



Mycobacterium tuberculosis-specific CD4 T-cell scoring discriminates tuberculosis infection from disease

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In a prospective study, a scoring system based on analysis of the activation state of tuberculosis (TB)-specific CD4⁺ T-cells was developed that allows reliable discrimination of TB infection and TB disease with high sensitivity and specificity <https://bit.ly/3EFG4KX>

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Abstract

Background Rapid and reliable diagnostic work-up of tuberculosis (TB) remains a major healthcare goal. In particular, discrimination of TB infection from TB disease with currently available diagnostic tools is challenging and time consuming. This study aimed at establishing a standardised blood-based assay that rapidly and reliably discriminates TB infection from TB disease based on multiparameter analysis of TB antigen-reactive CD4⁺ T-cells acting as sensors for TB stage-specific immune status.

Methods 157 HIV-negative subjects with suspected TB infection or TB disease were recruited from local tertiary care hospitals in Berlin (Germany). Peripheral blood mononuclear cells were analysed for CD4⁺ T-cells reactive to the *Mycobacterium tuberculosis* antigens purified protein derivative and early secretory antigenic target 6 kDa/culture filtrate protein 10. The activation state of TB antigen-reactive T-cells, identified by surface expression of CD154, was evaluated according to the expression profile of proliferation marker Ki-67 and activation markers CD38 and HLA-DR. Using data from 81 subjects with clinically confirmed TB infection (n=34) or culture-proven pulmonary or extrapulmonary TB disease (n=47), 12 parameters were derived from the expression profile and integrated into a scoring system.

Results Using the scoring system, our assay (TB-Flow Assay) allowed reliable discrimination of TB infection from both pulmonary and extrapulmonary TB disease with high sensitivity (90.9%) and specificity (93.3%) as was confirmed by Monte-Carlo cross-validation.

Conclusion With low time requirement, ease of sample collection, and high sensitivity and specificity both for pulmonary and extrapulmonary TB disease, we believe this novel standardised TB-Flow Assay will improve the work-up of patients with suspected TB disease, supporting rapid TB diagnosis and facilitating treatment decisions.

