CLAIMS

1. A recombinant influenza hemagglutinin (HA) polypeptide, comprising an amino acid sequence at least 99.8% identical to residues 2-566 of SEQ ID NO: 1 or at least 99.6% identical to residues 2-567 of SEQ ID NO: 3.

2. The influenza HA polypeptide of claim 1 comprising an amino acid sequence at least 99.8% identical to SEQ ID NO: 1 or at least 99.6% identical to SEQ ID NO: 3.

3. The influenza HA polypeptide of claim 1 or claim 2, wherein the amino acid sequence of the polypeptide comprises no more than 1 amino acid substitution relative to SEQ ID NO: 1 or no more than 2 amino acid substitutions relative to SEQ ID NO: 3.

4. The influenza HA polypeptide of claim 1, comprising the amino acid sequence of residues 2-566 of SEQ ID NO: 1 or residues 2-567 of SEQ ID NO: 3.

5. The influenza HA polypeptide of claim 1, consisting of the amino acid sequence of residues 2-566 of SEQ ID NO: 1 or residues 2-567 of SEQ ID NO: 3.

6. The influenza HA polypeptide of claim 2, comprising the amino acid sequence of SEQ ID NO: 1 or SEQ ID NO: 3.

7. The influenza HA polypeptide of claim 2, consisting of the amino acid sequence of SEQ ID NO: 1 or SEQ ID NO: 3.

8. An isolated nucleic acid molecule encoding the influenza HA polypeptide of any one of claims 1-7.

9. The isolated nucleic acid molecule of claim 8, wherein the nucleic acid molecule is codon-optimized for expression in mammalian cells.

10. The nucleic acid molecule of claim 9, comprising nucleotides of 4-1698 of SEQ ID NO: 2 or nucleotides 4-1701 of SEQ ID NO: 4.

11. The nucleic acid molecule of claim 9, comprising nucleotides of 1-1698 of SEQ ID NO: 2 or nucleotides 1-1701 of SEQ ID NO: 4.

12. The nucleic acid molecule of claim 9, comprising the nucleotide sequence of SEQ ID NO: 2 or SEQ ID NO: 4.

13. A vector comprising the nucleic acid molecule of any one of claims 8-12.

14. The vector of claim 13, further comprising a promoter operably linked to the nucleic acid sequence encoding the influenza HA polypeptide.

15. An isolated cell comprising the vector of claim 13 or claim 14.

16. An influenza virus-like particle (VLP) comprising the influenza HA polypeptide of any one of claims 1-7.

17. The influenza VLP of claim 16, further comprising an influenza neuraminidase (NA) protein, an influenza matrix (M1) protein, or both.

18. A fusion protein comprising the influenza HA polypeptide of any one of claims 1-7.

19. A composition comprising the influenza HA polypeptide of any one of claims 1-7, the VLP of any one of claims 16-17 or the fusion protein of claim 18, and a pharmaceutically acceptable carrier.

20. Use of the influenza HA polypeptide of any one of claims 1-7, the VLP of any one of claims 16-17, the fusion protein of claim 18, or the composition of claim 19 in the manufacture of a medicament for eliciting an immune response to influenza virus in a subject.

21. Use of a composition comprising the VLP of any one of claims 16-17 and pharmaceutically acceptable carrier in the manufacture of a medicament for immunizing a subject against influenza virus.

22. The use of claim 21, wherein the composition further comprises an adjuvant.

23. The use of claim 21 or claim 22, wherein the composition is to be administered intramuscularly.

24. The use of any one of claims 21-23, wherein the composition comprises about 1 to about 25 μg of the VLP.

25. The use of claim 24, wherein the composition comprises about 15 μg of the VLP.

CLAIMS

1. A recombinant influenza hemagglutinin (HA) polypeptide, wherein the amino acid sequence of the polypeptide comprises no more than 1 conservative amino acid substitution relative to SEQ ID NO: 1 or no more than 2 conservative amino acid substitutions relative to SEQ ID NO: 3.

2. The influenza HA polypeptide of claim 1, comprising the amino acid sequence of SEQ ID NO: 1 or SEQ ID NO: 3.

3. The influenza HA polypeptide of claim 1, consisting of the amino acid sequence of SEQ ID NO: 1 or SEQ ID NO: 3.

4. An isolated nucleic acid molecule encoding the influenza HA polypeptide of any one of claims 1-3.

5. The isolated nucleic acid molecule of claim 4, wherein the nucleic acid molecule is codon-optimized for expression in mammalian cells.

6. The nucleic acid molecule of claim 1, comprising nucleotides of 1-1698 of SEQ ID NO: 2 or nucleotides 1-1701 of SEQ ID NO: 4.

7. The nucleic acid molecule of claim 1, comprising the nucleotide sequence of SEQ ID NO: 2 or SEQ ID NO: 4.

8. A vector comprising the nucleic acid molecule of any one of claims 4-7.

9. The vector of claim 8, further comprising a promoter operably linked to the nucleic acid sequence encoding the influenza HA polypeptide.

10. An isolated cell comprising the vector of claim 8 or claim 9.

11. An influenza virus-like particle (VLP) comprising the influenza HA polypeptide of any one of claims 1-3.

12. The influenza VLP of claim 11, further comprising an influenza neuraminidase (NA) protein, an influenza matrix (M1) protein, or both.

13. A fusion protein comprising the influenza HA polypeptide of any one of claims 1-3.

14. A composition comprising the influenza HA polypeptide of any one of claims 1-3, the VLP of any one of claims 11-12 or the fusion protein of claim 13, and a pharmaceutically acceptable carrier.

15. Use of the influenza HA polypeptide of any one of claims 1-3, the VLP of any one of claims 11-12, the fusion protein of claim 13, or the composition of claim 14 in the manufacture of a medicament for eliciting an immune response to influenza virus in a subject.

16. Use of a composition comprising the VLP of any one of claims 11-12 and pharmaceutically acceptable carrier in the manufacture of a medicament for immunizing a subject against influenza virus.

17. The use of claim 16, wherein the composition further comprises an adjuvant.

18. The use of claim 16 or claim 17, wherein the composition is to be administered intramuscularly.

19. The use of any one of claims 16-18, wherein the composition comprises about 1 to about 25 μg of the VLP.

20. The use of claim 19, wherein the composition comprises about 15 μg of the VLP.