Claims

1. An isolated polypeptide comprising a sequence selected from:
   (a) the sequence of any one of SEQ ID NOs. 1-8; and
   (b) a variant of the sequences of (a); and
   (c) an immunogenic fragment of the sequences of (a).
2. The isolated peptide according to claim 1 comprising or consisting of the sequence selected from any one of SEQ ID NOs. 9-22 and 39.
3. The isolated polypeptide according to claim 1 or claim 2 fused to a second or further polypeptide selected from (i) one or more other polypeptides according to claim 1 or claim 2 (ii) other polypeptides which are melanoma associated antigens (iii) polypeptide sequences which are capable of enhancing an immune response (i.e. immunostimulant sequences) and (iv) polypeptide sequences, e.g. comprising universal CD4 helper epitopes, which are capable of providing strong CD4+ help to increase CD8+ T cell responses to antigen epitopes.
4. An isolated nucleic acid encoding the polypeptide according to any one of claims 1 to 3.
5. The nucleic acid according to claim 4 which is a DNA.
6. The nucleic acid according to claim 5 comprising or consisting of a sequence selected from any one of SEQ ID NOs. 23-30 and 31-38.
7. The nucleic acid according to claim 6 which is codon optimised for expression in a human host cell.
8. The nucleic acid according to claim 4 which is an RNA.
9. The nucleic acid according to claim 4, 5, 7 or 8 which is an artificial nucleic acid sequence.
10. A vector comprising the nucleic acid according to any one of claims 4 to 9.
11. The vector according to claim 10 which comprises DNA encoding regulatory elements suitable for permitting transcription of a translationally active RNA molecule in a human host cell.
12. The vector according to claim 10 or claim 11 which a viral vector.
13. The vector according to claim 12 which is an adenoviral vector, an adeno-associated virus (AAV), alphavirus, herpes virus, arena virus, measles virus, poxvirus, paramyxovirus, lentivirus and rhabdovirus vector.

14. An immunogenic pharmaceutical composition comprising a polypeptide, nucleic acid or vector according to any one of claims 1 to 13 together with a pharmaceutically acceptable carrier.
15. A vaccine composition comprising a polypeptide, nucleic acid or vector according to any one of claims 1 to 13 together with a pharmaceutically acceptable carrier.
16. The composition according to claim 14 or claim 15 which comprises one or more immunostimulants.
17. The composition according to claim 16 wherein the immunostimulants are selected from aluminium salts, saponins, immunostimulatory oligonucleotides, oil-in-water emulsions, aminoalkyl glucosaminide 4-phosphates, lipopolysaccharides and derivatives thereof and other TLR4 ligands, TLR7 ligands, TLR8 ligands, TLR9 ligands, IL-12 and interferons.
18. The composition according to any one of claims 14 to 17 which is a sterile composition suitable for parenteral administration.
19. A polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18 for use in medicine.
20. A method of raising an immune response in a human which comprises administering to said human the polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18.
21. The method according to claim 20 wherein the immune response is raised against a cancerous tumor expressing a sequence selected from SEQ ID NOs. 1-8 and variants and immunogenic fragments of any one thereof.
22. A polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18 for use in raising an immune response in a human.
23. The polypeptide, nucleic acid, vector or composition according to claim 22 wherein the immune response is raised against a cancerous tumor expressing a corresponding sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments or variants of any one thereof.
24. A method of treating a human patient suffering from cancer wherein the cells of the cancer express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, or of preventing a human from suffering from cancer which cancer would express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of

any one thereof, which method comprises administering to said human a corresponding polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18.

25. A polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18 for use in treating or preventing cancer in a human, wherein the cells of the cancer express a corresponding sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments of any one thereof.

26. A polypeptide, nucleic acid, vector or composition according to any one of claims 1-18 for use in the *ex vivo* stimulation and/or amplification of T-cells derived from a human suffering from cancer, for subsequent reintroduction of said stimulated and/or amplified T cells into the said human for the treatment of the said cancer in the said human.

27. A method of treatment of cancer in a human, wherein the cells of the cancer express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, which comprises taking from said human a population of white blood cells comprising at least T-cells optionally with antigen-presenting cells, stimulating and/or amplifying said T-cells in the presence of a corresponding polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18, and reintroducing some or all of said white blood cells at least stimulated and/or amplified T cells T-cells into the human.

28. A method or a polypeptide, nucleic acid, vector or composition for use according to any one of claims 21 and 23 to 27 wherein the cancer is melanoma e.g. cutaneous melanoma.

29. A process for preparing a T-cell population which is cytotoxic for cancer cells which express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof which comprises (a) obtaining T-cells optionally with antigen-presenting cells from a cancer patient and (ii) stimulating and amplifying the T-cell population *ex vivo* with a corresponding polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18.

30. A T-cell population obtainable by the process of claim 29.

31. A T-cell which has been stimulated with a polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18.

32. An antigen presenting cell modified by *ex vivo* loading with the polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18 or genetically engineered to express the polypeptide according to any one of claims 1 to 3.
33. The antigen presenting cell of claim 32 which is a dendritic cell.
34. An exosome loaded with a polypeptide prepared from cells loaded with a polypeptide, nucleic acid, vector or composition according to any one of claims 1 to 18 or genetically engineered to express the polypeptide according to any one of claims 1 to 3.
35. A pharmaceutical composition comprising the T-cell population, the T-cell, antigen presenting cell or exosome according to any one of claims 30 to 34 together with a pharmaceutically acceptable carrier.
36. A T-cell population, T-cell, antigen presenting cell or exosome according to any one of claims 30 to 34 for use in medicine.
37. A method of treating a human suffering from cancer wherein the cells of the cancer express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, or of preventing a human from suffering from cancer wherein the cells of the cancer would express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, which comprises administering to said human the T-cell population, the T-cell, antigen presenting cell, exosome or composition according to any one of claims 30 to 35.
38. A T-cell population, T-cell, antigen presenting cell, exosome or composition according to any one of claims 30 to 35 for use in treating or preventing cancer in a human, wherein the cells of the cancer express a corresponding sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments of any one thereof.
39. A process, a method or a T-cell population, T-cell, antigen presenting cell, exosome or composition for use according to any one of claims 29, 37 and 38 wherein the cancer is melanoma e.g. cutaneous melanoma.
40. An isolated antigen-binding polypeptide which is immunospecific for the polypeptide according to any one of claims 1 to 3.
41. The antigen-binding polypeptide according to claim 40 which is a monoclonal antibody or a fragment thereof.

42. The antigen-binding polypeptide according to claim 40 or claim 41 which is coupled to a cytotoxic moiety.
43. An antigen-binding polypeptide according to any one of claims 40 to 42 for use in medicine.
44. A pharmaceutical composition comprising the antigen-binding polypeptide according to any one of claims 40 to 42 together with a pharmaceutically acceptable carrier.
45. A method of treating a human suffering from cancer wherein the cells of the cancer express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, or of preventing a human from suffering from cancer wherein the cells of the cancer would express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, which comprises administering to said human the antigen-binding polypeptide or composition according to any one of claims 40 to 42 and 44.
46. An antigen-binding polypeptide or a composition according to any one of claims 40 to 42 and 44 for use in treating or preventing cancer in a human, wherein the cells of the cancer express a corresponding sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments of any one thereof.
47. A method, antigen-binding polypeptide or composition according to claim 45 or claim 46 wherein the cancer is melanoma e.g. cutaneous melanoma.
48. An isolated antigen-binding polypeptide which is immunospecific for an HLA-bound polypeptide that is or is part of the polypeptide according to any one of claims 1 to 3.
49. The antigen-binding polypeptide according to claim 48 which is a T-cell receptor or a fragment thereof.
50. The antigen-binding polypeptide according to claim 48 or claim 49 which is coupled to another polypeptide that is capable of binding to cytotoxic cells or other immune components in a subject.
51. A cytotoxic cell that has been engineered to express the antigen-binding polypeptide of any one of claims 48 to 50 on its surface.
52. The cytotoxic cell according to claim 51 which is a T-cell.
53. A cytotoxic cell according to claim 51 or claim 52 for use in medicine.

54. A pharmaceutical composition comprising the cell according to claim 51 or claim 52.

55. A method of treating a human patient suffering from cancer wherein the cells of the cancer express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, or of preventing a human from suffering from cancer which cancer would express a sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments and variants of any one thereof, which method comprises administering to said human a cell according to claim 51 or claim 52.

56. A cytotoxic cell according to claim 51 or claim 52 for use in treating or preventing cancer in a human, wherein the cells of the cancer express a corresponding sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments of any one thereof.

57. A method of diagnosing a human as suffering from cancer, comprising the steps of:
determining if the cells of said cancer express a polypeptide sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments or variants of any one thereof, or a nucleic acid encoding said polypeptide sequence, and diagnosing said human as suffering from cancer if said polypeptide or corresponding nucleic acid is overexpressed in said cancer cells.

58. A method of diagnosing that a human suffering from cancer which is cutaneous melanoma, comprising the steps of: determining if the cells of said cancer express the polypeptide sequence of any one of SEQ ID NOs. 4, 6 and 7 and immunogenic fragments or variants thereof; or a nucleic acid encoding said polypeptide sequence, and diagnosing said human as suffering from cancer which is cutaneous melanoma if said polypeptide or corresponding nucleic acid is overexpressed in said cancer cells.

59. A method of diagnosing that a human suffering from cancer which is cutaneous melanoma or uveal melanoma, comprising the steps of:
determining if the cells of said cancer express a polypeptide sequence selected from SEQ ID NOs. 1, 2, 3, 5 and 8 and immunogenic fragments or variants of any one thereof; or a nucleic acid encoding said polypeptide sequence, and diagnosing said human as suffering from cancer which is

cutaneous melanoma or uveal melanoma if said polypeptide or corresponding nucleic acid is overexpressed in said cancer cells.

60. A method of treating a human suffering from cancer, comprising the steps of:
(a) determining if the cells of said cancer express a polypeptide sequence selected from SEQ ID NOs. 1-8 and immunogenic fragments or variants of any one thereof or a nucleic acid encoding said polypeptide (e.g. selected from the sequences of SEQ ID NOs. 23-30 and 31-38); and if so
(b) administering to said human a corresponding polypeptide, nucleic acid, vector, composition, T-cell population, T-cell, antigen presenting cell, exosome, antigen-binding polypeptide or cytotoxic cell according to any one of claims 1 to 18, 30 to 35, 40 to 42, 44, 50, 51 and 53.

61. Use of a polypeptide comprising a sequence selected from:
(a) the sequence of any one of SEQ ID NOs. 1-8; or
(b) a variant of the sequences of (a); and
(c) an immunogenic fragment of the sequences of (a) isolated from the tumor of a human suffering from cancer, or use of a nucleic acid encoding said polypeptide, as a biomarker for the determination of whether said human would be suitable for treatment by a vaccine comprising a corresponding polypeptide, nucleic acid, vector, composition, T-cell population, T-cell, antigen presenting cell, exosome, antigen-binding polypeptide or cytotoxic cell according to any one of claims 1 to 18, 30 to 35, 40 to 42, 44, 51, 52 and 54.

62. The method or use according to claim 60 or claim 61 wherein the cancer is melanoma e.g. cutaneous melanoma.

63. A method or a polypeptide, nucleic acid, vector or composition for use according to any one of claims 21 and 23 to 27 wherein the polypeptide comprises a sequence selected from:
(a) the sequence of any one of SEQ ID NOs. 1, 2, 3, 5 and 8; and
(b) a variant of the sequences of (a); and
(c) an immunogenic fragment of the sequences of (a);
and for example the polypeptide comprises or consists of a sequence selected from any one of SEQ ID NOs. 9-15, 18 and 22 and for example the nucleic acid comprises or consists of a sequence selected from any one of

SEQ ID NOs. 23, 24, 25, 27 and 30 or selected from any one of SEQ ID NOs. 31, 32, 33, 35 and 38;
and wherein the cancer is uveal melanoma.

64. A method according to claim 45 or an antigen-binding polypeptide or composition for use according to claim 46 wherein the polypeptide comprises a sequence selected from:
(a) the sequence of any one of SEQ ID NOs. 1, 2, 3, 5 and 8; and
(b) a variant of the sequences of (a); and
(c) an immunogenic fragment of the sequences of (a);
and for example the polypeptide comprises or consists of a sequence selected from any one of SEQ ID NOs. 9-15, 18 and 22 and for example the nucleic acid comprises or consists of a sequence selected from any one of SEQ ID NOs. 23, 24, 25, 27 and 30 or selected from any one of SEQ ID NOs. 31, 32, 33, 35 and 38;
and wherein the cancer is uveal melanoma.

65. A process, a method or a T-cell population, T-cell, antigen presenting cell, exosome or composition for use according to any one of claims 29, 37 and 38 wherein the polypeptide comprises a sequence selected from:
(a) the sequence of any one of SEQ ID NOs. 1, 2, 3, 5 and 8; and
(b) a variant of the sequences of (a); and
(c) an immunogenic fragment of the sequences of (a);
and for example the polypeptide comprises or consists of a sequence selected from any one of SEQ ID NOs. 9-15, 18 and 22 and for example the nucleic acid comprises or consists of a sequence selected from any one of SEQ ID NOs. 23, 24, 25, 27 and 30 or selected from any one of SEQ ID NOs. 31, 32, 33, 35 and 38;
and wherein the cancer is uveal melanoma.

66. The method or use according to any one of claims 60 or 61 wherein the polypeptide comprises a sequence selected from:
(a) the sequence of any one of SEQ ID NOs. 1, 2, 3, 5 and 8; and
(b) a variant of the sequences of (a); and
(c) an immunogenic fragment of the sequences of (a);

and for example the polypeptide comprises or consists of a sequence selected from any one of SEQ ID NOs. 9-15, 18 and 22 and for example the nucleic acid comprises or consists of a sequence selected from any one of SEQ ID NOs. 23, 24, 25, 27 and 30 or selected from any one of SEQ ID NOs. 31, 32, 33, 35 and 38; and wherein the cancer is uveal melanoma.