

CLAIMS:

1. An antibody or antigen-binding fragment, wherein the antibody or antigen-binding fragment comprises:

a) an immunoglobulin heavy chain variable region comprising an amino acid sequence having at least about 70% identity to SEQ ID NOs: 1, 2, 3, 7, 10, 13, 14, 40, 42 or 44;

b) an immunoglobulin light chain variable region comprising an amino acid sequence having at least about 70% identity to any one of SEQ ID NOs: 4, 5, 6, 8, 9, 11, 12, 15, 16, 41, 43, and 45; or

c) a combination thereof.

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

(a) an immunoglobulin heavy chain variable region comprising a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1 or 13, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 2 or 7, a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 3, 10 or 14, or a combination of any thereof;

(b) an immunoglobulin light chain variable region comprising a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 4, 8, 11 or 15, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 5 or 9, a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 6, 12 or 16, or a combination of any thereof; or

(c) a combination thereof.

3. The antibody or antigen-binding fragment of claim 1 or 2, wherein the immunoglobulin heavy chain variable region comprises a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1 or 13, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 2 or 7, or a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 3, 10 or 14.

4. The antibody or antigen-binding fragment of any one of claims 1 to 3, wherein the immunoglobulin heavy chain variable region comprises a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1 or 13, a CDR_{H2} having an amino acid sequence comprising

SEQ ID NO: 2 or 7, and a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 3, 10 or 14.

5. The antibody or antigen-binding fragment of any one of claims 1 to 4, wherein the immunoglobulin heavy chain variable region comprises:

a) a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 7, and a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 3;

b) a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 7, and a CDR_{H3} having an amino acid sequence or SEQ ID NO: 10; or

c) a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 13, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 7, and a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 14.

6. The antibody or antigen-binding fragment of any one of claims 1 to 5, wherein the immunoglobulin light chain variable region comprises a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 4, 8, 11 or 15, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 5 or 9, or a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 6, 12 or 16.

7. The antibody or antigen-binding fragment of any one of claims 1 to 6, wherein the immunoglobulin light chain variable region comprises:

a) a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 8, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 9, and a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 6; or

b) a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 11, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 9, and a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 12; or

c) a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 15, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 9, and a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 16.

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

(a) an immunoglobulin heavy chain variable region comprising a CDR_{H1} having an amino acid sequence comprising SEQ ID NO: 1 or 13, a CDR_{H2} having an amino acid sequence comprising SEQ ID NO: 2 or 7, and a CDR_{H3} having an amino acid sequence comprising SEQ ID NO: 3, 10 or 14; and

(b) an immunoglobulin light chain variable region comprising a CDR_{L1} having an amino acid sequence comprising SEQ ID NO: 4, 8, 11 or 15, a CDR_{L2} having an amino acid sequence comprising SEQ ID NO: 5 or 9, and a CDR_{L3} having an amino acid sequence comprising SEQ ID NO: 6, 12 or 16.

9. The antibody or antigen-binding fragment of any one of claims 1 to 8, wherein the antibody or antigen-binding fragment comprises an immunoglobulin heavy chain variable region comprising an amino acid sequence having at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, at least 99.5% sequence, or at least 99.9% identity to any one of SEQ ID NOs: 40, 42 and 44 and / or an immunoglobulin light chain variable region comprising an amino acid sequence having at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, at least 99.5%, or at least 99.9% identity to any one of SEQ ID NOs: 41, 43, and 45.

10. The antibody or antigen-binding fragment of claim 9, wherein the antibody or antigen-binding fragment comprises an immunoglobulin heavy chain variable region comprising any one of SEQ ID NOs: 40, 42 and 44 and an immunoglobulin light chain variable region comprising any one of SEQ ID NOs: 41, 43 and 45.

11. An antibody or antigen-binding fragment thereof that comprises a polypeptide that has a tertiary structure that is structurally similar to a polypeptide having an amino acid sequence of any one of SEQ ID NOs: 1 to 46 or to a single CDR_{H3} loop comprising any one of SEQ ID NOs: 3, 10, and 14.

12. An antibody or antigen binding fragment having specific affinity for an N1 neuraminidase of an influenza virus, and wherein the antibody or antigen binding fragment binds to an active site residue of the N1 neuraminidase comprising at least about 70% of SEQ ID

NO: 46 and containing at least one residue selected from R118, E119, L134, D151, R152, R156, W178, I222, R224, E276, E277, R371, and Y406 according to the amino acid numbering of SEQ ID NO: 46.

13. A nucleic acid comprising a nucleotide sequence encoding the immunoglobulin heavy chain variable region of the antibody or antigen-binding fragment of any one of the preceding claims.

14. A nucleic acid comprising a nucleotide sequence encoding an immunoglobulin light chain variable region of the antibody or antigen-binding fragment of any one of claims 1 to 12.

15. An expression vector comprising the nucleic acid of claim 13 and/or the nucleic acid of claim 14.

16. A host cell comprising the expression vector of claim 15.

17. A method of producing an antibody or antigen-binding fragment that binds a neuraminidase of an influenza virus, the method comprising growing the host cell of claim 16 under conditions so that the host cell expresses a polypeptide or polypeptides comprising the immunoglobulin heavy chain variable region and the immunoglobulin light chain variable region, thereby producing the antibody or antigen-binding fragment and purifying the antibody or antigen-binding fragment.

18. A vaccine comprising an antibody or antigen-binding fragment of any one of claims 1 to 12.

19. A pharmaceutical composition, the composition comprising an antibody or antigen-binding fragment of any one of claims 1 to 12 and a pharmaceutically acceptable carrier or excipient.

20. The pharmaceutical composition of claim 19, wherein the composition further comprises a monoclonal antibody selective for a hemagglutinin of the influenza virus and /or an antiviral drug.

21. Use of the antibody or antigen-binding fragment of any one of claims 1 to 12, the nucleic acid of claims 13 or 14, the expression vector of claim 15, the vaccine of claim 18, or the composition of claims 19 or 20 in the manufacture of a medicament for the prevention or treatment of influenza in a subject in need thereof, wherein the antibody or antigen-binding

fragment, nucleic acid, expression vector, vaccine or composition is to be administered to the subject.

22. The antibody or antigen-binding fragment of any one of claims 1 to 12, the nucleic acid of claims 13 or 14, the expression vector of claim 15, the vaccine of claim 18, or the composition of claims 19 or 20 for use in therapy.