NATIONAL CANCER INSTITUTE
Technology Transfer Center

Enhanced Immunogenicity Against HIV-1 Using a DNA-prime Poxvirus Vaccination

Summary

Researchers at the National Cancer Institute (NCI) seek research co-development or licenses for a method of stimulating an immune response in a human at risk for infection by, or already infected with, an HIV-1 retrovirus. This method utilizes DNA vaccines to stimulate CD8+ T cell immune responses.

NIH Reference Number

E-157-2000

Product Type

- Vaccines

Keywords

- Combination Therapy, Cytotoxic T Lymphocyte, CTL, Pox Virus, Deoxyribonucleic Acid, DNA Vaccine, Human Immunodeficiency Virus, HIV, Franchini

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

Researchers at the National Cancer Institute (NCI) have developed a method of stimulating an immune response in humans at risk for infection by, or already infected with, an Human Immunodeficiency Virus (HIV)-1 retrovirus. This method utilizes deoxyribonucleic acid (DNA) vaccines to stimulate CD8+ T cell immune responses. The DNA vaccine encodes antigens known to be effective against retroviruses, such as HIV-1gag, gp120, nefCTL, and proCTL. The same antigens are also expressed by the pox virus vaccine, which elicits an increased immune response when combined with the DNA vaccine. The pox virus expands T and B cells activated by the DNA-primer vaccine, confering treatment for and protection against HIV-1 infection. In summary, researchers developed a method of coupling enhanced and prolonged immunoprotective cytotoxic T

lymphocyte (CTL) responses with reduced viremia. This method offers a means to develop a vaccination for infected HIV-1 patients, as well as a method to provide immunization to at-risk individuals.

Stimulating the activation of T cells was shown as critical to design and develop vaccines against HIV. However, vaccinations using either pox viruses or DNA-prime vaccines fail to protect against HIV-1 infection. With more than 30 million people currently infected with HIV and these failed vaccine approaches, there is an unmet need for novel combination therapies that boosts patients' immune response to the HIV retrovirus.

The National Cancer Institute, Vaccine Branch, seeks parties to co-develop this method of using a DNA vaccine primer with poxvirus vaccination to enhance immune response against HIV-1.

Potential Commercial Applications

- Development of enhanced immunotherapy treatments using DNA and poxvirus vaccines
- Development of HIV vaccines as a combination therapy
- Other infectious diseases

Competitive Advantages

- Applicable for repeated booster immunizations without generating blocking antibodies
- Reduces viral load and enhances CTL response
- Utilizes clinically tested pox viruses – establishing safety data for regulatory filings
- Adaptable for the development of vaccination and immunizations for other infectious diseases

Inventor(s)

Genoveffa Franchini (NCI), George N Pavlakis (NCI)

Development Stage

- Pre-clinical (in vivo)

Publications

Vaccari M, et al. Phase III HIV vaccine trial in Thailand: a step toward a protective vaccine for HIV. [PMID: 20822342]

Radaelli A, et al. Prior DNA immunization enhances immune response to dominant and subdominant viral epitopes induced by a fowlpox-based SIVmac vaccine in long-term slow-progressor macaques infected with SIVmac251. [PMID: 12890631]

Vaccari M. et al. Reduced protection from Simian Immunodeficiency Virus SIVmac251 infection afforded by memory CD8+T-cells induced by vaccination during CD4+T-cell deficiency. [PMID: 18667509]

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 60/200,444 , Filed 28 Apr

2000
- **U.S. Patent Filed:** U.S. Patent Application Number PCT/US2001/013968 , Filed 30 Apr 2001
- **U.S. Patent Filed:** U.S. Patent Application Number 10/258,570 , Filed 25 Oct 2002
- **U.S. Patent Issued:** U.S. Patent Number 7,094,408 , Issued 20 Aug 2006
- **Foreign Issued:** - Patent Number 2001259291, Issued 30 Apr 2001
- **U.S. Patent Issued:** U.S. Patent Number 7,771,729 , Issued 10 Aug 2010

Therapeutic Area
- Infectious Diseases

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