CLAIMS

1. A chimeric influenza virus hemagglutinin (HA) polypeptide comprising the stem domain of the HA of influenza virus A/California/4/2009 (H1N1) and the globular head domain of the HA of influenza virus A/Vietnam/1203/2004 (H5).

2. The chimeric influenza virus HA polypeptide of claim 1, wherein the stem domain of the HA maintains the cysteine residues A_p and A_q, wherein A_p is the Cys that corresponds to amino acid position 52 of an HA1 domain using H3 numbering, and wherein A_q is the Cys that corresponds to amino acid position 277 of an HA1 domain using H3 numbering.

3. The chimeric influenza virus HA polypeptide of claim 1 or 2, wherein

(a) the HA stem domain comprises (i) an HA1 N-terminal stem segment, wherein the HA1 N-terminal stem segment consists of amino acid residues $HA1_{N\text{-}term}$ through A_p; and (ii) an HA1 C-terminal stem segment, wherein the HA1 C-terminal stem segment consists of amino acid residues A_q through $HA1_{C\text{-}term}$; and

(b) the HA globular head domain comprises the amino acid residues between A_p and A_q of an HA1 domain;

wherein $HA1_{N\text{-}term}$ is the N-terminal amino acid of a mature HA0 protein lacking a signal peptide; wherein $HA1_{C\text{-}term}$ is the C-terminal amino acid of an HA1 domain; and wherein A_p is the Cys that corresponds to amino acid position 52 of an HA1 domain using H3 numbering; and wherein A_q is the Cys that corresponds to amino acid position 277 of an HA1 domain using H3 numbering.

4. The chimeric influenza virus HA polypeptide of claim 1 or 2, wherein

(a) the HA stem domain comprises (i) an HA1 N-terminal stem segment, wherein the HA1 N-terminal stem segment consists of amino acid residues $HA1_{N\text{-}term}$ through $A_{p\text{-}1}$, $A_{p\text{-}2}$, $A_{p\text{-}3}$, $A_{p\text{-}4}$, $A_{p\text{-}5}$, $A_{p\text{-}6}$, $A_{p\text{-}7}$, $A_{p\text{-}8}$, $A_{p\text{-}9}$, $A_{p\text{-}10}$, A_p, A_{p+1}, A_{p+2}, A_{p+3}, A_{p+4}, A_{p+5}, A_{p+6}, A_{p+7}, A_{p+8}, A_{p+9}, or A_{p+10}; and (ii) an HA1 C-terminal stem segment, wherein the HA1 C-terminal stem segment consists of amino acid residues $A_{q\text{-}1}$, $A_{q\text{-}2}$, $A_{q\text{-}3}$, $A_{q\text{-}4}$, $A_{q\text{-}5}$, $A_{q\text{-}6}$, $A_{q\text{-}7}$, $A_{q\text{-}8}$, $A_{q\text{-}9}$, $A_{q\text{-}10}$,

A_q, A_{q+1}, A_{q+2}, A_{q+3}, A_{q+4}, A_{q+5}, A_{q+6}, A_{q+7}, A_{q+8}, A_{q+9}, or A_{q+10} through $HA1_{C\text{-}term}$; and

(b) the HA globular head domain comprises the amino acid residues between (i) A_{p-1}, A_{p-2}, A_{p-3}, A_{p-4}, A_{p-5}, A_{p-6}, A_{p-7}, A_{p-8}, A_{p-9}, A_{p-10}, A_p, A_{p+1}, A_{p+2}, A_{p+3}, A_{p+4}, A_{p+5}, A_{p+6}, A_{p+7}, A_{p+8}, A_{p+9}, or A_{p+10}, and (ii) A_{q-1}, A_{q-2}, A_{q-3}, A_{q-4}, A_{q-5}, A_{q-6}, A_{q-7}, A_{q-8}, A_{q-9}, A_{q-10}, A_q, A_{q+1}, A_{q+2}, A_{q+3}, A_{q+4}, A_{q+5}, A_{q+6}, A_{q+7}, A_{q+8}, A_{q+9}, or A_{q+10} of an HA1 domain;

wherein $HA1_{N\text{-}term}$ is the N-terminal amino acid of a mature HA0 protein lacking a signal peptide; wherein $HA1_{C\text{-}term}$ is the C-terminal amino acid of an HA1 domain; and wherein A_p is the Cys that corresponds to amino acid position 52 of an HA1 domain using H3 numbering; and wherein A_q is the Cys that corresponds to amino acid position 277 of an HA1 domain using H3 numbering.

5. The chimeric influenza virus HA polypeptide of any one of claims 1 to 4, wherein the polypeptide is soluble.

6. The chimeric influenza virus HA polypeptide of claim 5, wherein the polypeptide comprises a trimerization domain.

7. The chimeric influenza virus hemagglutinin (HA) polypeptide of claim 5, wherein the polypeptide does not comprise a transmembrane domain and does not comprise an endodomain of an influenza virus HA.

8. The chimeric influenza virus hemagglutinin (HA) polypeptide of claim 7, wherein the polypeptide further comprises (i) a thrombin cleavage site and a T4 trimerization domain; or (ii) a HIS tag.

9. The chimeric influenza virus HA polypeptide of any one of claims 1 to 8, which is expressed and isolated from a cell.

10. The chimeric influenza virus HA polypeptide of claim 9, wherein the cell is a mammalian cell.

11. A nucleic acid encoding the chimeric influenza virus hemagglutinin (HA) polypeptide of any one of claims 1 to 8.

12. A cell expressing the nucleic acid of claim 11.

13. The cell of claim 12, wherein the cell is a mammalian cell or an insect cell.

14. A cell line expressing the nucleic acid of claim 11.

15. The cell line of claim 14, wherein the cell line is a mammalian or insect cell line.

16. The cell line of claim 15, which is a Crucell Per.C6 cell line, Vero cell line, CHO cell line, VERY cell line, BHK cell line, HeLa cell line, COS cell line, MDCK cell line, 293 cell line, 3T3 cell line, WI38 cell line, NS0 cell line, 45.6 TG1.7 cell line, AF-2 clone 9B5 cell line, AF-2 clone 9B5 cell line, J558L cell line, MOPC 315 cell line, MPC-11 cell line, NCI-H929 cell line, NP cell line, NS0/1 cell line, P3 NS1 Ag4 cell line, P3/NS1/1-Ag4-1 cell line, P3U1 cell line, P3X63Ag8 cell line, P3X63Ag8.653 cell line, P3X63Ag8U.1 cell line, RPMI 8226 cell line, Sp20-Ag14 cell line, U266B1 cell line, X63AG8.653 cell line, Y3.Ag.1.2.3 cell line, YO cell line, Sf9 cell line, Sf21 cell line, Ao/Tn 38 cell line, High Five cell line, Trichoplusia ni cell line, Spodoptera frugiperda cell line, or Bombyx mori cell line.

17. A virus comprising a genome engineered to express the nucleic acid of claim 11.

18. A virus comprising the polypeptide of any one of claims 1 to 8.

19. The virus of claim 17, wherein the virus is an influenza virus, vesicular stomatitis virus (VSV), Newcastle disease virus (NDV), adenovirus, or baculovirus.

20. The virus of claim 18, wherein the virus is an influenza virus, vesicular stomatitis virus (VSV), Newcastle disease virus (NDV), adenovirus, or baculovirus.

21. The virus of claim 19, which is inactivated, live attenuated, or split.

22. The virus of claim 20, which is inactivated, live attenuated, or split.

23. A virus-like particle comprising the polypeptide of any one of claims 1 to 8.

24. An embryonated egg comprising the virus of any one of claims 17 to 20.

25. The embryonated egg of claim 24, which is a chicken embryonated egg.

26. A method for producing the chimeric influenza virus HA polypeptide of any one of claims 1 to 8, comprising (a) culturing the cell or cell line of any one of claims 12 to 16; and (b) isolating the chimeric influenza virus HA polypeptide.

27. A method for producing the virus of any one of claims 17 to 20, comprising (a) propagating the virus of any one of claims 17 to 20 in an embryonated egg; and (b) isolating the virus from the embryonated egg.

28. An immunogenic composition comprising the polypeptide of any one of claims 1 to 8.

29. An immunogenic composition comprising the virus of any one of claims 17 to 22.

30. An immunogenic composition comprising the virus-like particle of claim 23.

31. The immunogenic composition of any one of claims 28-30 further comprising an adjuvant.

32. The immunogenic composition of claim 31, wherein the adjuvant is an aluminum salt, 3 De-O-acylated monophosphoryl lipid A, MF59, AS03, AS04, polysorbate 80, an

imidazopyridine compound, an imidazoquinoxaline compound, Matrix-M, MVA, ISCOMATRIX, AddaVax, polyI:C, *in vitro* transcribed RNA hairpin from Sendai virus Cantell strain defective interfering RNA, a saponin, Freund's adjuvant, an oil in water emulsion, CpG, a physical adjuvant, or a Toll-like receptor stimulatory molecule.

33. The immunogenic composition of any one of claims 28 to 32 for use in a method of immunizing a subject against influenza virus.

34. The immunogenic composition of any one of claims 28 to 32 for use in a method of immunizing a subject against influenza virus, wherein said subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition, and (ii) a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

35. The immunogenic composition of any one of claims 28 to 32 for use in a method of immunizing a subject against influenza virus, wherein said subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition; and (ii) a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus hemagglutinin (HA) polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric HA polypeptide comprises the HA stem domain and a globular head domain of an influenza HA polypeptide, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

36. The immunogenic composition of any one of claims 28 to 32 for use in a method of preventing an influenza virus disease in a subject.

37. The immunogenic composition of any one of claims 28 to 32 for use in a method of preventing an influenza virus disease in a subject, wherein said subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition, and (ii) a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

38. The immunogenic composition of any one of claims 28 to 32 for use in a method of preventing an influenza virus disease in a subject, wherein said subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition, and (ii) a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus hemagglutinin (HA) polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric influenza virus hemagglutinin (HA) polypeptide comprises an influenza virus HA stem domain and an influenza virus HA globular head domain, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

39. The immunogenic composition of any one of claims 28 to 32 for use in a method of treating an influenza virus infection or an influenza virus disease in a subject.

40. The immunogenic composition of any one of claims 28 to 32 for use in a method of treating an influenza virus infection or an influenza virus disease in a subject, wherein said subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition, and (ii) a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

41. The immunogenic composition of any one of claims 28 to 32 for use in a method of treating an influenza virus infection or an influenza virus disease in a subject, wherein said

subject is to be administered: (i) a first dose of an effective amount of the immunogenic composition, and (ii) a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus hemagglutinin (HA) polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric influenza virus hemagglutinin (HA) polypeptide comprises an influenza virus HA stem domain and an influenza virus HA globular head domain, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

42. The immunogenic composition of claim 34, 37, or 40, wherein said subject is to be administered a third dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the second dose.

43. The immunogenic composition of claim 35, 38, or 41, wherein the stem domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is the same as the stem domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

44. The immunogenic composition of any one of claims 33 to 43, wherein the subject is a human.

45. The immunogenic composition of any one of claims 33 to 43, wherein the subject is a 1-5 year old human subject.

46. The immunogenic composition of any one of claims 33 to 43, wherein the subject is an elderly human subject.

47. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for immunizing a subject against influenza virus.

48. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for immunizing a subject against influenza virus, wherein a first dose of an effective amount of an immunogenic composition is followed by a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

49. The use of claim 48, further comprising a third dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the second dose.

50. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for immunizing a subject against influenza virus, wherein a first dose of an effective amount of the immunogenic composition is followed by a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus HA polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric influenza virus hemagglutinin (HA) polypeptide comprises an influenza virus HA stem domain and an influenza virus HA globular head domain, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

51. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for preventing an influenza virus disease in a subject.

52. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for preventing an influenza virus disease in a subject, wherein a first dose of an effective amount of an immunogenic composition is followed by a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

53. The use of claim 52, further comprising a third dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the second dose.

54. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for preventing an influenza virus disease in a subject, wherein a first dose of an effective amount of the immunogenic composition is followed by a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus HA polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric influenza virus hemagglutinin (HA) polypeptide comprises an influenza virus HA stem domain and an influenza virus HA globular head domain, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

55. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for treating an influenza virus infection or an influenza virus disease in a subject.

56. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for treating an influenza virus infection or an influenza virus disease in a subject, wherein a first dose of an effective amount of an immunogenic composition is followed by a second dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the first dose.

57. The use of claim 56, further comprising a third dose of an effective amount of the immunogenic composition 30 days to 6 months after the subject has received the second dose.

58. Use of the immunogenic composition of any one of claims 28 to 32 in the manufacture of a medicament for treating an influenza virus infection or an influenza virus disease in a subject, wherein a first dose of an effective amount of the immunogenic composition is followed by a second dose of an effective amount of a second immunogenic composition comprising a second chimeric influenza virus HA polypeptide 30 days to 6 months after the subject has received the first dose, wherein the second chimeric influenza virus hemagglutinin (HA) polypeptide comprises an influenza virus HA stem domain and an influenza virus HA globular head domain, and wherein the globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

59. The use of the immunogenic composition of any one of claims 50, 54, or 58, wherein the stem domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is the same as the stem domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

60. The use of the immunogenic composition of any one of claims 46 to 59, wherein the subject is human.

61. The use of any one of claims 46 to 59, wherein the subject is a 1-5 year old human subject.

62. The use of any one of claims 46 to 59, wherein the subject is an elderly human subject.

63. The immunogenic composition of any one of claims 33 to 43, wherein the subject is a human infant, wherein the human infant is a newborn to 1 year old human.

64. The use of any one of claims 46 to 59, wherein the subject is a human infant, wherein the human infant is a newborn to 1 year old human.