CLAIMS

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

2. An immunogenic composition comprising a virus comprising a genome engineered to express a nucleic acid encoding a chimeric influenza virus HA polypeptide, wherein the chimeric influenza virus HA polypeptide comprises an HA stem domain of an HA of influenza virus A/California/4/2009 (H1N1) and an HA globular head domain of an HA of influenza virus A/Vietnam/1203/2004 (H5).

3. An immunogenic composition comprising a virus comprising a chimeric influenza virus HA polypeptide, wherein the chimeric influenza virus HA polypeptide comprises an HA stem domain of an HA of influenza virus A/California/4/2009 (H1N1) and an HA globular head domain of an HA of influenza virus A/Vietnam/1203/2004 (H5).

4. The immunogenic composition of claim 2, wherein the virus is a vesicular stomatitis virus (VSV), Newcastle disease virus (NDV), pox virus, adenovirus, adeno-associated virus, or baculovirus.

5. The immunogenic composition of claim 3, wherein the virus is a vesicular stomatitis virus (VSV), Newcastle disease virus (NDV), pox virus, adenovirus, adeno-associated virus, or baculovirus.

6. The immunogenic composition of claim 2, wherein the virus is an influenza virus.

7. The immunogenic composition of claim 6, wherein the influenza virus is an influenza A virus.

8. The immunogenic composition of claim 7, wherein the influenza A virus is a A/Leningrad/134/47/57 or A/PR/8/34.

9. The immunogenic composition of claim 3, wherein the virus is influenza virus.

10. The immunogenic composition of claim 9, wherein the influenza virus is an influenza A virus.

11. The immunogenic composition of claim 10, wherein the influenza A virus is a A/Leningrad/134/47/57 or A/PR/8/34.

12. The immunogenic composition of any one of claims 2 or 6 to 8, which is inactivated or split.

13. The immunogenic composition of any one of claims 3 or 9 to 11, which is inactivated or split.

14. The immunogenic composition of any one of claims 1 to 11, wherein the virus is a live attenuated virus.

15. An immunogenic composition comprising a virus-like particle comprising a chimeric influenza virus HA polypeptide, wherein the chimeric influenza virus HA polypeptide comprises an HA stem domain of an HA of influenza virus A/California/4/2009 (H1N1) and an HA globular head domain of an HA of influenza virus A/Vietnam/1203/2004 (H5).

16. The immunogenic composition of any one of claims 1 to 15, wherein

(a) the HA stem domain comprises (i) an HAI N-terminal stem segment, wherein the HA1 N-terminal stem segment consists of amino acid residues HA 1 $_{\text{N-term}}$ 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 $HA1_{\text{C-term}}$; and (iii) an HA2 stem domain; and

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

wherein $HA1_{\text{N-term}}$ is the N-terminal amino acid of a mature HA0 protein lacking a signal peptide; wherein $HA1_{\text{C-term}}$ 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.

17. The immunogenic composition of any one of claims 1 to 15, wherein

(a) the HA stern 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 $A_{p\text{-}1}$, $A_{p\text{-}2}$, $A_{p\text{-}3}$, $A_{p\text{-}4}$, $A_{p\text{-}5}$, $A_{p\text{-}6}$, $A_{p\text{-}7}$, $A_{p\text{-}8}$, $A_{p\text{-}9}$,$A_{p\text{-}10}$, 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}, Ap_{+9}, or A_{p+10} through $HA1_{C\text{-}term}$; and (iii) an HA2 stem domain; and

(b) the HA globular head domain consists of the amino acid residues between (i) $A_{p\text{-}1}$, $A_{p\text{-}2}$, $A_{p\text{-}3}$, $A_{p\text{-}4}$, $A_{p\text{-}5}$, $A_{p\text{-}6}$, $A_{p\text{-}7}$, $A_{p\text{-}8}$, $A_{p\text{-}9}$,$A_{p\text{-}10}$, 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) $A_{p\text{-}1}$, $A_{p\text{-}2}$, $A_{p\text{-}3}$, $A_{p\text{-}4}$, $A_{p\text{-}5}$, $A_{p\text{-}6}$, $A_{p\text{-}7}$, $A_{p\text{-}8}$, $A_{p\text{-}9}$,$A_{p\text{-}10}$, 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}, Ap_{+9}, or A_{p+10} of an HA1 stem 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.

18. The immunogenic composition of any one of claims 1 to 15, 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}; (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, A_{q+1}, A_{q+2}, or A_{q+3} through $HA1_{C\text{-}term}$; and (iii) an HA2 stem domain; and

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

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; wherein A_q is the Cys that corresponds to amino acid position 277 of an HA1 domain using H3 numbering.

19. The immunogenic composition of any one of claims 1 to 18, wherein the HA stem domain maintains the cysteine residues A_p and A_q.

20. The immunogenic composition of any one of claims 1 to 19, wherein the chimeric influenza virus HA polypeptide is soluble.

21. The immunogenic composition of claim 20, wherein the chimeric influenza virus HA polypeptide comprises a trimerization domain.

22. The immunogenic composition of claim 20, wherein the chimeric influenza virus HA polypeptide does not comprise a transmembrane domain and does not comprise an endodomain of an influenza virus HA.

23. The immunogenic composition of claim 22, wherein the chimeric influenza virus HA polypeptide further comprises (i) a thrombin cleavage site and a T4 trimerization domain; or (ii) a HIS tag.

24. The immunogenic composition of any or claims 1 to 19, wherein the chimeric influenza virus HA polypeptide further comprises the A/California/4/2009 (H1N1) transmembrane and cytoplasmic domains.

25. The immunogenic composition of any or claims 1 to 24, wherein the chimeric influenza virus HA polypeptide has fusogenic activity.

26. The immunogenic composition of any one of claims 1 to 25, further comprising an adjuvant.

27. The immunogenic composition of claim 26, 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.

28. The immunogenic composition of any one of claims 1 to 27 for use in a method of immunizing a subject against influenza virus.

29. The immunogenic composition of any one of claims 1 to 27 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.

30. The immunogenic composition of any one of claims 1 to 27 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 influenza virus HA polypeptide comprises a second HA stem domain of an influenza virus HA and a second HA globular head domain of an influenza virus HA, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

31. The immunogenic composition of any one of claims 1 to 27 for use in a method of preventing an influenza virus disease in a subject.

32. The immunogenic composition of any one of claims 1 to 27 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.

33. The immunogenic composition of any one of claims 1 to 27 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 a second influenza virus HA stem domain and a second influenza virus HA globular head domain, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

34. The immunogenic composition of any one of claims 1 to 27 for use in a method of treating an influenza virus infection or an influenza virus disease in a subject.

35. The immunogenic composition of any one of claims 1 to 27 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.

36. The immunogenic composition of any one of claims 1 to 27 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 a second influenza virus HA stem domain and a second influenza virus HA globular head domain, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

37. The immunogenic composition of claim 29, 32 or 35, 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.

38. The immunogenic composition of claim 30, 33 or 36, wherein the stem domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is the same as the second HA stem 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 38, wherein the subject is a human.

40. The immunogenic composition of any one of claims 28 to 38, wherein the subject is a 1-5 year old human subject.

41. The immunogenic composition of any one of claims 28 to 38, wherein the subject is an elderly human subject.

42. Use of the immunogenic composition of any one of claims 1 to 27 in the manufacture of a medicament for immunizing a subject against influenza virus.

43. Use of the immunogenic composition of any one of claims 1 to 27 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.

44. The use of claim 43, 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.

45. Use of the immunogenic composition of any one of claims 1 to 27 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 a second influenza virus HA stem domain and a second influenza virus HA globular head domain, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

46. Use of the immunogenic composition of any one of claims 1 to 27 in the manufacture of a medicament for preventing an influenza virus disease in a subject.

47. Use of the immunogenic composition of any one of claims 1 to 27 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.

48. The use of claim 47, 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.

49. Use of the immunogenic composition of any one of claims 1 to 27 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 a second influenza virus HA stem domain and a second influenza virus HA globular head domain, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different

than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

50. Use of the immunogenic composition of any one of claims 1 to 27 in the manufacture of a medicament for treating an influenza virus infection or an influenza virus disease in a subject.

51. Use of the immunogenic composition of any one of claims 1 to 27 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.

52. The use of claim 51, 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.

53. Use of the immunogenic composition of any one of claims 1 to 27 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 a second influenza virus HA stem domain and a second influenza virus HA globular head domain, wherein the second HA stem domain is heterologous to the second HA globular head domain, and wherein the HA globular head domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is different than the second HA globular head domain of the second chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

54. The use of the immunogenic composition of any one of claims 45, 49 or 53 wherein the stem domain of the chimeric influenza virus hemagglutinin (HA) polypeptide present in the immunogenic composition is the same as the second HA stem domain of the second

chimeric influenza virus hemagglutinin (HA) polypeptide present in the second immunogenic composition.

55. The use of the immunogenic composition of any one of claims 42 to 54, wherein the subject is human.

56. The use of any one of claims 42 to 54, wherein the subject is a 1-5 year old human subject.

57. The use of any one of claims 42 to 54, wherein the subject is an elderly human subject.

58. The immunogenic composition of any one of claims 28 to 38, wherein the subject is a human infant, wherein the human infant is a newborn to 1 year old human.

59. The use of any one of claims 42 to 54, wherein the subject is a human infant, wherein the human infant is a newborn to 1 year old human.