A VLP-Based Vaccine Targeting EGFRvIII

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Technology description

An innovative vaccine targeting EGFRvIII.
The vaccine utilizes an engineered bacteriophage virus-like particle (VLPs) that targets a neo-epitope in EGFRvIII. Preliminary data in mice show that VLPs displaying this epitope elicit more rapid and higher titer antibodies than the KLH-coupled vaccine that was tested in clinical trials.

Background

The epidermal growth factor receptor (EGFR) is a transmembrane cell surface protein that functions as a receptor for specific ligands. These ligands include epidermal growth factor (EGF) and transforming growth factor alpha (TGF-alpha). After binding to the ligands, EGFR dimerizes and in turn stimulates various cascade pathways within cells. The resulting consequences are DNA synthesis and cell proliferation or division. Both of which can be detrimental in tumor or cancer-related cells.
Several cancers (including glioblastoma multiform, non-small lung carcinomas, breast cancer, etc.) are characterized by a specific deletion in the EGFR coding sequence. This deletion, termed EGFRvIII, leads to a constitutively active form of EGFR that is important in tumor cell growth and survival. Because EGFRvIII is not found in normal cells, it represents a potential target of active and passive immunotherapies. An active immunotherapy targeting an epitope in EGFRvIII increased survival rates in phase II trials; however, in larger phase III trials there was no significant difference in survival rates among those immunized and the controls. As an alternative, we propose using a virus-like particle (VLP) based immunization strategy. VLPs are capable of producing rapid and potent immune responses against diverse antigens. We hypothesize that using a VLP-based vaccine targeting EGFRvIII will lead to more rapid and high-titer antibodies that could potentially substantially increase survival rates of cancer patients with the EGFRvIII mutation.

Technology Description

Researchers at the University of New Mexico have developed an innovative vaccine targeting EGFRvIII. The vaccine utilizes an engineered bacteriophage virus-like particle (VLPs) that targets a neo-epitope in EGFRvIII. Preliminary data in mice show that VLPs displaying this epitope elicit more rapid and higher titer antibodies than the KLH-coupled vaccine that was tested in clinical trials.

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Application area

Specific targeting of EGFRvIII
Rapid antibody development
Increased cancer survival rates
Use of a validated VLP-based immunogenic carrier

Institution

The University of New Mexico

Inventors

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