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A need for T-cell based vaccines against AIDS lentiviruses

A major pursuit to develop an effective HIV-1 vaccine has ensued throughout the last 30 years and led to only one promising clinical vaccine trial, RV144. This trial used a prime-boost vaccination approach focused mainly on inducing humoral immunity. Remarkably however, CD4+ cytotoxic T-lymphocyte (CTL) responses to the HIV-1 envelope were also detected. The importance of T-cell immunity in the control of virus infection and viral set point has been described for HIV-1 and simian immunodeficiency virus (SIV) infections. Moreover, a commercial vaccine against feline immunodeficiency virus (FIV), the feline counterpart of HIV-1, was mediated by anti-FIV T-cell immunity. To date, no T-cell based peptide vaccine has been commercially released for prophylaxis against human or animal pathogens. In current studies, two unique approaches were utilized in the selection and delivery of T-cell based vaccine epitopes. The selected T-cell epitopes were highly conserved among HIV-1, SIV and FIV induced potent CTL and poly-functional T-cell activities against multiple lentiviruses. These lentivirally-conserved epitope peptides were formulated in pamitoyled multiple antigen peptides and delivered into the cytosol of antigen presenting cells for peptide processing and presentation to the T cells. This approach induced robust CTL and polyfunctional T-cell activities that prevented infection without over-stimulating viral enhancing epitopes. In conclusion, current animal vaccine study demonstrated the existence of T-cell epitopes on the viral proteins that can either enhance infection or confer protection against an AIDS lentivirus and therefore the need for careful evaluation of epitopes on HIV vaccine immunogen.

Biography

Janet K Yamamoto is a Professor of Retroviral Immunology in the Department of Infectious Diseases and Pathology, University of Florida. She is the first to demonstrate together with Nobel laureate Dr. Francoise Barré-Sinoussi, that interferon-gamma will enhance HIV-1 infection and she served as the consultant of the second FDA-approved HIV-1 immunoblot for HIV-1 confirmatory test. She co-discovered the feline immunodeficiency virus (FIV) and also invented the first commercial FIV vaccine sold by Pfizer-Zoetis and Boehringer. She was inducted to the National Academy of Inventors in 2014 and has published over 85 journal/book articles and over 30 patent publications.

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