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The development of tuberculosis subunit vaccine EAMMH and regulation of vaccine induced immune memory by rapamycin

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The efficacy of Bacillus Calmette-Guerin (BCG), the currently available vaccine against tuberculosis (TB) remains controversial, especially in adult. Therefore, novel vaccines and vaccination strategy are urgently needed. Fusion protein-based subunit vaccine has the potential to boost BCG-primed immunity to provide prolonged protective immunity in adult. During the vaccination, memory T cells are critical components of protective immunity and inducing effective memory T cell responses is a major goal. We constructed a fusion protein vaccine candidate EAMMH consisting of ESAT -6, Ag85B, 190-198 peptide of MPT64, Mtb8.4, and HspX, several confirmed protective antigens from Mycobacterium tuberculosis, in adjuvant of liposome DDA plus Poly I:C. Then we evaluated the protective immune memory induced by EAMMH at different dose, and regulated the EAMMH induced immune memory response by treatment with rapamycin, an immune suppressive drug, and IL-28B, a cytokine down-regulating regulatory T cells so as to find a strategy to increase the magnitude or quality of vaccine induced memory T cells. The result showed that EAMMH provided higher immune protection against M. tuberculosis infection in mice than BCG did. Moreover, low dose of EAMMH showed higher protective efficacy than high dose. It is interesting that rapamycin could enhance the vaccine induced immune memory, while IL-28B inhibited the long-time immune memory responses although it could enhance the short-time immune responses. In conclusion, the immune memory induced by subunit vaccine EAMMH was longer than traditional BCG vaccine did; treatment of mice with rapamycin could enhance the subunit vaccine induced immune memory.

Biography

Bingdong Zhu got Bachelor degree of Medical Science from Lanzhou University in 1996, completed his MD from Sichuan University and Postdoctoral studies from Fudan University in China. He is the Professor of Pathogenic Biology and Deputy Director of Lanzhou Center for Tuberculosis Research, School of Basic Medical Sciences, Lanzhou University. His primary research interest is tuberculosis subunit vaccine and immune pathology in tuberculosis. He has published more than 20 papers and has been serving as an editorial board member of *Journal of Microbes and Infection* (in Chinese).

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