

CLAIMS

1. An isolated immunogenic polypeptide or epitope comprising at least 12 contiguous amino acids of one or more SARS-CoV-2 protein selected from the group consisting of a spike (S) protein, an envelope (E) protein, a membrane (M) protein, and a nucleocapsid (N) protein.

2. The polypeptide or epitope of claim 1, comprising 18 to 24 contiguous amino acids of spike (S) protein and/or nucleocapsid (N) protein of SARS-CoV-2.

3. The polypeptide or epitope of claim 1 or 2, selected from a polypeptide comprising an amino acid sequence selected from the group consisting of:

SEQ ID NO: 1 to 5, 11 to 38, 39 to 48, 49, 50, and 51 to 60 or a functional variant or fragment thereof;

a polypeptide sharing at least 75% sequence identity thereto; or

a polypeptide differing by one, two, three, or four amino acids thereto; or

portions thereof.

4. The polypeptide or epitope of any one of the preceding claims, wherein the polypeptide comprises an amino acid sequence selected from the group consisting of:

SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 47, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 55, and SEQ ID NO: 57; or

a peptide sharing at least 75% sequence identity thereto; or

a peptide differing by one, two, three, or four amino acids thereto; or

portions thereof.

5. The polypeptide or epitope of any one of the preceding claims, wherein the polypeptide induces an immune response, optionally the polypeptide induces a B cell immune response.

6. The polypeptide or epitope of any one of the preceding claims, wherein the polypeptide or epitope does not include a polypeptide or epitope of seasonal coronavirus or SARS-CoV.
7. The polypeptide or epitope of any one of the preceding claims, wherein the polypeptide or epitope does not include a polypeptide or epitope of one or more SARS-CoV protein selected from the group consisting of a spike (S) protein, an envelope (E) protein, a membrane (M) protein, and a nucleocapsid (N) protein.
8. A pharmaceutical composition comprising one or more isolated polypeptide of any one of claims 1 to 7 and a pharmaceutically acceptable carrier.
9. The pharmaceutical composition of claim 8, further comprising an adjuvant.
10. A composition comprising one or more isolated polypeptide of any one of claims 1 to 7.
11. An antigen binding molecule capable of specifically binding to the polypeptide or epitope of any one of claims 1 to 7.
12. The antigen binding fragment of claim 11, wherein the antigen binding molecule is one selected from the group consisting of IgG, IgM, IgE, IgA, IgD, F(ab) fragments, and fragments thereof.
13. A method of detecting the presence of SARS-CoV-2 virus in a sample comprising
contacting the sample to one or more polypeptide as claimed in claims 1 to 7 and
determining the binding of a component of the sample to the polypeptide, wherein the binding of a component of the sample to the polypeptide is indicative of the presence of SARS-CoV-2.
14. A method of predicting the severity of a SARS-CoV-2 infection comprising
contacting the sample to one or more polypeptide selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 50, SEQ ID NO: 55, and SEQ ID NO: 57 and

determining the binding of a component of the sample to the polypeptide, wherein the binding of a component of the sample to the polypeptide is indicative of an increased risk of a severe SARS-CoV-2 infection.

15. The method of claim 13 or 14, wherein the sample comprises a biological sample, optionally the sample is a fluid biological sample.

16. A kit comprising one or more polypeptide of any one of claims 1 to 7, the antigen binding molecule of claim 11 or 12.

17. The kit of claim 16, further comprising one or more of the following:

a substrate coated with a capture agent for anti-SARS-CoV-2 antigen binding molecule, and

a detection agent for detecting the presence of captured anti-SARS-CoV-2 antigen binding molecule,

wherein the capture agent and the detection agent comprise a SARS-CoV-2 antigen and/or anti-immunoglobulin.

18. The kit of claim 16 or 17, wherein the polypeptide is selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 47, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 55, and SEQ ID NO: 57.

19. Use of a polypeptide of any of claims 1 to 7 in the manufacture of a medicament for ~~A method of~~ treating or preventing SARS-CoV-2 in a subject in need thereof. ~~comprising administering into the subject a polypeptide of any one of claims 1 to 7.~~

20. A polypeptide of any one of claims 1 to 7 for use as a medicament.