

Claims

1. A pharmaceutically acceptable salt of peptide, wherein the peptide consists of SEQ ID NO: 290.
2. The pharmaceutically acceptable salt of claim 1, wherein the pharmaceutically acceptable salt is selected from chloride or acetate salts, optionally wherein the acetate salt is a trifluoroacetate salt.
3. Use of a peptide consisting of SEQ ID No. 290 in the manufacture of a medicament against prostate cancer.
4. Use of an antibody, soluble or membrane-bound, optionally a monoclonal antibody or fragment thereof, that specifically recognizes a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, in the manufacture of a medicament against prostate cancer.
5. Use of a T-cell receptor, soluble or membrane-bound, or a fragment thereof, that is reactive with an HLA ligand, wherein said ligand is a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, in the manufacture of a medicament against prostate cancer.
6. The use according to claim 5, wherein said T-cell receptor is provided as a soluble molecule and optionally carries a further effector function such as an immune stimulating domain or toxin.
7. Use of a nucleic acid, or an expression vector expressing said nucleic acid, wherein the nucleic acid encodes for a peptide consisting of SEQ ID No. 290, an antibody or fragment thereof that specifically recognizes a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, or a T-cell receptor or fragment thereof that is reactive with an HLA ligand, wherein said ligand is a peptide consisting of SEQ ID No. 290, or the peptide consisting of

SEQ ID No. 290 when bound to an MHC molecule, optionally linked to a heterologous promoter sequence, in the manufacture of a medicament against prostate cancer.

8. Use of a recombinant host cell comprising the peptide consisting of SEQ ID No. 290, an antibody or fragment thereof that specifically recognizes a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, a T-cell receptor or fragment thereof that is reactive with an HLA ligand, wherein said ligand is a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, or a nucleic acid or an expression vector expressing said nucleic acid, wherein the nucleic acid encodes for said peptide, antibody, or T-cell receptor, wherein said host cell optionally is selected from an antigen presenting cell, such as a dendritic cell, a T cell or an NK cell in the manufacture of a medicament against prostate cancer.
9. Use of an activated T lymphocyte that selectively recognizes a cell which over-presents a peptide consisting of SEQ ID No. 290, in the manufacture of a medicament against prostate cancer.
10. Use of a pharmaceutical composition comprising at least one active ingredient selected from the group consisting of the pharmaceutically acceptable salt according to claim 1 or claim 2, a peptide consisting of SEQ ID No. 290, an antibody or fragment thereof that specifically recognizes a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, a T-cell receptor or fragment thereof that is reactive with an HLA ligand, wherein said ligand is a peptide consisting of SEQ ID No. 290, or the peptide consisting of SEQ ID No. 290 when bound to an MHC molecule, a nucleic acid or an expression vector expressing said nucleic acid, wherein the nucleic acid encodes for said peptide, antibody, or T-cell receptor, a host cell comprising said peptide, antibody, T-cell receptor, or nucleic acid or expression vector, or an activated T lymphocyte that specifically recognizes a cell which over-presents a peptide consisting of SEQ

ID No. 290, a conjugated or labelled active ingredient, and a pharmaceutically acceptable carrier, and optionally, pharmaceutically acceptable excipients and/or stabilizers, in the manufacture of a medicament against prostate cancer.

11. The use according to claim 10, further comprising one or more adjuvants selected from interleukin and immunoadjuvant.
12. The use according to claim 11, wherein
 - a) the interleukin is IL-2; and/or
 - b) the immunoadjuvant is IL-15.
13. Use of an effective number of activated T cells that specifically recognize a cell which over-presents a peptide consisting of SEQ ID No. 290 in the manufacture of a medicament for killing target cancer cells which over-present a peptide consisting of SEQ ID No. 290.
14. Use of the pharmaceutically acceptable salt according to claim 1 or claim 2 in the manufacture of a medicament against cancer.
15. The use according to any one of claims 3 to 14, wherein said cancer is selected from tumors that show an over-presentation of a peptide consisting of SEQ ID NO: 290.
16. A method for producing a personalized anti-cancer vaccine or a compound-based and/or cellular therapeutic agent for an individual, said method comprising:
 - a) identifying tumor-associated peptides (TUMAPs) presented by a tumor sample from said individual;
 - b) comparing the peptides as identified in a) with a warehouse of peptides that have been pre-screened for immunogenicity and/or over-presentation in tumors as compared to normal tissues;
 - c) selecting at least one peptide from the warehouse that matches a TUMAP identified in the tumor sample of said individual; and

d) manufacturing and/or formulating the personalized vaccine or compound-based or cellular therapeutic agent based on step c)

wherein the selected warehouse peptide is a peptide consisting of SEQ ID No. 290.

17. The method according to claim 16, wherein said TUMAPs are identified by:
 - a1) comparing expression data from the tumor sample to expression data from a sample of normal tissue corresponding to the tissue type of the tumor sample to identify proteins that are over-expressed or aberrantly expressed in the tumor sample; and
 - a2) correlating the expression data with sequences of MHC ligands bound to MHC class I and/or class II molecules in the tumor sample to identify MHC ligands derived from proteins over-expressed or aberrantly expressed by the tumor.
18. The method according to claim 16 or 17, wherein the sequences of MHC ligands are identified by eluting bound peptides from MHC molecules isolated from the tumor sample, and sequencing the eluted ligands.
19. The method according to any of claims 16 to 18, wherein the normal tissue corresponding to the tissue type of the tumor sample is obtained from the same patient.
20. The method according to any of claims 16 to 19, wherein the peptides included in the warehouse are identified based on the following steps:
 - aa. Performing genome-wide messenger ribonucleic acid (mRNA) expression analysis by highly parallel methods, such as microarrays or sequencing-based expression profiling, comprising identify genes that over-expressed in a malignant tissue, compared with a normal tissue or tissues;
 - ab. Selecting peptides encoded by selectively expressed or over-expressed genes as detected in step aa, and

- ac. Determining an induction of *in vivo* T-cell responses by the peptides as selected comprising *in vitro* immunogenicity assays using human T cells from healthy donors or said individual; or
 - ba. Identifying HLA ligands from said tumor sample using mass spectrometry;
 - bb. Performing genome-wide messenger ribonucleic acid (mRNA) expression analysis by highly parallel methods, such as microarrays or sequencing-based expression profiling, comprising identify genes that over-expressed in a malignant tissue, compared with a normal tissue or tissues;
 - bc. Comparing the identified HLA ligands to said gene expression data;
 - bd. Selecting peptides encoded by selectively expressed or over-expressed genes as detected in step bc;
 - be. Re-detecting of selected TUMAPs from step bd on tumor tissue and lack of or infrequent detection on healthy tissues and confirming the relevance of over-expression at the mRNA level; and
 - bf. Determining an induction of *in vivo* T-cell responses by the peptides as selected comprising *in vitro* immunogenicity assays using human T cells from healthy donors or said individual.
21. The method according to any of claims 16 to 20, wherein the immunogenicity of the peptides included in the warehouse is determined by a method comprising *in vitro* immunogenicity assays, MHC multimer staining, ELISPOT assays and/or intracellular cytokine staining.
 22. The method according to any of claims 16 to 21, further comprising identifying at least one mutation that is unique to the tumor sample relative to normal corresponding tissue from the individual, and selecting a peptide that correlates with the mutation for inclusion in the vaccine or for the generation of cellular therapies.
 23. The method according to claim 22, wherein said at least one mutation is identified by whole genome sequencing.