Claims

1. An isolated canine influenza virus A, wherein said influenza virus has an HA serotype of H3 and wherein said influenza virus comprises a polynucleotide which encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34; or wherein said influenza virus comprises a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polypeptide comprises 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

2. The influenza virus according to claim 1, wherein the HA gene encodes a hemagglutinin protein comprising one or more of the following modifications a serine at position 83; a leucine at position 222; a threonine at position 328; and a threonine at position 483 versus the amino acid sequence of equine H3 consensus sequence.

3. The influenza virus according to claim 1, wherein said influenza virus has the serotype H3N8.

4. The influenza virus according to claim 1, wherein said influenza virus comprises a polynucleotide comprising the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31, or said polynucleotide comprises 98% or greater sequence identity with the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31.

5. The influenza virus according to claim 1, wherein said influenza virus is the viral isolate designated as A/canine/Florida/43/04 and deposited with the ATCC under ATCC

Accession No. PTA-7914 or the viral isolate designated as A/canine/Florida/242/2003 and deposited with the ATCC under ATCC Accession No. PTA-7915.

6. An isolated polynucleotide that comprises all or part of a genomic segment or gene of a canine influenza virus of any one of claims 1 to 5.

7. The polynucleotide according to claim 6, wherein said polynucleotide encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

8. The polynucleotide according to claim 6, wherein said polynucleotide comprises the nucleotide sequence shown in SEQ ID NOs: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31, or said polynucleotide comprises 98% or greater sequence identity with the nucleotide sequence shown in SEQ ID NOs: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31.

9. A polynucleotide expression construct comprising a polynucleotide of any one of claims 6 to 8.

10. An isolated polypeptide encoded by a polynucleotide of any one of claims 6 to 8.

11. A composition comprising a diluent and an immunogen of the canine influenza virus of any one of claims 1 to 5, wherein said immunogen is capable of inducing an immune response against an influenza virus that is capable of infecting a canid animal.

12. The composition according to claim 18, wherein said immunogen comprises cell-free whole virus, or a portion thereof; a viral polynucleotide; a viral protein; a viral polypeptide or peptide; a virus infected cell; a recombinant viral vector based construct; a reassortant virus; or naked nucleic acid of said virus.

13. The composition according to claim 12, wherein said viral protein, polypeptide, or peptide comprises an amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said viral protein, polypeptide, or peptide comprises 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

14. The composition according to claim 12, wherein said viral polynucleotide encodes a polypeptide comprising an amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

15. Use of an effective amount of an influenza virus according to any of claims 1 to 5, a polynucleotide expression construct of claim 9, a polypeptide according to claim 10, or a composition according to any one of claims 11 to 14, in the manufacture of a medicament for inducing an immune response in an animal against a canine influenza virus.

16. The use according to claim 15, wherein said composition comprises a viral protein, polypeptide, or peptide comprising an amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said viral protein, polypeptide, or peptide comprises 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

17. The use according to claim 15, wherein said immune response is a protective immune response that prevents or inhibits infection of said animal by an influenza virus.

18. The use according to claim 15, wherein said composition further comprises an adjuvant.

19. The use according to claim 15, wherein said animal is a canid.

20. The use according to claim 15, wherein said canid animal is a domesticated dog.

21. The use according to claim 15, wherein said composition is for administration parenterally.

22. The use according to claim 21, wherein said composition is for administration subcutaneously, intraperitoneally, or intramuscularly.

23. The use according to claim 15, wherein said composition is for administration nasally or orally.

24. A cell comprising a canine influenza virus of any one of claims 1 to 5 or a polynucleotide of any one of claims 6 to 8 or a polypeptide of claim 10.

25. The cell according to claim 24, wherein said cell is a canid animal cell.

26. A reassortant virus comprising at least one gene, genomic segment, or a polynucleotide of a canine influenza virus of any of claims 1 to 5.

27. An isolated virus that comprises one or more polynucleotides wherein said one or more polynucleotides encode a canine influenza virus protein selected from the group consisting of hemagglutinin (HA), neuraminidase (NA), nucleoprotein (NP), matrix protein (MA), polymerase basic (PB) 1, PB2, polymerase acidic (PA), and non-structural protein (NS), or a functional or immunogenic fragment thereof, wherein said one or more polynucleotides encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment

thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34; or wherein said virus comprises one or more polypeptides comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polypeptide comprises 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

28. The virus according to claim 27, wherein said one or more polynucleotides comprise a nucleotide sequence selected from the group consisting of SEQ ID NOs: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, and 31.

29. The virus according to claim 27, wherein said HA protein comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 16 and 32.

30. A vaccine comprising a canine influenza virus of any of claims 1 to 5.

31. The vaccine according to claim 30, wherein said influenza virus comprises a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof.

32. The vaccine according to claim 30, wherein said influenza virus comprises a polynucleotide which encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

33. The vaccine according to claim 30, wherein said influenza virus comprises a polynucleotide comprising the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13,

15, 17, 19, 21, 23, 25, 27, 29, or 31, or said polynucleotide comprises 98% or greater sequence identity with the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31.

34. The vaccine according to claim 30, wherein said influenza virus is inactivated or attenuated.

35. The vaccine according to claim 30, wherein said influenza virus is provided in a pharmaceutically acceptable carrier or diluent.

36. The vaccine according to claim 30, wherein said influenza virus comprises a polynucleotide encoding a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

37. The vaccine according to claim 30, wherein said influenza virus comprises a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

38. The vaccine according to claim 30, wherein said canine influenza virus comprises a polynucleotide encoding a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

39. The vaccine according to claim 30, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO:15 or SEQ ID NO:31, or a nucleotide sequence comprising 98% or greater sequence identity to SEQ ID NO:15 or SEQ ID NO:31.

40. A recombinant viral vector or polynucleotide vector comprising a polynucleotide which encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34.

41. A recombinant viral vector or polynucleotide vector comprising a polynucleotide comprising the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31, or said polynucleotide comprises 98% or greater sequence identity with the nucleotide sequence shown in SEQ ID NO: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, or 31.

42. A recombinant viral vector or polynucleotide vector comprising a polynucleotide encoding a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

43. The vector according to claim 42, wherein said polynucleotide encodes a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

44. The vector according to claim 42, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO:15 or SEQ ID NO:31, or a nucleotide sequence comprising 98% or greater sequence identity to SEQ ID NO:15 or SEQ ID NO:31.

45. The vector according to any one of claims 40 to 44, wherein said recombinant viral vector is from adenovirus, avipox, herpesvirus, vaccinia virus, canarypox, entomopox, swinepox, or West Nile virus.

46. The vector according to any one of claims 40 to 44, wherein said recombinant viral vector is a canarypox viral vector.

47. The vector according to any one of claims 40 to 44, wherein said polynucleotide vector is a viral vector.

48. A vaccine comprising a vector of any of claims 40 to 47.

49. The vaccine according to claim 48, wherein said vaccine comprises an adjuvant and/or diluent.

50. Use of an effective amount of a vaccine of any one of claims 30 to 39 or a vector of any one of claims 40 to 47, or a vaccine of claim 48 or 49, in the manufacture of a medicament for inducing an immune response in an animal against a canine influenza virus.

51. The influenza virus according to claim 1, wherein said influenza virus comprises a polynucleotide which encodes a polypeptide comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34.

52. The influenza virus according to claim 1, wherein said influenza virus comprises a polynucleotide encoding a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID

NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

53. The influenza virus according to claim 1, wherein said influenza virus comprises a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

54. The influenza virus according to claim 1, wherein said polynucleotide encodes a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

55. The influenza virus according to claim 1, wherein said hemagglutinin (HA) comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

56. The influenza virus according to claim 1, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO:15 or SEQ ID NO:31, or a nucleotide sequence comprising 98% or greater sequence identity to SEQ ID NO:15 or SEQ ID NO:31.

57. The polynucleotide according to claim 6, wherein said polynucleotide encodes a polypeptide comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide

comprising 98% or greater sequence identity with the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34.

58. The polynucleotide according to claim 6, wherein said polynucleotide encodes a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

59. The polynucleotide according to claim 6, wherein said polynucleotide encodes a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

60. The polynucleotide according to claim 6, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO:15 or SEQ ID NO:31, or a nucleotide sequence comprising 98% or greater sequence identity to SEQ ID NO:15 or SEQ ID NO:31.

61. The polynucleotide expression construct according to claim 9, wherein said polynucleotide encodes a polypeptide comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34.

62. The polynucleotide expression construct according to claim 9, wherein said polynucleotide encodes a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a

serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

63. The polynucleotide expression construct according to claim 9, wherein said polynucleotide encodes a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

64. The polynucleotide expression construct according to claim 9, wherein said polynucleotide comprises the nucleotide sequence of SEQ ID NO:15 or SEQ ID NO:31, or a nucleotide sequence comprising 98% or greater sequence identity to SEQ ID NO:15 or SEQ ID NO:31.

65. The polypeptide according to claim 10, wherein said polypeptide comprises the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polypeptide comprises 98% or greater sequence identity with the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34.

66. The polypeptide according to claim 10, wherein said polypeptide is a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

67. The polypeptide according to claim 10, wherein said polypeptide comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

68. The composition according to claim 11, wherein said influenza virus comprises a polynucleotide which encodes a polypeptide comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes a polypeptide comprising 98% or greater sequence identity with the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34.

69. The composition according to claim 11, wherein said influenza virus comprises a polynucleotide encoding a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

70. The composition according to claim 11, wherein said influenza virus comprises a hemagglutinin (HA) comprising the amino acid sequence of SEQ ID NO:33 or SEQ ID NO:34, or a functional and/or immunogenic fragment thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:33 or SEQ ID NO:34, wherein said HA protein comprises a serine at position 82, a leucine at position 221, a threonine at position 327, and a threonine at position 482 of the amino acid sequence.

71. The composition according to claim 12, wherein said polynucleotide encodes a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or said polynucleotide encodes an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

72. The composition according to claim 12, wherein said polypeptide comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

73. Use of an effective amount of an influenza virus of any of claims 51 to 56, or a polynucleotide expression construct of any of claims 61 to 64, or a polypeptide of any of claims 65 to 67, the composition of any one of claims 68 to 72 , in the manufacture of a medicament for inducing an immune response in an animal against a canine influenza virus.

74. The cell according to claim 24, wherein said cell comprises the influenza virus of any one of claims 51 to 56 or the polynucleotide of any one of claims 57 to 64, or the polypeptide of any of claims 65 to 67.

75. The reassortant virus according to claim 26, wherein said reassortant virus comprises at least one gene, genomic segment, or a polynucleotide of an influenza virus of any one of claims 51 to 56.

76. The virus according to claim 27, wherein said virus comprises one or more polynucleotides of any one of claims 57 to 64.

77. The vaccine according to claim 30, wherein said influenza virus comprises a hemagglutinin (HA) that comprises the amino acid sequence of SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof, or an amino acid sequence comprising greater than 95% amino acid sequence identity to SEQ ID NO:16 or SEQ ID NO:32, or the mature form thereof.

78. The influenza virus according to claim 1, wherein said influenza virus comprises a polypeptide comprising 98% or greater sequence identity with the amino acid sequence shown in SEQ ID NO: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, or 34, or a functional and/or immunogenic fragment thereof.