absence of modification, antibodies (including monoclonal antibodies) are only generally suitable for targeting cancer antigens located at the surface or exterior of host cells [14-15]. In the examples above, HER2 receptor is located on the cell surface and is hence accessible for antibody binding by Herceptin, Likewise, VEGF is secreted into the bloodstream and is able to be bound by Bevacizumab.

Most oncogenic proteins are intracellular proteins (such as intracellular phosphatases, intracellular kinases, transcription factors, etc), and have remained under-explored by the approach of antibody therapies. The long held view that antibodies are too large to penetrate cell membrane has hampered the technology of antibody therapy used in targeting intracellular proteins.

There is therefore an urgent need for effective ways of treating and preventing cancer metastasis. Antibodies have not hitherto been used for targeting intracellular antigens or cancer markers because of the inability of the antibodies to cross the cell membrane and the consequent inaccessibility of the antigen.

Summary

In a first aspect, there is provided use of PRL3 or a polypeptide having at least 95% sequence identity to PRL3 in the manufacture of a medicament for use in preventing a PRL3 expressing cancer in a human individual in need thereof, wherein the use comprises that a prophylactically effective amount of PRL3 or a polypeptide having at least 95% identity to PRL3 is to be administered to the individual.

In a second aspect, there is provided a pharmaceutical composition comprising PRL3, or a polypeptide having at least 95% identity to PRL3 together with a pharmaceutically acceptable excipient, diluent or carrier.

We demonstrate in the Examples that *intracellular* oncoproteins can be targeted with either antibody therapy or vaccination to prevent cancer metastasis in mice.

Firstly, wild-type C57BL6 mice intravenously (i.v.) injected either with B16F0 or B16F10 melanoma cells, followed by i.v. injection with PRL-3 monoclonal antibody (mAb) showed that PRL-3 mAb can reduce tumors formed by B16F0 melanoma cells that express endogenous PRL-3 intracellular phosphatase, but not those by B I6F10 melanoma cells that do not express PRL-3.

Secondly, C57BL6 mice i.v. injected with either EGFP-B16F0 or EGFP-B16F10 cells in which both cell lines were engineered to overexpress EGFP, followed by i.v. injection with EGFP monoclonal antibody showed that regardless of PRL-3 expression status, EGFP mAb could eradicate tumors formed by both EGFP-B16F0 and EGFP-B16F10 melanoma cell lines.

CLAIMS

1. Use of PRL3 or a polypeptide having at least 95% sequence identity to PRL3 in the manufacture of a medicament for use in preventing a PRL3 expressing cancer in a human individual in need thereof, wherein the use comprises that a prophylactically effective amount of PRL3 or a polypeptide having at least 95% identity to PRL3 is to be administered to the individual.

2. Use according to claim 1 wherein the cancer is metastatic cancer.

3. Use according to claim 1 or claim 2 wherein the medicament is a cancer vaccine.

4. Use according to any preceding claim, in which the PRL3 is human PRL3.

5. The use according to any preceding claim, in which the cancer is associated with or caused by over-expression of PRL3.

6. Use according to any preceding claim, in which the cancer is selected from the group consisting of: acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), adrenocortical cancer, anal cancer, bladder cancer, blood cancer, bone cancer, brain tumor, breast cancer, 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, hepatocellular cancer, Hodgkin's disease, hypopharyngeal cancer, Kaposi's sarcoma, kidney cancer, laryngeal cancer, 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, testicular cancer, thyroid cancer, urinary system cancer, uterine sarcoma, vaginal cancer, vascular system, Waldenstrom's macroglobulinemia and Wilms' tumor.

7. A pharmaceutical composition comprising PRL3, or a polypeptide having at least 95% identity to PRL3 together with a pharmaceutically acceptable excipient, diluent or carrier.