Department of Biomedical Sciences

Departmental Seminar

Functional cure of HIV infection by active vaccination

By

Prof. Zhiwei Chen

AIDS Institute and Research Center for Infection and Immunity

Department of Microbiology

Li Ka Shing Faculty of Medicine

The University of Hong Kong

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Room B6605 *(near Lift 3)*
Level 6, Blue Zone, Academic 1
City University of Hong Kong
Tat Chee Avenue, Kowloon Tong

For abstract, please refer to the attachment.

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~ All are Welcome ~

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About the speaker

Dr. Zhiwei Chen is the founding director of the AIDS Institute, which was established in 2007 (http://www.hku.hk/aidsinst), at the University of Hong Kong Li Ka Shing Faculty of Medicine. In 1996, Dr. Chen graduated from the Aaron Diamond AIDS Research Center (ADARC) and obtained his Ph.D. degree in New York University School of Medicine, United States. From 1996 to 2007, he progressed from a post-doc to a research scientist, and then to a staff investigator/assistant professor all at ADARC of the Rockefeller University. He has been engaged in studies of HIV origin, molecular mechanisms of HIV/SIV entry, and AIDS vaccine since 1991. He was the first to isolate simian AIDS virus from wild Sooty Mangabeys in West Africa, to identify a new subtype F of HIV-2, and to demonstrate monkey CCR5 as a key co-receptor for HIV and SIV. Currently, he focuses his research areas on AIDS preventive drugs and vaccines with recent peer-reviewed articles published in JV, JBC, JCI, etc. He was an inventor/co-inventor of two AIDS vaccines recently finished clinical phase one trails in the US. He has published over 100 SCI papers and received numerous research grants as a PI from NIHR32, amFAR, NIHR01, Gates Foundation in US; RGC, RFCID and ITF in Hong Kong, as well as a project leader of 973, 11th- and 12th- Mega grants in mainland China. He also serves as an academic editor for PLoSONE, and an editorial board member for JAIDS and JMP. Besides that, Dr. Chen has been appointed by the Hong Kong Special Administrative Region Government as a Member of the Advisory Council on AIDS since 2007.

Abstract

Although antiretroviral therapy (ART) helps control HIV disease progression, reduces the chance of viral transmission and expands the life span of infected individuals, one of the major scientific challenges is the lack of a therapeutic cure against AIDS after over 30 years of efforts. To date, evidence of vaccine-elicited protection against AIDS viruses in non-human primate models and immune control of HIV in humans under certain circumstances (e.g. elite controllers), together with scientific advances in understanding viral latency, provide a strong rationale to continue the pursuit of an effective vaccine-based immunotherapy to eliminate AIDS in an active way. The goal of our research team is to determine "active vaccination for elimination (AV4E) of HIV latency" using the newly discovered PD1-vaccine strategy, which uniquely promotes HIV-1 antigen targeting to dendritic cells and antigen cross-presentation for inducing high frequency of HIV Gag-specific, broadly reactive, polyfunctional and memory CD8+ T cells. These responses conferred significant protection in vivo against lethal challenges of virulent vaccinia-Gag virus and malignant Gag-mesothelioma. Moreover, repeat vaccinations using the PD1-vaccine also cure the pre-existing Gag-mesothelioma by overcoming tumor-induced immunosuppressive environment. The mechanism underlying our discovery is likely because PD1-vaccine enhances uniquely lymph node DCs to produce IL-12 and enhances the cross-presentation of HIV antigen via distinct intracellular pathways. Moreover, the CD8+ T cells elicited by the PD-1 vaccine was found to enhance T-bet and Eomes expression for efficient effector and memory functions, together with about 100-fold higher avidity for tetramer binding as compared to controls. The significance of our ongoing study is to offer a potent and cost-effective vaccine strategy to potentially eliminate AIDS, in line with the global goal of "Getting to Zero".