

WHAT IS CLAIMED IS:

1. A nucleic acid molecule comprising:
a CMV/R or CMV/R 8κB backbone; and
a polynucleotide encoding a modified hemagglutinin (HA) protein,
wherein the protein comprises a modified proteolytic cleavage site that
reduces proteolytic processing of the HA protein.
2. The nucleic acid molecule of Claim 1, wherein the modified HA protein
comprises the amino acids PQRETR in the proteolytic cleavage site.
3. The nucleic acid molecule of Claim 1, wherein the backbone is the
CMV/R backbone.
4. The nucleic acid molecule of Claim 1, wherein the backbone is the
CMV/R 8κB backbone.
5. The nucleic acid molecule of Claim 1, wherein the HA protein is
encoded with a truncation at the carboxy terminal end.
6. The nucleic acid molecule of Claim 1, wherein the polynucleotide is
codon optimized for humans.
7. The nucleic acid molecule of Claim 1, wherein said molecule is at least
95% identical to plasmid VRC 9123.
8. The nucleic acid molecule of Claim 1, wherein the HA protein is an
A/Thailand/1 (KAN-1)/2004 strain of HA.
9. The nucleic acid molecule of Claim 8, wherein the modified HA protein
comprises the amino acids PQRETR in the proteolytic cleavage site.
10. The nucleic acid molecule of Claim 8, wherein the polynucleotide is
codon optimized for humans.
11. The nucleic acid molecule of Claim 8, wherein said molecule is at least
95% identical to plasmid VRC 7720.
12. The nucleic acid molecule of Claim 1, wherein said molecule is at least
95% identical to plasmid VRC7721.
13. The nucleic acid molecule of Claim 1, wherein said molecule is at least
95% identical to plasmid VRC7722.

14. The nucleic acid molecule of Claim 1, wherein said molecule is at least 95% identical to plasmid VRC7727.

15. A pharmaceutical composition comprising at least one nucleic acid molecule of any of Claims 1-14 and a pharmaceutically acceptable solution in a therapeutically effective dose.

16. A vaccine composition comprising at least one nucleic acid molecule of any of Claims 1-14 and a pharmaceutically acceptable solution in a prophylactically effective dose.

17. The composition of Claim 16, additionally comprising an adjuvant or nucleic acid encoding an adjuvant.

18. The composition of Claim 17, wherein said adjuvant is a cytokine.

19. The composition of Claim 16 for use as a vaccine to prevent influenza infection in a mammal.

20. A vaccine composition comprising a vector having a CMV/R or CMV/R 8κB backbone and a polynucleotide encoding a modified hemagglutinin (HA) protein, wherein the protein comprises a modified proteolytic cleavage site that reduces proteolytic processing of the HA protein.

21. The vaccine composition of Claim 20, wherein said HA protein is an A/Thailand/1 (KAN-1)/2004 strain of HA.

22. The vaccine composition of Claim 20, wherein said composition comprises a plurality of vectors encoding a modified HA proteins from different serotypes of influenza viruses.

23. A pseudotyped lentiviral particle pseudotyped with an influenza HA protein comprising:

- (a) a lentiviral vector plasmid expressing luciferase,
- (b) lentiviral structural and accessory proteins sufficient for assembly of a lentiviral particle, and
- (c) influenza HA protein, wherein the influenza HA protein effectively pseudotypes the lentiviral particle.