What is Claimed:

1. A viral particle comprising a targeting moiety and a polypeptide comprising a viral structural protein comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 2, optionally wherein the viral structural protein comprises an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO:1.

2. The viral particle of claim 1, wherein the viral particle is a pseudotyped lentivirus.

3. The viral particle of claim 1 or 2, wherein the viral particle further comprises a nucleic acid molecule encoding a heterologous molecule;

optionally wherein the heterologous molecule is an siRNA, an shRNA, a non-coding RNA, a peptide, a protein, a chimeric antigen receptor ("CAR"), a viral payload, a viral genome, or a combination thereof.

4. The viral particle of claim 3, wherein the heterologous molecule is a CAR and comprises:

i) an antigen binding domain comprising an amino acid sequence having at least 85% identity to SEQ ID NO: 51; or

ii) an antigen binding domain comprising an amino acid sequence having at least 85% identity to SEQ ID NO: 52.

5. The viral particle of any one of claims 1-4, wherein the targeting moiety:

i) binds to an immune cell, optionally wherein the immune cell is selected from the group consisting of a T cell; a B cell; a NK cell; a dendritic cell; a neutrophil; a macrophage; a CD3+ T cell; a CD4+ T cell; a CD7+ T cell, a CD8+ T cell; a CD19+ B cell; a CD20+ B cell; a CD34+ haematopoietic stem cell; a CD105+ haematopoietic stem cell; a CD117+ haematopoietic stem cell; a Haematopoietic stem cell; and a NKG2D+ natural killer cell; and/or

ii) binds to CD7, CD8, cKit (CD117), CD4, CD3, CD5, CD6, CD2, TCR alpha, TCR beta, TCR gamma, TCR delta, CD10, CD34, CD110, CD33, CD14, CD68, CCR7, CD62L, CD25, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, or CXCR3, A glycosylated CD43 epitope expressed

on acute leukemia or lymphoma but not on hematopoietic progenitors; A glycosylated CD43 epitope expressed on non-hematopoietic cancers; A kinase anchor protein 4 (AKAP-4); Adrenoceptor beta 3 (ADRB3); AFP; Anaplastic lymphoma kinase (ALK); Androgen receptor; Angiopoietin-binding cell surface receptor 2 (Tie 2); Auto antibody to desmoglein 1 (Dsgl); Auto antibody to desmoglein 3 (Dsg3); B7H3 (CD276); Biotin; Bone marrow stromal cell antigen 2 (BST2); BST1/CD157; Cancer/testis antigen 1 (NY-ESO-1); Cancer/testis antigen 2 (LAGE-la); Carbonic anhydrase IX (CA1X); Carcinoembryonic antigen (CEA); CCCTC-Binding Factor (Zinc Finger Protein)-Like (BORIS or Brother of the Regulator of lmprinted Sites); CCR4; CD5; CD19; CD20; CD22; CD24; CD30; CD32 (FCGR2A); CD33; CD34; CD38; CD44v6; CD72; CD79a; CD79b; CD97; CD99; CD123; CD171; CD179a; CD179b-IGLll; CD200R; CD276/B7H3; CD300 molecule-like family member f (CD300LF); CDH1-CD324; CDH6; CDH17; CDH19; Chromosome X open reading frame 61 (CXORF61); Claudin 6 (CLDN6); Claudinl8.2 (CLD18A2 or CLDN18A.2); CMV pp65; C-MYC epitope Tag; Cripto; CS1; CSF2RA (GM-CSFR-alpha); C-type lectin domain family 12 member A (CLEC12A); C-type lectin-like molecule-1 (CLL-1 or CLECL1); Cyclin Bl; Cytochrome P450 IB 1 (CYP1B 1); DLL3; EBV-EBNA3c; EGF-bke module- containing mucin-like hormone receptor-like 2 (EMR2); Elongation factor 2 mutated (ELF2M); Ephrin B2; Ephrin type-A receptor 2 (EphA2); Epidermal growth factor receptor (EGFR); Epidermal growth factor receptor variant III (EGFRviii); Epithelial cell adhesion molecule (EPCAM); ERG; ETS translocation-variant gene 6 located on chromosome 12p (ETV6-AML); Fc fragment of IgA receptor (FCAR or CD89); Fc receptor-like 5 (FCRL5); Fibroblast activation protein alpha (FAP); FITC; Fms Like Tyrosine Kinase 3 (FLT3); Folate receptor alpha (FRa or FR1); Folate receptor beta (FRb); Follicle stimulating hormone receptor (FSHR); Fos-related antigen 1; Fucosyl-GMl; G protein coupled receptor class C group 5 member D (GPRC5D); G protein-coupled receptor 20 (GPR20); GAD; Ganglioside G2 (GD2) ; Ganglioside GD3 (aNeu5Ac(2-8)aNeu5Ac(2-3)bDGalp(l-4)bDGlcp(l-l)Cer); Ganglioside GM3 (aNeu5Ac(2-3)bDClalp(l- 4)bDGlcp(l-l)Cer); GD3; GFRalpha4; Glycoprotein 100 (gplOO); Glypican-3 (GPC3); Gonadotropin Hormone receptor (CGHR or GR); GpA33; GpNMB; GPRC5D; Guanylyl cyclase C (GCC); Heat shock protein 70-2 mutated (mut hsp70-2); Hepatitis A virus cellular receptor 1 (HAVCR1); Hexasaccharide portion of globoH glycoceramide (GloboH); High molecular weight-melanoma associated antigen (HMWMAA); HIV1 envelope glycoprotein;

HLA; HLA-DOA; HLA-A; HLA-A2; HLA-B; HLA-C; HLA-DM; HLA-DOB; HLA-DP; HLA-DQ; HLA-DR; HLA-G; HTLVl-Tax; Human papilloma virus E6 (HPV E6); Human papilloma virus E7 (HPV E7); Human Telomerase reverse transcriptase (hTERT); IgE; IL13Ra2; ILl lRa; Immunoglobulin lambda-like polypeptide 1 (IGLL1); Influenza A hemagglutinin (HA); Insulin-like growth factor 1 receptor (IGF-I receptor); Interleukin 11 receptor alpha (IL-llRa); Interleukin-13 receptor subunit alpha-2 (IL-13Ra2 or CD213A2); Intestinal carboxyl esterase; KIT (CD117); KSHV K8.1; KSHV-gH; LAMP1 ; Legumain; Leukocyte immunoglobulin-like receptor subfamily A member 2 (LILRA2); Leukocyte-associated immunoglobulin-like receptor 1 (LAIR1); Leutenizing hormone receptor (LHR); Lewis(Y) antigen; Lews Ag; Livl; Locus K 9 (LY6K); Low conductance chloride channel; Lymphocyte antigen 6 complex; Lymphocyte antigen 75 (LY75); Lymphocyte-specific protein tyrosine kinase (LCK); Mammary gland differentiation antigen (NY-BR-1); Melanoma antigen recognized by T cells 1 (MelanA or MARTI); Melanoma- associated antigen 1 (MAGE-A1); Melanoma cancer testis antigen-1 (MAD-CT-1); Melanoma cancer testis antigen-2 (MAD-CT-2); Melanoma inhibitor of apoptosis (ML-IAP); Mesothelin; MPL; Mucin 1 cell surface associated (MUC1); N-Acetyl glucosaminyl-transferase V (NA17); Nectin-4; Neural cell adhesion molecule (NCAM); NKG2D; NYBR1; O-acetyl-GD2 ganglioside (OAcGD2); Olfactory receptor 51E2 (OR51E2); Oncogene fusion protein consisting of breakpoint cluster region (BCR) and Abelson murine leukemia viral oncogene homolog 1 (Abl) (bcr-abl); P53 mutant; Paired box protein Pax-3 (PAX3); Paired box protein Pax-5 (PAX5); Pannexin 3 (PANX3); PDL1; P-glycoprotein; Placenta-specific 1 (PLAC1); Platelet-derived growth factor receptor beta (PDGFR-beta); Polysialic acid; Proacrosin binding protein sp32 (OY-TES1); Prostase; Prostate carcinoma tumor antigen-1 (PCT A-l or Galectin 8); Prostate stem cell antigen (PSCA); Prostate-specific membrane antigen (PSMA); Prostatic acid phosphatase (PAP); Prostein; Protease Serine 21 (Testisin or PRSS21); Proteasome (Prosome Macropain) Subunit Beta Type 9 (LMP2); PTK7; Ras G12V; Ras Homolog Family Member C (RhoC); Rat sarcoma (Ras) mutant; Receptor for Advanced Glycation Endproducts (RAGE-1); Receptor tyrosine kinase-like orphan receptor 1 (ROR1); Receptor tyrosine-protein kinase ERBB2 or Her-22/neu; Renal ubiquitous 1 (RU1); Renal ubiquitous 2 (RU2); Sarcoma translocation breakpoints; Serine 2 (TMPRSS2) ETS fusion gene; Sialyl Lewis adhesion molecule (sLe); SLAMF4; SLAMF6; Slea (CA19.9 or Sialyl Lewis Antigen); Sperm protein 17 (SPA17);

Squamous Cell Carcinoma Antigen Recognized By T Cells 3 (SART3); Stage-specific embryonic antigen-4 (SSEA-4); STEAP1; Survivin; Synovial sarcoma X breakpoint 2 (SSX2); TCR Gamma Alternate Reading Frame Protein (TARP); TCR-beta1 chain; TCR-beta2 chain; TCR-delta chain; TCR-gamma chain; TCRgamma-delta; Telomerase; TGFbetaR2; The antigen recognized by TNT antibody; Thyroid stimulating hormone receptor (TSHR); Timl-/HVCR1; Tissue Factor 1 (TF1); Tn ag; Tn antigen ((Tn Ag) or (GalNAca-Ser/Thr)); TNF receptor family member B cell maturation (BCMA); Transglutaminase 5 (TGS5); Transmembrane protease; TROP2; Tumor endothelial marker 1 (TEM1/CD248); Tumor endothelial marker 7-related (TEM7R); Tumor protein p53 (p53); Tumor-associated glycoprotein 72 (TAG72); Tyrosinase; Tyrosinase-related protein 2 (TRP-2); Uroplakin 2 (UPK2); Vascular endothelial growth factor receptor 2 (VEGFR2); V-myc avian myelocytomatosis viral oncogene neuroblastoma derived homolog (MYCN); Wilms tumor protein (WT1); or X Antigen Family Member 1A (XAGE1); and/or

iii) binds to CD7; or

iv) binds to CD8; or

v) binds to TCR alpha, TCR beta, TCR gamma, or TCR delta;

optionally wherein the targeting moiety comprises an antigen binding domain selected from the group consisting of a single chain variable fragment (scFv), an ankyrin repeat (e.g., DARPIN), a single domain antibody, a FN3 domain, and any combination thereof; further optionally wherein the targeting moiety comprises an scFv or a single domain antibody.

6. The viral particle of any one of claims 1-5, wherein the targeting moiety is attached to the viral surface through:

an IgG Fc stalk, optionally wherein the IgG Fc stalk comprises a CD8 or CD28 transmembrane domain;

a polypeptide stalk;

an envelope glycoprotein G or H of a virus of the Paramyxoviridae family, optionally a morbillivirus or a henipavirus; further optionally a Measles virus, a Nipah virus, a Cedar virus, or a Hendra virus;

a glycoprotein of a virus of the Rhabdoviridae family, optionally a vesicular stomatitis New Jersey virus, a vesicular stomatitis Indiana virus, a vesicular

stomatitis Alagoas virus, a vesicular stromatitis Maraba virus, a vesicular stomatitis Carajas virus, a Parainfluenza virus, a Spodoptera frugiperda rhabdovirus isolate Sf G, a Drosophila obscura sigmavirus 10A, a Wuhan insect virus 7, a Perch virus, or a Spring viremia of carp virus;

a glycoprotein of a virus of the Filoviridae family, optionally an Ebola virus; or

a glycoprotein of a virus of the Arenaviridae family, optionally a Machupo virus.

7. The viral particle of claim 5 or 6, wherein the targeting moiety binds to CD7 and comprises a polypeptide comprising:

(i) a heavy chain variable region (VH) comprising a VH CDR1, a VH CDR2, and a VH CDR3, wherein the VH CDR1 comprises the amino acid sequence of SEQ ID NO: 12; the VH CDR2 comprises the amino acid sequence of SEQ ID NO: 13; and the VH CDR3 comprises the amino acid sequence of SEQ ID NO: 14; and

(ii) a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein the VL CDR1 comprises the amino acid sequence of SEQ ID NO: 15; the VL CDR2 comprises the amino acid sequence of SEQ ID NO: 16; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO: 17;

optionally wherein:

a) the VH comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 24, optionally wherein the VH comprises the amino acid sequence of SEQ ID NO: 24; or

b) the VL comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 25, optionally wherein the VL comprises the amino acid sequence of SEQ ID NO: 25; or

c) the VH comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 24; and the VL comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 25, optionally wherein the VH comprises the amino acid sequence of SEQ ID NO: 24 and the VL comprises the amino acid sequence of SEQ ID NO: 25;

further optionally wherein the VH and the VL are, or are not, linked by a linker, optionally a peptide linker; further optionally wherein the peptide linker comprises a sequence of $(GGGGS)_n$ (SEQ ID NO: 26), wherein n is independently 1-5, or the sequence set forth in SEQ ID NO:27.

8. The viral particle of claim 7, wherein the targeting moiety that binds to CD7 comprises a polypeptide comprising a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 28 or SEQ ID NO: 29, optionally wherein the polypeptide comprises the amino acid sequence of SEQ ID NO: 28 or SEQ ID NO: 29.

9. The viral particle of claim 5 or 6, wherein the targeting moiety binds to CD8 and comprises a polypeptide comprising:

(i) a heavy chain variable region (VH) comprising a VH CDRl, a VH CDR2, and a VH CDR3, wherein the VH CDR1 comprises the amino acid sequence of SEQ ID NO: 32; the VH CDR2 comprises the amino acid sequence of SEQ ID NO: 33; and the VH CDR3 comprises the amino acid sequence of SEQ ID NO: 34; and

(ii) a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein the VL CDR1 comprises the amino acid sequence of SEQ ID NO: 35; the VL CDR2 comprises the amino acid sequence of SEQ ID NO: 36; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO: 37;

optionally wherein:

a) the VH comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 44, optionally wherein the VH comprises the amino acid sequence of SEQ ID NO: 44; or

b) the VL comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 45, optionally wherein the VL comprises the amino acid sequence of SEQ ID NO: 45; or

c) the VH comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 44, and the VL comprises a sequence having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 45, optionally wherein the VH comprises the

amino acid sequence of SEQ ID NO: 44 and the VL comprises the amino acid sequence of SEQ ID NO: 45;

further optionally wherein the VH and the VL are, or are not, linked by a linker, optionally a peptide linker; further optionally wherein the peptide linker comprises a sequence of $(GGGGS)_n$ (SEQ ID NO: 26), wherein n is independently 1-5, or the sequence set forth in SEQ ID NO:27.

10. The viral particle of claim 9, wherein the targeting moiety that binds to CD8 comprises a polypeptide comprising a sequence having at least 90% sequence identity to an amino acid sequence of SEQ ID NO: 46 or SEQ ID NO: 47, optionally wherein the polypeptide comprises the amino acid sequence of SEQ ID NO: 46 or SEQ ID NO:47.

11. A method of making the viral particle of any one of claims 1-10, the method comprising transfecting or transducing a viral packaging cell with a nucleic acid molecule encoding the polypeptide comprising the viral structural protein and a nucleic acid molecule encoding the targeting moiety under conditions sufficient to produce the viral particle;

optionally wherein the method further comprises transfecting or transducing the viral packaging cell with a lentiviral transfer genome encoding for the heterologous molecule;

optionally wherein the heterologous molecule is an siRNA, an shRNA, a non-coding RNA, a peptide, a protein, a CAR, a viral payload, a viral genome, or a combination thereof;

optionally wherein the heterologous molecule is a CAR and the CAR comprises:

i) an antigen binding domain comprising an amino acid sequence having at least 85% identity to the amino acid sequence of SEQ ID NO: 51, optionally wherein the antigen binding domain comprises the amino acid sequence of SEQ ID NO: 51, or

ii) an antigen binding domain comprising an amino acid sequence having at least 85% identity to the amino acid sequence of SEQ ID NO: 52, optionally wherein the antigen binding domain comprises the amino acid sequence of SEQ ID NO: 52;

further optionally wherein the method further comprises transfecting or transducing the viral packaging cell with a nucleic acid molecule encoding gag-pol and/or rev, wherein the cell expresses gag-pol and/or rev;

optionally wherein the cell is a HEK293 or a HEK293T cell;

optionally wherein the method further comprises culturing the cells for at least 24 or 48 hours to produce the viral particles;

optionally wherein the method further comprises isolating the viral particles from the cell supernatant, optionally wherein the isolating comprises centrifugation.

12. Use of the viral particle of any one of claims 3-10 in the manufacture of a medicament for delivering a heterologous molecule to a target cell, wherein the cell is to be contacted with the viral particle;

optionally wherein the viral particle is a pseudotyped lentivirus;

optionally wherein the target cell is in a human subject;

optionally wherein the target cell is an immune cell, optionally wherein the immune cell is selected from the group consisting of a T cell; a B cell; a NK cell; a dendritic cell; a neutrophil; a macrophage; a CD3+ T cell; a CD4+ T cell; a CD7+ T cell, a CD8+ T cell; a CD19+ B cell; a CD20+ B cell; a CD34+ haematopoietic stem cell; a CD105+ haematopoietic stem cell; a CD117+ haematopoietic stem cell; a Haematopoietic stem cell; and a NKG2D+ natural killer cell;

optionally wherein the targeting moiety binds to CD7 or CD8 on the target cell;

optionally wherein the targeting moiety comprises an scFv or a single domain antibody;

optionally wherein the heterologous molecule is a CAR, an siRNA, an shRNA, a non-coding RNA, a peptide, a protein, a viral payload, or a viral genome;

or

an *in vitro* method of delivering a heterologous molecule to a target cell, comprising contacting the target cell with the viral particle of any one of claims 3-10;

optionally wherein the viral particle is a pseudotyped lentivirus;

optionally wherein the target cell is an immune cell, optionally wherein the immune cell is selected from the group consisting of a T cell; a B cell; a NK cell; a dendritic cell; a neutrophil; a macrophage; a CD3+ T cell; a CD4+ T cell; a CD7+ T cell, a CD8+ T cell; a CD19+ B cell; a CD20+ B cell; a CD34+ haematopoietic stem cell; a CD105+ haematopoietic stem cell; a CD117+ haematopoietic stem cell; a Haematopoietic stem cell; and a NKG2D+ natural killer cell;

optionally wherein the targeting moiety binds to CD7 or CD8 on the target cell;

optionally wherein the targeting moiety comprises an scFv or a single domain antibody;

optionally wherein the heterologous molecule is a CAR, an siRNA, an shRNA, a non-coding RNA, a peptide, a protein, a viral payload, or a viral genome.

13. Use of the viral particle of any one of claims 3-10 in the manufacture of a medicament for treating a cancer in a human subject;

optionally wherein the viral particle is a pseudotyped lentivirus;

optionally wherein the heterologous molecule is a CAR;

optionally wherein the target cell is a T cell, a NK cell, or a Haematopoietic stem cell;

optionally wherein the targeting moiety binds to CD7 or CD8 on the target cell;

optionally wherein the targeting moiety is a scFv or a single domain antibody;

optionally wherein the cancer is a carcinoma, a blastoma, a sarcoma, a leukemia, a lymphoid malignancy, a benign tumor, a malignant tumor, a melanoma, a breast cancer, a prostate cancer, an ovarian cancer, a cervical cancer, a skin cancer, a pancreatic cancer, a colorectal cancer, a renal cancer, a liver cancer, a brain cancer, a lymphoma, a lung cancer, a thyroid cancer, a B cell related cancer or a T cell related cancer.

14. A viral particle comprising a targeting moiety, a polypeptide comprising a viral structural protein, and a nucleic acid molecule encoding a CAR;

wherein the targeting moiety comprises an amino acid sequence comprising a sequence having at least 90% identity to any one of the sequences of SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 46, and SEQ ID NO: 47, optionally wherein the amino acid sequence comprises the sequence of any of the sequences of SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 46, or SEQ ID NO: 47;

wherein the polypeptide comprising the viral structural protein comprises an amino acid sequence comprising a sequence having at least 90% identity to the amino acid sequence of SEQ ID NO: 2, optionally wherein the viral structural protein comprises the amino acid sequence of SEQ ID NO:1 or SEQ ID NO:2;

optionally wherein the CAR comprises an antigen binding domain having an amino acid sequence comprising a sequence having at least 90% identity to any one of the sequences of SEQ

ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 55, and SEQ ID NO: 56, optionally wherein the amino acid sequence comprises any of the sequences of SEQ ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 55, or SEQ ID NO: 56;

optionally wherein the viral particle is a pseudotyped lentivirus.

15. Use of the viral particle of claim 14 in the manufacture of a medicament for treating a cancer in a human subject in need thereof, optionally wherein the cancer is a carcinoma, a blastoma, a sarcoma, a leukemia, a lymphoid malignancy, a benign tumor, a malignant tumor, a melanoma, a breast cancer, a prostate cancer, an ovarian cancer, a cervical cancer, a skin cancer, a pancreatic cancer, a colorectal cancer, a renal cancer, a liver cancer, a brain cancer, a lymphoma, a lung cancer, a thyroid cancer, a B cell related cancer or a T cell related cancer.