

Researchers Identify Tuberculosis Strain That Thrives on Antibiotic

December 21 2009

(PhysOrg.com) -- Scientists have identified a strain of antibiotic-resistant tuberculosis that thrives in the presence of rifampin, a front-line drug in the treatment of tuberculosis. The bacterium was identified in a patient in China and is described in a study by researchers at the Johns Hopkins Bloomberg School of Public Health, Chongqing Pulmonary Hospital, Lanzhou University and Fudan University.

The researchers determined that the bacteria grew poorly in the absence of the antibiotic [rifampin](#) and better in the presence of the drug. They also observed that the patient's condition grew worse with treatment regimens containing rifampin, before being cured with rifampin-free regimens. The study, which will appear in the January 2010 issue of *The International Journal of [Tuberculosis](#) and Lung Disease*, is among the first to document the treatment of a patient with rifampin-dependent infection.

The World Health Organization (WHO) estimates that tuberculosis kills approximately 2 million people worldwide each year. Multidrug-resistant tuberculosis (MDR-TB) is becoming an increasing problem in many parts of the world, largely due to poor patient adherence to the six-month tuberculosis chemotherapy. About 5 percent of all TB cases are MDR-TB that is resistant to isoniazid and rifampin, two main drugs used to treat the disease.

“Rifampin-dependent tuberculosis is an unrecognized and potentially serious treatment issue,” said Ying Zhang, MD, PhD, senior author of

the study and professor in the Bloomberg School's W. Harry Feinstone Department of [Molecular Microbiology](#) and Immunology. "Rifampin resistance is ominous. Our study highlights the potential dangers of continued treatment of MDR-TB with rifamycins that occur frequently due to delayed or absent drug susceptibility testing in the field. Further studies are urgently needed to determine how common such rifampin-dependent MDR-TB is in field conditions and if it contributes to the worsening of the disease in MDR patients and treatment failures."

Zhang adds that rifampin-dependent tuberculosis is difficult to detect and may be a bigger problem than we currently realize, since the bacteria do not grow well in the culture medium unless rifampin is added. The study authors urge timely detection of rifampin-dependent or -enhanced bacteria in patients with treatment failure by including rifampin in culture media and removing of rifampin from the treatment regimen once rifampin dependency or enhancement are detected. However, the researchers note that drug susceptibility testing is time-consuming and not easily performed in resource-poor settings where tuberculosis is frequently more common.

For the study, the research team documented the treatment of a 35-year-old Chinese man with tuberculosis. The man failed to respond to the WHO's thrice-weekly treatment regimen, which includes rifampin and other first-line tuberculosis drugs. The patient's condition worsened following an additional treatment regimen with rifampin and other second-line agents. Further testing detected the rifampin-dependency/enhancement. The patient fully recovered once rifampin was removed from his treatment regimen.

More information: Additional authors of "An interesting case of rifampicin-dependent/enhanced multidrug-resistant tuberculosis" are M. Zhong, X. Zhang, Y. Wang, C. Zhang, G. Chen, M. Li, B. Zhu, and W. Zhang. The study is available online [here](#).

Provided by Johns Hopkins Bloomberg School of Public Health

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