

# Identification of Urine Specific Marker for Non-invasive Diagnosis of Tuberculosis

Amrita Masanta<sup>1</sup> and Shikha Singh<sup>1\*</sup>

<sup>1</sup>Centre for Biotechnology, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India  
E-mail: \*shikhsingh@gmail.com

---

**Abstract**—Tuberculosis (TB), one of the most widespread infectious and contagious disease which globally responsible for 2 millions death annually. Current available invasive methods like (sputum smear microscopy, tuberculin skin test, gastric lavage, etc) for detecting TB have limitations of very less specificity or sensitivity and also often time-consuming, inaccurate and complicated. As *Mycobacterium tuberculosis* genomic sequencing revealed the presence of several novel proteins with unknown functions in urine samples and one of them is lipoarabinomannan (LAM) which shows early and rapid detection of TB as pathogen biomarker. LAM (lipoarabinomannan) is a mycobacterial antigen (16700 daltons) that releases from metabolically active or degrading mycobacterial organisms into the serum, with subsequent filtration by the kidneys, passing into the urine. During active tuberculosis, LAM in a soluble form is released both from metabolically active and degrading bacterial cells. Furthermore, as LAM is a carbohydrate antigen, and thus inherently heat-stable, LAM may be detectable by sensitive immunological techniques, even after heat treatment of urine samples. Biomarker LAM can be used for detection of TB from urine. In this study, we have also identified other small antigenic proteins from TB urine samples. This protein can be utilized for the development of antibody and preparation of ICT (Immuno Chromatographic Technique) kit for rapid and non-invasive detection of TB from urine samples. Hence, this diagnostic test would allow an earlier implementation of an appropriate treatment and the reduction of disease transmission and set a tremendous opportunity to improve the condition of TB endemic areas.

**Keywords:** Tuberculosis, TB biomarker, Urine, Lipoarabinomannan (LAM), novel antigen ICT.