CLAIMS

1. A retroviral or lentiviral vector having a viral envelope which comprises first and second mitogenic T-cell activating transmembrane proteins, each of which comprises a mitogenic domain and a transmembrane domain; in which the mitogenic T-cell activating transmembrane proteins are not part of a viral envelope glycoprotein, and in which the first mitogenic T-cell activating transmembrane protein binds CD3 and the second mitogenic T-cell activating transmembrane protein binds CD28.

2. A retroviral or lentiviral vector according to Claim 1, in which the first mitogenic T-cell activating transmembrane protein comprises the binding domain from OKT3.

3. A retroviral or lentiviral vector according to Claim 1, in which the second mitogenic T-cell activating transmembrane protein comprises the binding domain from 15E8 or TGN1412.

4. A retroviral or lentiviral vector according to any preceding claim, which additionally comprises a mitogenic T-cell activating transmembrane protein which binds CD134 or CD137.

5. A retroviral or lentiviral vector according to any preceding claim, which also comprises a cytokine-based T-cell activating transmembrane protein which comprises a cytokine selected from IL2, IL7 and IL15.

6. A retroviral or lentiviral vector according to any preceding claim, which comprises a heterologous viral envelope glycoprotein giving a pseudotyped viral vector.

7. A retroviral or lentiviral vector according to Claim 6, in which the envelope glycoprotein is from RD114, VSV-G, Gibbon-ape leukaemia virus (GALV), or is the Amphotropic envelope, Measles envelope or baboon retroviral envelope glycoprotein.

8. A retroviral or lentiviral vector according to any preceding claim, in which the viral envelope also comprises:

(iii) a tagging protein which comprises:

a binding domain which binds to a capture moiety; and

a transmembrane domain

which tagging protein facilitates purification of the viral vector from cellular supernatant via binding of the tagging protein to the capture moiety.

9. A retroviral or lentiviral vector according to Claim 8, in which the binding domain of the tagging protein comprises one or more streptavidin-binding epitope(s).

10. A retroviral or lentiviral vector according to Claim 9, in which the streptavidin-binding epitope is a biotin mimic.

11. A retroviral or lentiviral vector according to Claim 10, in which the biotin mimic binds streptavidin with a lower affinity than biotin, so that biotin may be used to elute streptavidin-captured retroviral vectors produced by the packaging cell.

12. A retroviral or lentiviral vector according to Claim 11, in which the biotin mimic is selected from the following group: StreptagII (SEQ ID NO: 36), Flankedccstretag (SEQ ID NO: 37) and ccstreptag (SEQ ID NO:38).

13. A retroviral or lentiviral vector according to any preceding claim which comprises a nucleic acid sequence encoding a T-cell receptor or a chimeric antigen receptor.

14. A retroviral or lentiviral vector according to any preceding claim which is a virus-like particle (VLP).

15. A host cell which expresses, at the cell surface first and second mitogenic T-cell activating transmembrane proteins, each of which comprises a mitogenic domain and a transmembrane domain; in which the first mitogenic T-cell activating transmembrane protein binds CD3 and the second mitogenic T-cell activating transmembrane protein binds CD28, in which the host cell produces a retroviral or lentiviral vector as defined in any of Claims 1 to 7.

16. A host cell according to Claim 15, which also expresses, at the cell surface:

(iii) a tagging protein which comprises:

a binding domain which binds to a capture moiety; and

a transmembrane domain

which tagging protein facilitates purification of the viral vector from cellular supernatant via binding of the tagging protein to the capture moiety,

such that a retroviral or lentiviral vector produced by the host cell is as defined in any of Claims 8 to 12.

17. A packaging cell which is a host cell as defined in Claim 15 or 16 which also comprises one or more of the following genes: *gag*, *pol*, *env* and/or *rev.*

18. A producer cell which is a host cell as defined in Claim 15 or 16 which comprises gag, pol, env and optionally rev genes and also comprises a retroviral or lentiviral genome.

19. A method for making a host cell according to Claim 15 or 16, a packaging cell according to Claim 17 or a producer cell according to Claim 18 which comprises the step of transducing or transfecting a cell with a nucleic acid encoding the first and second mitogenic T-cell activating transmembrane proteins.

20. A method for producing a retroviral or lentiviral vector according to any of Claims 1 to 14 which comprises a step of expressing a retroviral or lentiviral genome in a cell according to any of Claims 15 to 18.

21. An *in vitro* method for making an activated transgenic T-cell or natural killer (NK) cell, which comprises the step of transducing a T or NK cell with a retroviral or lentiviral vector according to any of Claims 1 to 14, such that the T-cell or NK cell is activated by the first and second mitogenic T-cell activating transmembrane proteins.

22. A kit for making a retroviral or lentiviral vector as defined in any of Claims 1 to 14, which comprises:

(i) a host cell as defined in Claim 15 or 16;

(ii) nucleic acids comprising *gag*, *pol*, *env* and optionally *rev*; and

(iii) a retroviral genome.

23. A kit for making a retroviral or lentiviral vector as defined in any of Claims 1 to 14 which comprises:

(i) a packaging cell as defined in Claim 17; and

(ii) a retroviral or lentiviral vector genome.

24. A kit for making a packaging cell according to Claim 17 which comprises:

(i) one or more nucleic acid(s) encoding first and second mitogenic T-cell activating transmembrane proteins, and in which the first mitogenic T-cell activating transmembrane protein binds CD3 and the second mitogenic T-cell activating transmembrane protein binds CD28; and

(ii) nucleic acids comprising retroviral *gag*, *pol*, *env* and optionally *rev* genes.

25. A kit for making a producer cell according to Claim 18 which comprises:

(i) one or more nucleic acid(s) encoding first and second mitogenic T-cell activating transmembrane proteins, in which the first mitogenic T-cell activating transmembrane protein binds CD3 and the second mitogenic T-cell activating transmembrane protein binds CD28;

(ii) nucleic acids comprising retroviral gag, pol, and env and optionally rev genes; and

(iii) a retroviral or lentiviral vector genome.