Communication and Marketing Department
Isebe loThungelwano neNtengiso
Kommunikasie en Bemarkingsdepartement

Private Bag X3, Rondebosch 7701, South Africa
Welgelegen House, Chapel Road Extension, Rosebank, Cape Town
Tel: +27 (0) 21 650 5427/5428/5674 Fax: +27 (0) 21 650 5628

www.uct.ac.za

**3 March 2021**

# UCT scientists fine-tuning TB technology to understand transmission

As Tuberculosis (TB) awareness month kicks off, it's appropriate to remember that it is ranked as one of the deadliest infectious diseases globally. According to the World Health Organization's (WHO) Global Tuberculosis Report, which was released in October 2020, Africa hosts 25% of the world's TB burden, and 3.6% of these global cases are attributed to South Africa – with an estimated 360 000 people in the country having contracted TB in 2019.

Transmission, infection, disease is the successive cycle driven by *Mycobacterium tuberculosis* (*M. tb*) – the bacterium that causes tuberculosis (TB). However, the mechanisms behind the successful transmission of the bacterium have been poorly researched, mainly due to an inability to capture and identify live *M. tb* in the exhaled breath of TB patients.

This is changing – guided by collaborative efforts from scientists at the University of Cape Town's (UCT) Faculty of Health Sciences and the Institute of Infectious Disease and Molecular Medicine (IDM).

Of concern is the fact that fewer than one-third of new *M. tb* infections can be confidently linked to known TB cases, a deficiency reflecting the effects of the prolonged infectious period of TB and the potential for transmission from transient exposures.

"There is significant power in simply knowing when, by whom and how many *M. tb* organisms are produced in a community," said Professor Digby Warner of the IDM.

A recent paper published in *PLOS Pathogens* attempts to tackle this challenge. Led by joint first authors PhD candidate Ryan Dinkele and postdoctoral fellow Dr Sophia Gessner, the work describes the development of the requisite microbiological and microscopy techniques. Through this study, scientists demonstrated the ability to detect live *M. tb* organisms in 90% of TB cases and were able to trap the captured organisms for serial microscopic imaging over several days.

"A core motivation of this research was the need to keep the TB-causing bacteria, bacilli, alive following detection, to ensure the potential that previously inaccessible features such as morphological and physiological characteristics of aerosolised *M. tb* could be investigated. This [is order to] better understand the factors that might contribute to the successful transfer of infectious organisms from one person to another," Gessner explained.

This pipeline for detecting *M. tb* offers a uniquely sensitive way to identify who is transmitting *M. tb* and when, and for understanding what features of the bacterium might be critical to successful transmission. "Understanding transmission dynamics at this level will aid in targeting interventions to areas that serve as transmission hotspots," Gessner said.

The hope is that this work might inform better approaches to interrupt transmission. Although it contributes to the anti-TB strategy, this line of action remains mostly underexplored, because of the poor understanding of the events surrounding transfer of *M. tb* between hosts.

"This technique may also assess the current TB-control strategy, which involves treating passively-identified TB patients to reduce infectiousness. These patients can be tracked over time to monitor the frequency at which they produce infectious bioaerosols and, importantly, to quickly ascertain the impact of anti-TB drug therapy on infectious aerosol release," Dinkele added.

***ENDS***

***Issued by: UCT Communication and Marketing Department***

**Ridovhona Mbulaheni**
Media Liaison Assistant
Communication and Marketing Department
University of Cape Town
Rondebosch
Tel: (021) 650 2333
Cell: (064) 905 3807
Email: ridovhona.mbulaheni@uct.ac.za
Website: www.uct.ac.za