

CLAIMS

1. An adenoviral vector or adeno-associated virus vector comprising a nucleotide sequence encoding a single cancer specific CD8+ T cell epitope, wherein the vector is capable of inducing an inflating memory CD8+ T cell response wherein said vector does not comprise a nucleic acid encoding further cancer specific T cell epitopes.
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2. The vector according to claim 1, wherein the vector is capable of inducing production of CD8+ T cells characterised by markers selected from the group comprising CX3CR1+, KLRG-1+, CD44+, CD62L-.
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3. The vector according to claim 1, wherein the vector is capable of inducing production of CD8+ T cells characterised by markers selected from the group comprising CX3CR1+, KLRG-1+, CD44+, CD62L-, CD27-(low), CD127-(low).
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4. The vector according to any of claims 1 to 3, wherein the nucleotide sequence encoding the cancer specific CD8+ T cell epitope comprises from 12 to 45 nucleotide base pairs.
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5. The vector according to any of claims 1 to 4, wherein the nucleotide sequence encoding the cancer specific CD8+ T cell epitope comprises from 24 to 45 nucleotide base pairs.
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6. The vector according to any of claims 1 to 5, wherein the cancer specific CD8+ T cell epitope is derived from a tumour associated antigen.
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7. The vector according to any of claims 1 to 6, wherein the T cell epitope is mutated in a cancer cell.
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8. The vector according to any of claims 1 to 7, wherein the T cell epitope is overexpressed in a cancer cell.
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9. The vector according to any of claims 1 to 8, wherein the T cell epitope is derived from a tumour associated antigen selected from the group consisting of TRP-1, CEA, TAG-72, 9D7, Ep-CAM, EphA3, telomerase, mesothelin, SAP-1 Melan-A/MART-1, tyrosinase, CLPP, cyclin-A1, cyclin-B1, MAGE-A1, MAGE-C1, MAGE-C2, SSX2, XAGE1b/GAGED2a, CD45, glypican-3, IGF2B3, kallikrein-4, KIF20A, lengsin, meloe, MUC5AC, survivin, PRAME, SSX-2, NY-ESO-1/LAGE1, gp70, MC1R, TRP-1/-2, β -catenin, BRCA1/2, CDK4, foetal protein SIM1.
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10. The vector according to claim 9, wherein the T cell epitope comprises SEQ ID NO:2 (SLLMWITQC).

11. The vector according to any of claims 1 to 6, wherein the cancer specific CD8+ T cell epitope is specific for colorectal cancer, prostate cancer, oesophageal cancer, liver cancer, renal cancer, lung cancer, breast cancer, breast cancer, pancreatic cancer, brain cancer, hepatocellular cancer, lymphoma, leukaemia, gastric cancer, cervical cancer, ovarian cancer, thyroid cancer, melanoma, carcinoma, head and neck cancer, skin cancer, nasopharyngeal cancer, Epstein Barr driven cancers, Human Papilloma virus driven cancers and soft tissue sarcoma.
12. The vector according to any of claims 1 to 11, wherein the vector is human serotype 5 (AdHu5).
13. The vector according to any of claims 1 to 12, wherein the vector comprises a CMV promoter.
14. The vector according to any of claims 1 to 13, wherein the vector comprises a TATA box.
15. The vector according to any of claims 1 to 14, wherein the vector lacks the E1 and E3 proteins.
16. An immunogenic composition, comprising the vector according to any of claims 1 to 15.
17. An immunogenic composition, comprising at least two vectors according to any of claims 1 to 15.
18. The composition according to claim 17, wherein each vector encodes a different cancer specific CD8+ T cell epitope.
19. The composition of any of claims 16 to 18, comprising one or more additional active ingredients, pharmaceutically acceptable carrier, diluent, excipient or adjuvant.
20. A host cell, comprising the vector according to any of claims 1 to 15, or the immunogenic composition according to any of claims 16 to 19.
21. The vector or composition according to any of claims 1 to 19, for use in therapy.
22. The vector or composition according to any of claims 1 to 19, for use in the treatment or prevention of cancer.

23. A method of treating or preventing a cancer, comprising administering a therapeutically effective amount of the vector according to claims 1 to 15 or a composition according to claims 16 to 19.
- 5 24. A method of inducing an inflating memory CD8+ T cell response, comprising the step of; administering a therapeutically effective amount of the vector according to any of claims 1 to 15, or composition according to any of claims 16 to 19, to a subject in need thereof, wherein the CD8+ T cells are characterised by markers selected from the group comprising CX3CR1+, KLRG-1+, CD44+ and CD62L-.
- 10 25. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or composition is administered intravenously or intramuscularly.
26. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or composition is administered as a single dose.
- 15 27. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or composition is administered as multiple doses.
- 20 28. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or immunogenic composition is administered prophylactically to the subject.
29. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or immunogenic composition is administered therapeutically to the subject.
- 25 30. The vector or composition according to claim 21 or 22, the method according to claim 23 or 24, wherein the vector or composition is administered in combination with an immunomodulatory molecule either separately, sequentially or simultaneously.
- 30 31. The method, vector or composition according to claim 30, wherein the immunomodulatory molecule is an immune checkpoint inhibitor.
- 35 32. The method, vector or composition according to claim 31, wherein the immune check point inhibitor is an inhibitor of an immune checkpoint protein selected from the group consisting of CTLA-4, PD-1, PD-L1, PD-L2, TIM3, LAG -3, B7-H3, B7-H4, B7-H6, A2aR, BTLA, GAL9 and IDO.

33. A method of producing the vector according to any of claim 1 to 15, comprising the steps of;
- 5 i) synthesising the nucleic acid sequence encoding the epitope, as a sense and antisense primer,
- ii) cloning the nucleic acid sequence encoding epitope sequence into a first plasmid,
- iii) cloning the sequence comprising the nucleic acid sequence encoding epitope into a second vector comprising the adenoviral DNA.
34. A kit comprising the vector according to any of claims 1 to 15 or a composition according to claims 16 to 19, one or more additional active ingredients, pharmaceutically acceptable carrier, diluent, excipient or adjuvant, and optionally instructions for use.
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35. A method for inducing a T cell immune response in an animal against a cancer specific CD8+ T cell epitope, comprising contacting a cell with the vector to claims 1 to 15 or a composition according to claims 16 to 19.
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