

New test for multi-drug resistant TB could save thousands of lives each year

October 12 2006

An international team of researchers based in Peru has developed a cheaper, faster and more accurate method of diagnosing TB and its multi-drug resistant strains. It is hoped that the work, funded by the Wellcome Trust, could ensure that people with TB and drug-resistant forms of the disease are identified and treated appropriately earlier than is currently the case, reducing both the severity of their disease and their chances of infection others.

It is thought that over two million people die each year from TB, but whilst the common strain is almost 100 percent treatable, medical experts across the globe are seeing an increasing number of cases of multi-drug resistant tuberculosis (MDRTB). MDRTB is defined as being resistant to at least rifampicin and isoniazid, the two most potent first-line TB drugs in use.

Currently, the World Health Organisation recommends "sputum smear microscopy" as the most cost effective method of testing for TB. This involves analysing a sample obtained by getting the patient to cough deeply and expel the material that comes from the lungs (sputum). Rarely, the sample may be cultured, usually using solid media. The strain isolated from a positive culture is then tested against the standard three or four drugs in use to test its susceptibility to drugs. Smear microscopy takes one day but has low sensitivity and provides no information about drug susceptibility. Conventional culture takes at least three weeks with an additional 3-6 weeks for drug susceptibility testing, during which time the patient may have become very sick or have transmitted the infection

to others.

Now, Dr David Moore and Professor Jon Friedland at the Wellcome Trust Centre for Clinical Tropical Medicine, Imperial College London have led an evaluation of a faster and more sensitive yet low-cost test developed by an international team at the Universidad Cayetano Heredia, Peru. The Microscopic Observation Drug Susceptibility (MODS) test allows doctors to diagnose TB twice as quickly as previous gold-standard tests and to identify multi-drug resistance in a third of the time. The results of the study are published in the latest edition of the New England Journal of Medicine.

"For financial and, to a degree, pragmatic reasons, the standard of care in testing for TB and its multi-drug resistant strains in developing countries is set way below that in industrialised nations," explains Dr Moore, the recipient of a Wellcome Trust Training Fellowship in Clinical Tropical Medicine. "However, sputum smear microscopy alone, the current diagnostic tool integral to the WHO's strategy for global TB control and used to diagnose the vast majority of TB patients across the globe, is no longer adequate. It would rightly not be acceptable in the industrialised world and we should not accept that it is good enough elsewhere. With this new test, we are beginning to approach a situation where a tool is available to bring equity in TB diagnostics to countries with limited resources, where the need is greatest."

Using MODS, the TB organism is cultured in liquid media, where it grows in characteristic tangles or coils readily recognisable under a microscope. The bacteria grow more rapidly in liquid culture than in conventional solid culture and the use of a microscope allows earlier detection than inspection of solid media with the naked eye. In addition, the liquid media means that TB drugs can be more easily administered for testing: if the bacteria grow in the presence of these drugs, this indicates resistance.

The new test could dramatically help those who have contracted MDRTB in countries such as Peru, and is also shown to be highly effective where cases of TB are often combined with HIV infection.

"In one study in Lima, half of HIV patients with MDRTB were dead within two months of commencing TB treatment, the minimum time to get results from standard tests in Peru or indeed almost anywhere in the developing world," says Dr Moore. "Their MDRTB had gone undetected and so they had received the wrong treatment. A correct diagnosis at the start of treatment would have improved many of their outcomes."

The study was carried out over two years in community clinics and hospitals in Lima, Peru and was a collaboration involving Imperial College London, Johns Hopkins Bloomberg School of Public Health (US), Universidad Peruana Cayetano Heredia (Peru), Asociación Benéfica PRISMA (Peru) and the National TB Control Programme of Peru.

In January, Dr Moore began a Wellcome Trust Career Development Fellowship to evaluate implementation strategies of MODS in a region of the national TB programme in Peru. Dr Moore and his team have undertaken preliminary studies in Ica and Arequipa, two provincial cities in the south of Peru, where MODS is now being implemented. The research is a good example of clinical research that has an immediate impact on health in terms of improved clinical outcome as well as translation into health policy.

"We have plans with a range of potential willing collaborators in Africa and Asia to roll-out MODS in a number of different settings over the next six months," says Dr Moore.

Source: Imperial College London

Citation: New test for multi-drug resistant TB could save thousands of lives each year (2006, October 12) retrieved 9 April 2024 from <https://medicalxpress.com/news/2006-10-multi-drug-resistant-tb-thousands-year.html>

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