OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Vaccines & Vaccination
July 29-31, 2013 Embassy Suites Las Vegas, NV, USA

Enhanced protective immunity against *Mycobacterium tuberculosis* afforded by BCG prime-DNA boost regimen correlates with increased IL-2-producing CD4 T cell frequency

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The development of improved vaccines and vaccination strategies against *Mycobacterium tuberculosis* has been hindered by a limited understanding of the immune correlates of anti-tuberculosis protective immunity. Simple measurement of IFN- frequency or production *per se* does not provide adequate prediction of immune protection. In this study, we examined the relationship between T cell immune responses and protection conferred by the heterologous vaccination strategy, BCG prime-Ag85A DNA boost (B/D), in a mouse model of pulmonary tuberculosis. The results demonstrated that mice vaccinated with the B/D regimen had a significantly reduced bacillary load compared to BCG-vaccinated mice, and the CFU reduction was associated with decreased pathology and lower levels of inflammatory cytokines in the infected lungs. Further analysis of immunogenicity showed that the superior protection afforded by the B/D regimen correlated with significantly increased frequency of IL-2-producing CD4 T cells and increased IL-2 production when measured as integrated mean fluorescence intensity (iMFI) value post-vaccination. These data suggest that measurement of elevated IL-2 production or frequency of IL-2-producing CD4 T cells can predict vaccine efficacy, and add to the accumulating body of evidence suggesting that BCG vaccination in prime-boost strategies may be a useful tool for the control of *M. tb* infection.

Keywords: Protective immunity; Prime-boost; DNA vaccine; Multifunctional T cell; IL-2; *Mycobacterium tuberculosis*.

Biography

Xiao-Yong Fan, Ph.D. Associate Professor, Young PI. He was born in April 1977, was awarded to be Shanghai Rising-Star (A) programmed by Shanghai Science and Technology Commission in 2009 and got the tracking support in 2012, and was promoted atypically to be Master's tutor of Pathogeny Biology in Fudan University in Jan 2011. In Sep 2005, Dr. Fan entered to Department of Microbiology, Fudan University to pursue his doctorate under supervision of Prof. Guo-Ping Zhao, academician of Chinese Academy of Sciences. After graduation, Dr. Fan joined into the Department of Scientific Research, Shanghai Public Health Clinical Center since Sep, 2008 as assistant professor firstly, and he was promoted as associate professor soon and began to establish Tuberculosis laboratory on infection and immunity in 2011. At present, Dr Fan's research interests focus on infection and immunity, and vaccine development on Tuberculosis.

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