# A faster, cheaper way to diagnose TB

17 August 2011

Researchers have discovered a faster, cheaper method for the diagnosis of tuberculosis (TB). A major barrier in TB prevention, especially in developing countries, is that diagnosis is slow and costly. Dr Olivier Braissant and his colleagues have developed a method which could potentially decrease the time taken to make a diagnosis. Their method is also cheaper than the current fastest methods. This research has been published today in the Society for Applied Microbiology's *Journal of Applied Microbiology*.

The bacterium which causes TB is called Mycobacterium tuberculosis and diagnosis of this disease is often done by growing and examining the bacteria in a laboratory. This process is slow and can take up to 57 days.

Faster methods have been developed, but these tend to be very expensive and are, therefore often unavailable in developing countries. Dr Braissant and his colleagues used a microcalorimeter to detect the growth of Mycobacterium tuberculosis. This method proved to be faster than growing the bacteria in the lab and as fast as other more expensive methods (between 5.5 and 12.5 days).

Microcalorimeters, like the one used in this research, measure the heat given off during a chemical, physical or biological process, in this case when the bacteria grow. They convert this tiny temperature rise into an electrical signal which can be amplified and recorded by a computer. This then produces a graphical footprint which is unique to each species of bacteria.

As multiple samples from the same person can be tested at the same time using the microcalorimeter it is also possible to test drug susceptibilities of the bacteria. This is done by measuring the growth of different samples in the presence of different antibiotics: if no growth is detected with one antibiotic, this drug can be used to fight the infection. With the growing resistance of TB to antimicrobials, this is essential.

A further important feature of this method is that it uses readily available, cheap materials. Other fast TB detection methods often use consumables such as fluorescent or radioactive probes, meaning that every individual test comes at a significant cost. This is on top of the initial cost of the equipment, which can be around $39,000 (US). Whilst relatively inexpensive microcalorimeters are commercially available, a recent study1 estimated that a simple calorimeter can be built for around $1000 (US).

Dr Braissant and his team have shown this new method works in a laboratory setting, but this is not necessarily representative of the way it would work in outside world. So the next step is to test their method outside the lab.

"Microcalorimeters have already been shipped to Tanzania and we hope to start a first validation of our approach in the field before the end of the year" Dr Braissant explained.

One third of the world's population are infected with TB and in 2009 there were 1.7 million deaths from the disease. The highest number of these deaths was in Africa. TB is spread through the air via sneezing, coughing and spitting and it is estimated that every untreated person infects between 10 and 15 people per year. Prompt and affordable diagnosis is therefore essential. This new technique could potentially provide a method for the rapid diagnosis of TB and due to the relatively low cost, it could be used worldwide.

Provided by Wiley