

Research reveals new target to fight tuberculosis

Wednesday, 5 June 2013

New research from the Menzies School of Health Research (Menzies) could open the door to the development of new treatments for Tuberculosis (TB).

A leading cause of illness of more than eight million people globally every year, TB can cause severe symptoms such as cough, weight loss and fever for many months, leading to permanent lung damage or death.

Senior Clinical Research Fellow with Menzies' Global and Tropical Health division, Dr Anna Ralph said nitric oxide can kill TB in laboratory experiments, but the findings reveal that people with TB cannot make enough of the molecule in their lungs, just when they need it most.

"When we tested TB patients, we found that nitric oxide was being made in low amounts compared to healthy volunteers. The sicker the TB patients were, the lower their nitric oxide levels," Dr Ralph said.

"Importantly, the people who could improve their nitric oxide levels the most while receiving TB treatment, were more likely to successfully clear the bacteria causing their TB."

Published this week in *The Journal of Infectious Diseases*, Dr Ralph said the study suggests that if nitric oxide concentrations can be enhanced, people might recover from TB more quickly.

"This is the first time this has been shown, and raises the possibility of an additional way to treat TB."

The study involved 200 people with TB of the lungs in Indonesia's Papua Province, who had nitric oxide levels in the breath measured regularly over a six month period. The readings were correlated with growth of TB from sputum samples.

Dr Ralph said there may be many reasons for low nitric oxide levels in TB patients. These include insufficient amounts of arginine, the protein building block used to make nitric oxide, from either malnutrition or increased breakdown.

"If someone is malnourished, their arginine supplies are reduced and this is where nitric oxide comes from," she said.

"The answer is not as simple as just increasing arginine intake though, since this can be chewed up by the wrong enzymes in people with advanced TB. We are looking at this question now, as well as exploring new ways of delivering arginine or other nitric oxide sources."

Dr Ralph explains that while TB can be well controlled with appropriate treatment and medication, in many countries with TB with large populations and limited resources, tracking down every case of TB, preventing its spread, and making sure it is cured, continues to be a huge challenge.

"This is made even worse by drug-resistant TB which is becoming more common, and is much more difficult, and sometimes impossible to cure," she said. "We are continuing our work on nitric oxide and additional therapies in Malaysian Borneo."

The study titled *Impaired pulmonary nitric oxide bioavailability in pulmonary tuberculosis: association with disease severity and delayed mycobacterial clearance with treatment* is available at:

<http://jid.oxfordjournals.org/content/early/2013/06/03/infdis.jit248.abstract?keytype=ref&ijkey=SK2plvDsD4c8TIJ>

This research was been funded by the Australian Government's National Health and Medical Research Council.

Media contact: Richmond Hodgson

communications@menzies.edu.au; 08 8922 8438; 0408 128 099

Background: Menzies School of Health Research (Menzies) are Australia's only Medical Research Institute dedicated to improving Indigenous health and wellbeing. We have a 27-year history of scientific discovery and public health achievement. Menzies work at the frontline and collaborate broadly, partnering with over 60 Indigenous communities across Northern Australia to create resources, grow local skills, and find enduring solutions to problems that matter.