucleic acid molecule of claim 1, wherein the VH comprises the amino acid sequence of SEQ ID NO:27 and the VL comprises the amino acid sequence of SEQ ID NO:28.

5. The nucleic acid molecule of claim 4, wherein the polynucleotide sequence encodes a variable heavy chain (VH) and a variable light chain (VL), wherein the VH and VL are encoded by SEQ ID NO:39 and SEQ ID NO:40, respectively.

6. A vector comprising the nucleic acid molecule of any one of claims 1-5.

7. The vector of claim 6, wherein the vector further comprises a promoter and optionally an enhancer.

8. The vector of claim 6 or 7, wherein the vector is a plasmid, a virus, a cosmid, or a phage.

9. A cell comprising the nucleic acid molecule of any one of claims 1-5 or the vector of any one of claims 6-8.

10. A cell comprising a nucleic acid molecule comprising a polynucleotide sequence encoding a variable heavy chain (VH) and a nucleic acid molecule comprising a polynucleotide sequence encoding a variable light chain (VL), wherein the VH and VL comprise amino acid sequences selected from the group consisting of:

(a) SEQ ID NO:27 and SEQ ID NO:28, respectively;

(b) SEQ ID NO:29 and SEQ ID NO:30, respectively;

(c) SEQ ID NO:31 and SEQ ID NO:32, respectively;

(d) SEQ ID NO:62 and SEQ ID NO:63 or SEQ ID NO:64, respectively; and

(e) SEQ ID NO:65 and SEQ ID NO:66 or SEQ ID NO:67, respectively.

11. The cell of claim 10, wherein the polynucleotide sequence encoding the VH and the polynucleotide sequence encoding the VL comprise sequences selected from the group consisting of:

(a) SEQ ID NO:39 and SEQ ID NO:40, respectively;

(b) SEQ ID NO:41 and SEQ ID NO:42, respectively;

(c) SEQ ID NO:43 and SEQ ID NO:44, respectively;

(d) SEQ ID NO:70 and SEQ ID NO:72 or SEQ ID NO:73, respectively; and

(e) SEQ ID NO:71 and SEQ ID NO:74 or SEQ ID NO:75, respectively.

12. The cell of claim 10, wherein the VH and VL comprise the amino acid sequences of SEQ ID NO:27 and SEQ ID NO:28, respectively.

13. The cell of claim 12, wherein the polynucleotide sequence encoding the VH and the polynucleotide sequence encoding the VL comprise the sequences of SEQ ID NO:39 and SEQ ID NO:40, respectively.

14. The cell of any one of claims 9-13, wherein said cell is a bacterial cell or a eukaryotic cell.

15. A method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing the cell of any one of claims 9-14; and (b) isolating the antibody or antigen-binding fragment thereof from said cultured cell.