vaccination using mutant peptides could specifically ablate cancer cells expressing respective mutated targets, but sparing normal tissues unharmed. However, making antibodies one by one *in vitro* specifically against countless point mutations discovered so far is very difficult and not practical. Therefore, vaccination using mutant peptides could be a choice.

SUMMARY OF THE INVENTION

In a first aspect, the present invention refers to the use of a polypeptide in the manufacture of a medicament for the treatment ~~or prevention~~ of cancer, ~~by~~ wherein the treatment involves stimulating the production of anti-intracellular oncoprotein antibodies in a subject in need thereof, the polypeptide ~~being~~ comprising a fragment of an intracellular oncoprotein having between 10 and 150 amino acids, preferably between 10 and 100 amino acids, wherein the intracellular oncoprotein ~~fragment does not comprise an extracellular domain or a transmembrane domain~~is PRL3.

In a second aspect, the present invention refers to the use of a fragment of between 10 and 150 amino acids of an intracellular oncoprotein ~~or peptide based on a fragment of said intracellular oncoprotein~~ in the manufacture of a medicament for ~~preventing~~ treating cancer metastasis in a patient with cancer, wherein the intracellular oncoprotein was identified to be specific to the patient's cancer, wherein the intracellular oncoprotein is PRL3.

In a third aspect, the present invention refers to the use of a fragment of an intracellular oncoprotein ~~or peptide based on a fragment of said intracellular oncoprotein, the fragment or peptide being~~comprising between 10 and 150 amino acids in length in the manufacture of a medicament for treating ~~or preventing~~ cancer in a person, wherein the person was determined as suffering from, or likely to develop, a cancer associated with ~~an~~ the intracellular oncoprotein before administration of the fragment of peptide to that person, wherein the intracellular oncoprotein is PRL3.

~~In a fourth aspect, the present invention refers to~~Also described herein is a pharmaceutical composition comprising an intracellular oncoprotein fragment, or a variant, homologue or derivative thereof, together with a pharmaceutically acceptable excipient, diluent or carrier.

As described herein, intracellular oncoproteins can be targeted with vaccination to prevent cancer and cancer metastasis.

CLAIMS

1. Use of a polypeptide in the manufacture of a medicament for the treatment or prevention of cancer by stimulating the production of anti-intracellular oncoprotein antibodies in a subject in need thereof, the polypeptide being a fragment of an intracellular oncoprotein having between 10 and 150 amino acids, preferably between 10 and 100 amino acids, wherein the intracellular oncoprotein fragment does not comprise an extracellular domain or a transmembrane domain.

2. Use according to claim 1 wherein the polypeptide is selected from the group PRL3, PRL-1, VHZ, Her2, estrogen receptor (ER), an HBV protein and HBV X-protein.

3. Use according to any one of the preceding claims wherein the polypeptide is a fragment comprising an oncogenic mutation.

4. Use according to any one of the preceding claims wherein the polypeptide comprises a plurality of fragments.

5. Use according to claim 4 wherein the polypeptide comprises a plurality of fragments of the same oncoprotein.

6. Use according to claim 5 wherein the polypeptide comprises a plurality of fragments from two or more oncoproteins.

7. Use according to any one of the preceding claims, wherein the treatment or prevention of cancer is for preventing or reducing cancer metastasis.

8. Use to any one of the preceding claims wherein the patient has a primary cancer that expresses the intracellular oncoprotein.

9. Use according to any one of the preceding claims wherein the polypeptide comprises a fragment of an oncoprotein selected from the group consisting PRL3, PRL1, or VHZ.

10. Use of a fragment of between 10 and 150 amino acids of an intracellular oncoprotein or peptide based on a fragment of said intracellular oncoprotein in the manufacture of a medicament for preventing cancer metastasis in a patient with cancer, wherein the

intracellular oncoprotein was identified to be specific to the patient's cancer.

11. Use of a fragment of an intracellular oncoprotein or peptide based on a fragment of said intracellular oncoprotein, the fragment or peptide being between 10 and 150 amino acids in length in the manufacture of a medicament for treating or preventing cancer in a person, wherein the person was determined as suffering from, or likely to develop, a cancer associated with an intracellular oncoprotein before administration of the fragment or peptide to that person.

12. The use of claim 10 or claim 11 wherein the fragment comprises an oncogenic mutation.

13. The use of any one of claims 10 to 12 wherein the patient is administered a plurality of oncoprotein fragments.

14. The use of claim 13 wherein the plurality of oncoprotein fragments are combined into one or more peptides that each comprises a plurality of different peptides, each optionally linked by a peptide linker.

15. The use of any one of claims 10 to 14 wherein the patient is induced to produce antibodies against the peptide.

16. The use of any one of claims 11 to 15 wherein the person is to be administered with the intracellular oncoprotein fragment or peptide before they develop the cancer.

17. The use of any one of claims 10 to 16 wherein the person is to be administered with a further dose of the intracellular oncoprotein fragment or peptide.

18. The use of any one of claims 11 to 17 wherein the person is identified as being likely to suffer from a cancer associated with an intracellular oncoprotein by assessing the prevalence of the cancer in family members.

19. The use according to any one of the preceding claims, in which the intracellular oncoprotein comprises a cytoplasmic or nuclear oncoprotein.

20. The use according to any preceding claim, in which the cancer is associated with or caused by over-expression of the intracellular oncoprotein.

21. The use according to any preceding claim, in which the cancer is selected from the group consisting of: breast cancer, hepatocellular cancer, acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), adrenocortical cancer, anal cancer, bladder cancer, blood cancer, bone cancer, brain tumor, cancer of the female genital system, cancer of the male genital system, central nervous system lymphoma, cervical cancer, childhood rhabdomyosarcoma, childhood sarcoma, chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), colon and rectal cancer, colon cancer, endometrial cancer, endometrial sarcoma, esophageal cancer, eye cancer, gallbladder cancer, gastric cancer, gastrointestinal tract cancer, hairy cell leukemia, head and neck cancer, Hodgkin's disease, hypopharyngeal cancer, Kaposi's sarcoma, kidney cancer, laryngeal cancer, leukemia, leukemia, liver cancer, lung cancer, malignant fibrous histiocytoma, malignant thymoma, melanoma, mesothelioma, multiple myeloma, myeloma, nasal cavity and paranasal sinus cancer, nasopharyngeal cancer, nervous system cancer, neuroblastoma, non-Hodgkin's lymphoma, oral cavity cancer, oropharyngeal cancer, osteosarcoma, ovarian cancer, pancreatic cancer, parathyroid cancer, penile cancer, pharyngeal cancer, pituitary tumor, plasma cell neoplasm, primary CNS lymphoma, prostate cancer, rectal cancer, respiratory system, retinoblastoma, salivary gland cancer, skin cancer, small intestine cancer, soft tissue sarcoma, stomach cancer, stomach cancer, testicular cancer, thyroid cancer, urinary system cancer, uterine sarcoma, vaginal cancer, vascular system, Waldenstrom's macroglobulinemia and Wilms' tumor.

22. The use according to any one of claims 10 to 21 wherein the oncoprotein is selected from the group Estrogen Receptor, an HBV protein, PRL3, VHZ and Her2, Kras, EGFR, Braf, PI3KCA, beta-catenin, GNAS, Ret, EZH2 or GNAQ.

CLAIMS

1. Use of a polypeptide in the manufacture of a medicament for the treatment of cancer, wherein the treatment involves stimulating the production of anti-intracellular oncoprotein antibodies in a subject in need thereof, the polypeptide comprising a fragment of an intracellular oncoprotein having between 10 and 150 amino acids, preferably between 10 and 100 amino acids, wherein the intracellular oncoprotein is PRL3.

2. Use according to claim 1 wherein the polypeptide is a fragment comprising an oncogenic mutation.

3. Use according to claim 1 or claim 2 wherein the polypeptide comprises a plurality of fragments.

4. Use according to claim 3 wherein the polypeptide comprises a plurality of fragments of the same oncoprotein.

5. Use according to claim 4 wherein the polypeptide comprises a plurality of fragments from two or more oncoproteins.

6. Use according to any one of the preceding claims, wherein the treatment of cancer is for reducing cancer metastasis.

7. Use to any one of the preceding claims wherein the patient has a primary cancer that expresses the intracellular oncoprotein.

8. Use of a fragment of between 10 and 150 amino acids of an intracellular oncoprotein in the manufacture of a medicament for treating cancer metastasis in a patient with cancer, wherein the intracellular oncoprotein was identified to be specific to the patient's cancer, wherein the intracellular oncoprotein is PRL3.

9. Use of a fragment of an intracellular oncoprotein comprising between 10 and 150 amino acids in length in the manufacture of a medicament for treating cancer in a person, wherein the person was determined as suffering from, or likely to develop, a cancer associated with the intracellular oncoprotein before administration of the fragment or peptide to that person, wherein the intracellular oncoprotein is PRL3.

10. The use of claim 8 or claim 9 wherein the fragment comprises an oncogenic mutation.

11. The use of any one of claims 8 to 10 wherein the patient is administered a plurality of oncoprotein fragments.

12. The use of claim 11 wherein the plurality of oncoprotein fragments are combined into one peptide, each optionally linked by a peptide linker.

13. The use of any one of claims 8 to 12 wherein the patient is induced to produce antibodies against the peptide.

14. The use of any one of claims 9 to 13 wherein the person is to be administered with the intracellular oncoprotein fragment or peptide before he/she develops the cancer.

15. The use of any one of claims 8 to 14 wherein the person is to be administered with a further dose of the intracellular oncoprotein fragment or peptide.

16. The use of any one of claims 9 to 16 wherein the person has been identified as being likely to suffer from a cancer associated with an intracellular oncoprotein by assessing the prevalence of the cancer in family members.

17. The use according to any one of the preceding claims, in which the intracellular oncoprotein comprises a cytoplasmic or nuclear oncoprotein.

18. The use according to any preceding claim, in which the cancer is associated with or caused by over-expression of the intracellular oncoprotein.

19. The use according to any preceding claim, in which the cancer is selected from the group consisting of: breast cancer, hepatocellular cancer, acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), adrenocortical cancer, anal cancer, bladder cancer, blood cancer, bone cancer, brain tumor, cancer of the female genital system, cancer of the male genital system, central nervous system lymphoma, cervical cancer, childhood rhabdomyosarcoma, childhood sarcoma, chronic lymphocytic leukemia (CLL), chronic myeloid leukemia (CML), colon and rectal cancer, colon cancer, endometrial cancer, endometrial sarcoma, esophageal cancer, eye cancer, gallbladder cancer, gastric cancer, gastrointestinal tract cancer, hairy cell leukemia, head and neck cancer, Hodgkin's disease,

hypopharyngeal cancer, Kaposi's sarcoma, kidney cancer, laryngeal cancer, leukemia, leukemia, liver cancer, lung cancer, malignant fibrous histiocytoma, malignant thymoma, melanoma, mesothelioma, multiple myeloma, myeloma, nasal cavity and paranasal sinus cancer, nasopharyngeal cancer, nervous system cancer, neuroblastoma, non-Hodgkin's lymphoma, oral cavity cancer, oropharyngeal cancer, osteosarcoma, ovarian cancer, pancreatic cancer, parathyroid cancer, penile cancer, pharyngeal cancer, pituitary tumor, plasma cell neoplasm, primary CNS lymphoma, prostate cancer, rectal cancer, respiratory system, retinoblastoma, salivary gland cancer, skin cancer, small intestine cancer, soft tissue sarcoma, stomach cancer, stomach cancer, testicular cancer, thyroid cancer, urinary system cancer, uterine sarcoma, vaginal cancer, vascular system, Waldenstrom's macroglobulinemia and Wilms' tumor.