Washington University in St. Louis
Office of Technology Management

EFFECTIVE TEST FOR ACTIVE TUBERCULOSIS INFECTION

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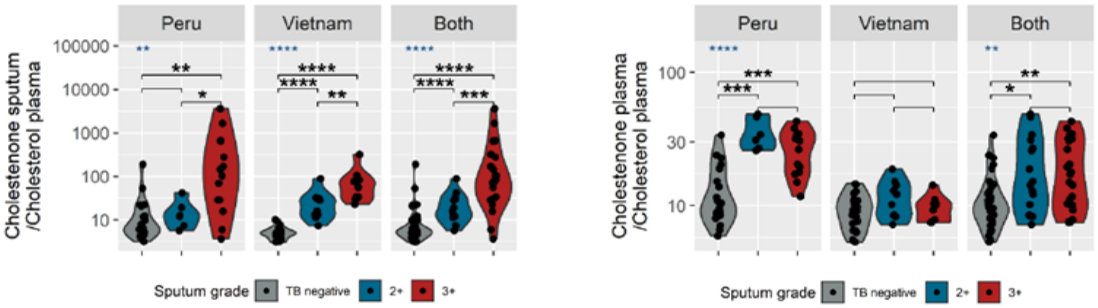
Technology Description

Researchers in Jennifer Philips' lab at Washington University in St. Louis have developed a more sensitive biomarker test for active tuberculosis infection. These biomarkers, found in the sputum and plasma, comprise of cholesterol metabolites that are cooperatively produced by enzymes from both the host macrophages as well as the mycobacterial pathogens

The current WHO-recommended TB tests, TST and IGRA, measure immune sensitization by *Mycobacterium tuberculosis* (Mtb). They cannot specifically detect living Mtb or distinguish active from latent infections and are therefore prone to false positives. Other methods to diagnose TB rely upon sputum samples and are limited by low sensitivity, long turn-around times, or the need for sophisticated equipment. In addition, there are no validated biomarkers for disease burden or response to therapy to aid clinical decision-making. In contrast, this test detects only active Mtb infections with high specificity and sensitivity, and can serve as a biomarker that correlates with disease burden and treatment success.



Graphs showing the ratio of (left) sputum or (right) plasma cholestenone to plasma cholesterol in patients with varying sputum grades. Patients were drawn from geographically distinct cohorts in Peru and Vietnam.

Stage of Research

The biomarker-based TB test has been validated with clinical samples. Biomarker measurement is currently carried out with mass spectroscopy, but future development may include antibody-based tests. These biomarkers have also been shown to detect non-tuberculous mycobacterium (NTM), which is an important cause of pulmonary disease in the developed world, particularly in patients with cystic fibrosis.

Publications

- Chandra P, Coullon H, Agarwal M, Goss CW, Philips JA. (2022). Macrophage global metabolomics identifies cholestenone as host/pathogen cometabolite present in human *Mycobacterium tuberculosis* infection. *Journal of Clinical Investigation*, 132(3): e152509.

Applications

- Diagnosis of Mtb infections and nontuberculous mycobacteria (NTM) infections

Key Advantages

- High specificity to active infections, and insensitive to cleared or latent Mtb infections
- Correlates with infection severity and Mtb load
- Non-sputum based test

Patents: Pending

Related Web Links: Philips Profile & Lab