

I/We Claim:

1. A polypeptide fragment having an amino acid sequence with at least 95% identity to the amino acid sequence as set forth in SEQ ID NO: 2, wherein the polypeptide fragment has at least two variations in the amino acid sequence at A18P and P197L.
2. The polypeptide fragment as claimed in claim 1, wherein the polypeptide fragment has EIS at N-terminal and has an amino acid sequence as set forth in SEQ ID NO: 8.
3. The polypeptide fragment as claimed in claim 1, having variation in the amino acid sequence as set forth in SEQ ID NO: 2, wherein the at least one variation is selected from the group consisting of A18P/P197L/A190G/Y35F/T3H, A18P/A42M/P197L/A190G/Y35F/T3H, A18P/A42M/T100V/P197L/A190G/Y35F/T3H, A18P/Y35W/P197L, A18P/V37F/P197L, A18P/Y35W/V37F/P197L, N13D/A18P/V37F/P197L, and N13D/A18P/Y35W/P197L. I28F/Y35W/F62W/I104F.
4. The polypeptide fragment as claimed in claim 2, having variations in the amino acid sequence as set forth in SEQ ID NO: 8, wherein the variation is selected from the group consisting of A21P/P200L/A193G/Y38F/T6H, A21P/A45M/P200L/A193G/Y38F/T6H, A21P/A45M/T103V/P200L/A193G/Y38F/T6H, A21P/Y38W/P200L, A21P/V40F/P200L, A21P/Y38W/V40F/P200L, N16D/A21P/V40F/P200L, and N16D/A21P/Y38W/P200L.
5. The polypeptide fragment as claimed in claim 3, wherein the polypeptide fragment has an amino acid selected from the group having the amino acid sequence as set forth in SEQ ID NO: 69, and SEQ ID NO: 77.

6. The polypeptide fragment as claimed in claim 4, wherein the polypeptide fragment has an amino acid sequence selected from the group having the amino acid sequence as set forth in SEQ ID NO: 56, SEQ ID NO: 76, SEQ ID NO: 79, SEQ ID NO: 81, and SEQ ID NO: 83.
- 5 7. A recombinant construct comprising a nucleic acid fragment encoding a polypeptide fragment as claimed in any one of the claims 1 to 6 operably linked to a promoter.
8. The recombinant construct as claimed in claim 7, wherein the recombinant construct further comprises:
- 10 (a) a tpa signal sequence;
(b) histidine tag sequence;
(c) a linker;
(d) HRV3C recognition sequence, and
(e) optionally comprising at least one trimerization domain selected the group
- 15 consisting of human cartilage matrix protein (hCMP), chicken CMP (cCMP), fish cartilage matrix protein (F1CMP), fish isoform 2 cartilage matrix protein (F2-CMP), leucine Zipper with double cysteine (CCIZ), Synthetic trimerization domain (cCMP-IZ_m), foldon, or glycosylated leucine zipper sequence (Gly IZ).
- 20 9. The recombinant construct as claimed in claim 8, wherein human cartilage matrix protein (hCMP) having an amino acid sequence as set forth in SEQ ID NO: 87 , foldon having an amino acid sequence as set forth in SEQ ID NO: 88, chicken CMP (cCMP) having an amino acid sequence as set forth in SEQ ID NO: 89, fish cartilage matrix protein (F1CMP) having an amino acid sequence
- 25 as set forth in SEQ ID NO: 90, fish isoform 2 cartilage matrix protein (F2-CMP) having an amino acid sequence as set forth in SEQ ID NO: 91, leucine Zipper

- with double cysteine (CCIZ) having an amino acid sequence as set forth in SEQ ID NO: 92, synthetic trimerization domain (cCMP-IZ_m) having an amino acid sequence as set forth in SEQ ID NO: 93, or glycosylated leucine zipper sequence (Gly IZ) having an amino acid sequence as set forth in SEQ ID NO: 94.
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10. The recombinant construct as claimed in anyone of the claims 7-9, wherein the nucleic acid fragment has a nucleotide sequence selected from the group consisting of SEQ ID NO: 55, SEQ ID NO: 75, SEQ ID NO: 78, SEQ ID NO: 80, and SEQ ID NO: 82.
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11. A recombinant vector comprising the recombinant construct as claimed in any one of the claims 7-10.
12. A recombinant host cell comprising the recombinant construct as claimed in any one of the claims 7-10 or the recombinant vector as claimed in claim 11.
13. The recombinant host cell as claimed in claim 12, wherein the recombinant host
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- cell is selected from the group consisting of bacterial cell, yeast cell, insect cell, and mammalian cell.
14. The recombinant host cell as claimed in claim 13, wherein the bacterial cell is *Escherichia coli*, and wherein the yeast cell is selected from the group consisting of *Pichia X33*, *Pichia GlycoSwitch*[®], *DSMZ 70382*, *GS115*, *KM71*, *KM71H*, *BG09*, *GS190*, *GS200*, *JC220*, *JC254*, *JC227*, *JC300-JC308*, *YJN165*, *CBS7435*, and wherein the insect cell is selected from the group consisting of *Expi-Sf9*[®], *Sf9*, *High Five*[®], *Sf21*, and *S2*, and wherein the mammalian cell is selected from the group consisting of *Expi293F*[®]*Expi-CHO-S*[®], *CHO-K1*, *CHO-S*, *HEK293F*[®], *CHO*^{BC™}, *SLIM*[™], *SPOT*[™], *SP2/0*, *Sp2/0-Ag14*, *CHO DG44*, *HEK 293S*, *HEK 293 Gnt1^{-/-}*, *HEK293-EBNA1*, *CHOL-NSO*, and *NSO*.
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15. An immunogenic composition comprising the polypeptide fragment as claimed in any one of the claims 1-6, and a pharmaceutically acceptable carrier.

16. An immunogenic composition comprising:
- (a) a combination of at least two polypeptide fragments having an amino acid sequence selected from the group consisting of SEQ ID NO: 69, and SEQ ID No: 79, and a pharmaceutical acceptable carrier;
 - 5 (b) a combination of at least two polypeptide fragments having an amino acid sequence selected from the group consisting of SEQ ID NO: 81, and SEQ ID NO: 83, and a pharmaceutically acceptable carrier.
17. The immunogenic composition as claimed in claim 15 or 16, wherein the pharmaceutically acceptable carrier is selected from the group consisting of at
- 10 least one adjuvant, and excipients.
18. The immunogenic composition as claimed in claim 17, wherein the adjuvant is selected from the group consisting of an oil-in-water adjuvant, a polymer and water adjuvant, a water-in-oil adjuvant, an aluminum hydroxide adjuvant, and combinations thereof.
- 15 19. The immunogenic composition as claimed in any one of the claims 15-18, wherein the immunogenic composition is administered by a method selected from the group consisting of intranasal, subcutaneous, intravenous, intra-arterial, intra-peritoneal, intramuscular, intradermal, oral, dermal, and buccal.
- 20 20. The immunogenic composition as claimed in any one of the claims 15-19, wherein immunogenic composition is in form of a vaccine.
- 25 21. A method for obtaining the immunogenic composition as claimed in any one of claims 15-18, wherein the method comprises: (a) culturing the recombinant host cell of claim 12 under suitable conditions to obtain the polypeptide fragment as claimed in any one of the claims 1 to 6; (b) subjecting the polypeptide to purification; and (c) contacting the polypeptide of step (b) with a pharmaceutically acceptable carrier for obtaining the immunogenic composition.
22. The method as claimed in claim 21, wherein the recombinant host cell comprising the recombinant construct or the recombinant vector comprises a

nucleic acid fragment encoding a polypeptide fragment comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 69, SEQ ID NO: 76, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 81, SEQ ID NO: 83, wherein the recombinant host cell is mammalian cell.

5 23. The immunogenic composition as claimed in anyone of the claims 15-20 for use in eliciting an immune response in a subject.

24. The immunogenic composition as claimed in claim 23, wherein the immunogenic composition is to be administered by a method selected from the group consisting of intranasal, subcutaneous, intravenous, intra-arterial, intra-peritoneal, intramuscular, intradermal, oral, dermal, nasal, and inhalation.

10 25. A kit comprising the polypeptide as claimed in any one of the claims 1 to 6 or the immunogenic composition as claimed in anyone of the claims 15-20, and an instruction leaflet.

26. The immunogenic composition as claimed in anyone of the claims 15-20, wherein the immunogenic composition elicits immune response against severe acute respiratory syndrome coronavirus 2.

15 27. The polypeptide as claimed in any one of the claims 1 to 6, wherein the immunogenic polypeptide is capable of eliciting protection against severe acute respiratory syndrome coronavirus 2.

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