

DBT-BIRAC supports a portable microscopy module for TB diagnosis

New Delhi, Sep 25 : Tuberculosis (TB) remains a serious public health challenge in India, accounting for the highest number of cases in the world. As pronounced by our Honourable Prime Minister, several ambitious programs and plans have been implemented by the Government of India to meet an ambitious goal of ending TB by 2025. However, there is still a large gap between the number of new cases reported and the estimated incident cases (in 2018). This gap is due to a combination of underreporting of detected cases and underdiagnosis.



As a small add-up to India's effort to improve the diagnosis of TB, Grand Challenges India through one of its programs has supported start-up Valetude Primus Healthcare Pvt Ltd. This early stage company is attempting to address the problem of TB diagnosis with a simple point-of-care diagnostic device called "See TB". This efficient screening method can help break the cycle of infection by a high sensitive screening of every TB patient at designated microscopy centres.

The most rapid, inexpensive, widely used screening method for TB diagnosis in India is sputum smear microscopy using bright field microscopes. With "See TB", the company has upgraded the existing bright-field microscopes for highly sensitive fluorescence-based TB diagnosis systems. It converts the existing simple bright-field microscope and a fluorescent microscope to the total internal reflection fluorescence without any hassle of optical filters, and lens installation.

This innovation is highly compact (approximately the size of a calculator), robust, cost-effective and allows rapid diagnosis of tuberculosis without added infrastructure cost and training. This small device can be attached to a simple optical microscope to convert it into a fluorescence microscope, thus enabling better TB diagnosis at the point-of-care.

The device is battery operated and allows quick identification of the bacteria. "SeeTB" utilizes the company's two novel techniques:

- Compact Total Reflection Fluorescence (cTIRF) -excitation device, a novel-patented planar waveguide-based illumination technology developed by Valetude. cTIRF can be used with bright-field microscopes to convert it into a fluorescence microscope, without expensive instrument modifications to the existing microscopy setup. Evanescent wave-based illumination enhances the z-resolution in fluorescence imaging and reduces the background noise.
- Sputum Thinning Reagent (SLR): Sputum processing reagent is a novel method for sputum thinning. No-specific labelling of debris in sputum leads to poor sensitivity and specificity. Sputum digestion with clearing reagent removes debris and frees the bacilli present in sputum for fluorescent labelling.

The results have shown that compared to fluorescence microscopy, the CLR-SeeTB system has higher sensitivity.

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