CLAIMS

1. A virus comprising a retroviral envelope construct, a retroviral packaging construct, and a retroviral transfer construct, wherein at least one of the envelope construct, the packaging construct, or the transfer construct comprises a transgene that codes for a non-retroviral protein, and wherein the virus is an oncolytic virus.

2. The virus of claim 1, wherein the envelope construct, the packaging construct, and the transfer construct are inserted at different locations within the genome of the oncolytic virus.

3. The virus of claim 1 or 2, wherein the envelope construct comprises a gene that codes for a retroviral envelope protein and the packaging construct comprises a gene that codes for a retroviral structural protein.

4. The virus of claim 3, wherein the gene that codes for the retroviral envelope protein is under the control of a first early viral promoter, a first early/late viral promoter or a first late viral promoter; and the gene that codes for a retroviral structural protein is under the control of a second early viral promoter, a second early/late viral promoter, or a second late viral promoter.

5. The virus of any one of claims 1 to 4, comprising an exogenous nucleic acid sequence that codes for a nucleic acid polymerase.

6. The virus of claim 5, wherein the nucleic acid polymerase is selected from the group consisting of: T7 RNA polymerase, T3 RNA polymerase and SP6 RNA polymerase, a RNA polymerase variant, and a DNA polymerase mutant.

7. The virus of any one of claims 1 to 6, comprising an exogenous nucleic acid sequence that codes for a bacteriophage polymerase.

8. The virus of claim 7, wherein the bacteriophage is selected from the group consisting of a T3 bacteriophage, a T7 bacteriophage and an SP6 bacteriophage.

9. The virus of claim 8, wherein a T3 bacteriophage polymerase is expressed with a

T3 bacteriophage promoter, a T7 bacteriophage polymerase is expressed with a T7 bacteriophage promoter, and an SP6 bacteriophage polymerase is expressed with an SP6 bacteriophage promoter.

10. The virus of any one of claims 1 to 7, wherein the non-retroviral protein comprises a therapeutic protein or a diagnostic protein.

11. The virus of claim 8, wherein the non-retroviral protein comprises the therapeutic protein, and wherein the therapeutic protein comprises an immune checkpoint modulator, an antibody or portion thereof, a Fc fusion protein, an anticoagulant, a blood factor, a bone morphogenetic protein, an immunosuppressive agent, an immunostimulatory agent, an enzyme, a growth factor, a hormone, an interferon, an interleukin, a thrombolytic, an anti-angiogenic, a chemotherapeutic, an antibiotic, an antifungal, an antiviral, and any combination thereof.

12. The virus of any one of claims 1 to 9, wherein the retroviral envelope construct, the retroviral packaging construct, and the retroviral transfer construct are from an Alpharetrovirus, a Betaretrovirus, a Deltaretrovirus, an Epsilonretrovirus, a Gamma retrovirus, a Lentivirus, or any combination thereof.

13. The virus of claim 12, wherein the retroviral envelope construct, the retroviral packaging construct, and the retroviral transfer construct are from the lentivirus.

14. The virus of claim 13, wherein the lentivirus is an HIV.

15. The virus of claim 12, wherein the retroviral envelope construct, the retroviral packaging construct, and the retroviral transfer construct are from the Gamma retrovirus.

16. The virus of claim 15, wherein the Gamma retrovirus is a Moloney murine leukemia virus.

17. The virus of any one of claims 1 to 15, wherein the virus comprises a mutation or deletion of at least one viral gene selected from the group consisting of: B5R, A52R

(VACWR178), F13L, A36R, A34R, A33R, B8R, B18R, SPI-1, SPI-2, B15R, VGF, E3L, K3L, A41L, K7R, N1L, C12L, TK, and any combinations thereof.

18. The virus of any one of claims 1 to 17, wherein the oncolytic virus is a measles virus, a poliovirus, a poxvirus, a vaccinia virus, an adenovirus, an adeno-associated virus, a herpes simplex virus, a vesicular stomatitis virus, a reovirus, a Newcastle disease virus, a senecavirus, a lentivirus, a mengovirus, or a myxomavirus.

19. The virus of claim 18, wherein the oncolytic virus is the vaccinia virus.

20. Use of the virus of any one of claims 1 to 19 in the manufacture of a medicament for the treatment of cancer.

21. A virus of any one of claims 1 to 19 for use in therapy.