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Human cellular and humoral responses to four latent tuberculosis antigens in Chinese population

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Tuberculosis is a global public health problem. *M. tuberculosis* infection rate was 44.5% in China, indicating that about 550 million people are infected with *M. tuberculosis*. Latent tuberculosis infection (LTBI) constitutes the main reservoir for reactivation of TB, and the diagnosis and treatment of LTBI is a critical step to control the disease. In our study, 4 recombinant TB latent proteins (Rv2029c, Rv2659c, Rv2628 and Rv1813c) were prepared and analyzed for their immunological characteristics and potential identification role in TB patients and healthy recruits. A total of 112 PLA healthy recruits and 94 TB patients (41 cases for Rv2029c, 43 cases for Rv2659c, 34 cases for Rv2628, 34 cases for Rv1813c) were tested for IFN-γresponses to recombinant CFP10-ESAT6 fusion protein and 4 recombinant TB latent proteins by ELISPOT assay. Our results showed that 33.04% (37/112) healthy recruits were positive rCFP10-ESAT6 ELISPOT (SFCs ≥13, 86.68±89.55, taken as the persons with LTBI) and 66.96% (75/112) healthy recruits were negative rCFP10-ESAT6 ELISPOT (SFCs≥13, 1.87±3.19, taken as normal persons without LTBI). The rRv2029c, rRv2659 and rRv2628 proteins induced detectable higher IFN-γ production in persons with LTBI (SFCs 109.92±107.87, 33.49±62.25, 31.19±56.05, respectively) compared with TB patients (SFCs 7.41±19.00, 2.40±4.46, 0.68±1.53, respectively) and normal persons (SFCs 35.99±57.40, 3.6±11.74, 3.03±7.99, respectively) by ELISPOT assay ($p<0.01$). The cellular immunity of rRv1813c was poor because SFCs of rRv1813c were 0 in 88.23% (30/34) TB patients and 82.69% (86/104) healthy recruits. The levels of IgG antibody specific to recombinant rRv2029c and rRv2659 proteins did not show significant difference between TB and healthy persons, LTBI and TB, LTBI and normal persons ($p>0.05$). The levels of IgG antibody specific to rRv2628 protein did not show significant difference between TB and healthy persons ($p>0.05$), but showed significant difference between LTBI and TB, LTBI and normal persons ($p<0.05$). The levels of IgG antibody specific to rRv1813c protein did not show significant difference between LTBI and normal persons ($p>0.05$), but showed significant difference between LTBI and TB, TB and normal persons ($p<0.01$). This is the first clinical report of human immune recognition of the latent proteins in Chinese populations. Our findings have implications for determining the biomarkers of latent M. tuberculosis infection, active TB disease, and protective immunity, also for the selection of potential TB vaccine candidates.

Biography

Xueqiong Wu, MD, Ph.D., The Director of Army Tuberculosis Prevention and Control Key Laboratory, the Vice Head of Institute of Tuberculosis Research, the 309th Hospital of Chinese PLA, Beijing 100091, China. She does research on tuberculosis (TB) in the following directions: (1) New TB vaccines; (2) the new, rapid diagnostic techniques of TB, for example, mycobacterial species identification, rapid detection of *M. tuberculosis* and its drug resistance, risk prediction of anti-TB drug-induced hepatotoxicity, rapid diagnosis of bacterium-negative TB, etc.; (3) New Chinese herbal medicine.

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