

CLAIMS

What is claimed is:

1. A recombinant HCMV vector comprising a TR3 backbone and a nucleic acid sequence encoding a heterologous antigen, wherein:
 - (i) the vector does not express UL18, UL78, UL128, UL130, UL146, or UL147, or orthologs thereof;
 - (ii) the vector comprises a nucleic acid sequence encoding UL82, or an ortholog thereof; and
 - (iii) the heterologous antigen replaces all or part of UL78 and is operably linked to the UL78 promoter;wherein the heterologous antigen is a HIV fusion protein comprising an amino acid sequence having at least 90%, at least 91 %, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identity to the amino acid sequence according to SEQ ID NO: 3.
2. The recombinant HCMV vector of claim 1, wherein the vector does not express one or more of a UL18 protein, UL78 protein, UL128 protein, UL130 protein, UL146 protein, or UL147 protein, resulting from the presence of one or more mutations in the nucleic acid sequence encoding UL18, UL78, UL128 , UL130, UL146, or UL147.
3. The recombinant HCMV vector of claim 2, wherein the mutation in the nucleic acid sequence encoding UL18, UL78, UL128, UL130, UL146, or UL147 is a point mutation, frameshift mutation, truncation mutation, or deletion of all of the nucleic acid sequence encoding the viral protein.
4. The recombinant HCMV vector of any one of claims 1-3, wherein the vector further comprises a nucleic acid sequence encoding a microRNA (miRNA) recognition element (MRE), wherein the MRE contains a target site for a miRNA expressed in endothelial cells and/or a miRNA expressed in myeloid cells.

5. A recombinant HCMV vector comprising a nucleic acid sequence having at least 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identity to the nucleic acid sequence according to SEQ ID NO:7 or 9.

6. A pharmaceutical or immunogenic composition comprising the recombinant HCMV vector of any one of claims 1-5 and a pharmaceutically acceptable carrier.

7. The pharmaceutical composition of claim 6, wherein the pharmaceutically acceptable carrier is a histidine trehalose (HT) buffer.

8. The pharmaceutical composition of claim 7, wherein the histidine trehalose (HT) buffer:

- (i) comprises about 20 mM L-histidine and about 10% (w/v) trehalose;
- (ii) comprises 20 mM L-histidine and 10% (w/v) trehalose; and/or
- (iii) has a pH of 7.2.

9. The composition of any one of claims 6-8, wherein the CMV vector is lyophilized or in a solution.

10. Use of the recombinant HCMV vector or composition of any of claims 1-9 in the manufacture of a medicament for generating an immune response in a subject.

11. Use of the recombinant HCMV vector or composition of any one of claims 1-9 in the manufacture of a medicament for treating or preventing HIV infection in a subject.

12. Use of the nucleic acid sequence according to SEQ ID NO:7 or 9 or a pharmaceutical composition comprising the nucleic acid sequence according to SEQ ID NO:7 or 9 in the manufacture of a medicament for treating or preventing HIV infection in a subject.

13. The use of any one of claims 10-12, wherein the subject is seropositive for HCMV.

14. The use of any one of claims 10-12, wherein the subject is seronegative for HCMV.

15. The use of any one of claims 10-12, wherein the recombinant HCMV is to be administered in an amount of:

- (a) at least 1×10^3 focus-forming units (ffu)
- (b) about 5×10^4 ffu;
- (c) about 5×10^5 ffu;
- (d) about 5×10^6 ffu;
- (e) about 1×10^3 ffu;
- (f) about 3×10^4 ffu; or
- (g) about 1×10^6 ffu.

16. The use of any one of claims 10-15, wherein the medicament is to be administered subcutaneously.

17. The use of any one of claims 10-16, wherein the medicament is to be administered in two doses.

18. The use of any one of claims 11-17, wherein

- (i) a CDS+ T cell response to at least one HIV antigen is elicited;
- (ii) viremia and/or detectable HIV load is reduced, including reducing detectable HIV load below the limit of detection by any suitable test (e.g., polymerase chain reaction (PCR));
- (iii) HIV replication and/or mutation is contained such that primary HIV infection is rapidly aborted; and/or

(iv) sustained infection and disease is averted such that life-long antiviral treatment (ART) is not required.

19. The use of claim 18, wherein sustained infection and disease comprises:

- (i) detection of at least 10,000 HIV copies per milliliter of blood and/or
- (ii) detection of HIV in blood samples for three or more consecutive weeks.