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Researchers find signs TB can persist in lungs despite treatment

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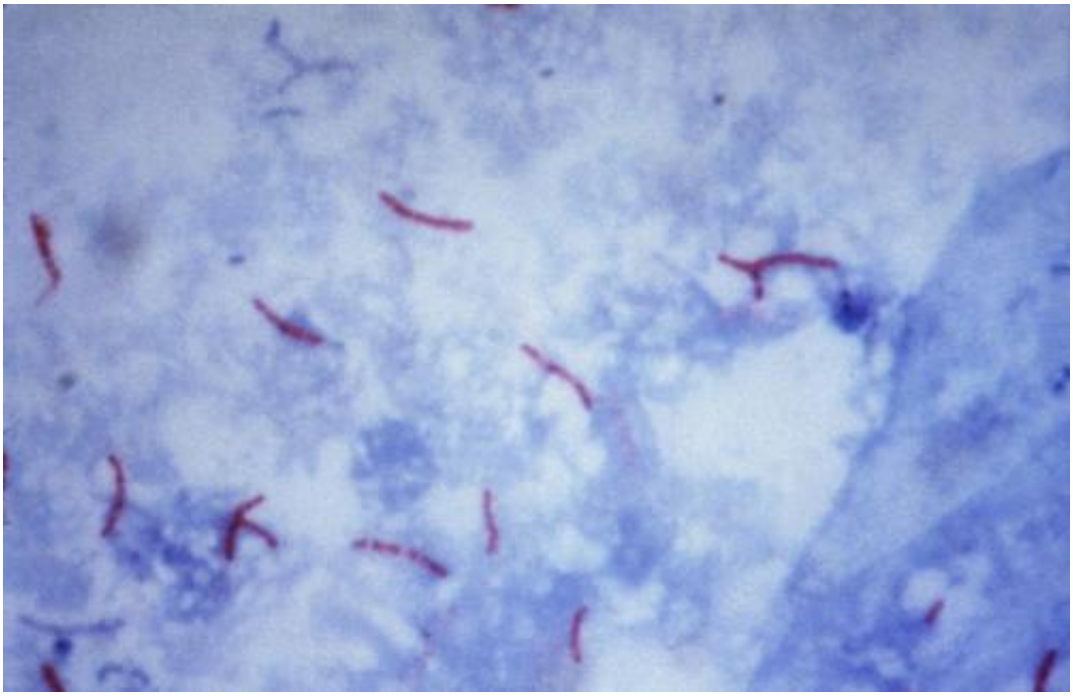

This photomicrograph reveals Mycobacterium tuberculosis bacteria using acid-fast Ziehl-Neelsen stain; Magnified 1000 X. The acid-fast stains depend on the ability of mycobacteria to retain dye when treated with mineral acid or an acid-alcohol solution such as the Ziehl-Neelsen, or the Kinyoun stains that are carbolfuchsin methods specific for M. tuberculosis. Credit: public domain

Patients with active tuberculosis of the lungs, the infectious form of the disease known as pulmonary tuberculosis (TB), are typically treated with several medications for a period of six months. However, clinicians

currently lack a definitive way to determine when antibiotics have effectively cured a patient of the disease. It has been known that the microbe that causes TB, *Mycobacterium tuberculosis*, can persist in the lungs even after patient tissue samples test negative for the bacteria. In new research appearing in *Nature Medicine*, intramural researchers at the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, together with NIAID grantees, found through the use of positron emission tomography/computerized tomography (PET/CT) scanning that TB lesions can remain in the lungs long after treatment with antibiotics has been completed.

The scientists used PET/CT to examine the lungs of 99 patients with pulmonary TB in South Africa before, during and after treatment with a typical regimen of TB medications. For tuberculosis, PET/CT can be used to measure the level of inflammation, or lesions, in affected areas of the lungs. Previously, NIAID researchers found that PET/CT could be used to successfully predict the effectiveness of TB drug regimens.

After six months of treatment, PET/CT scans of 76 of the 99 patients showed lung lesions similar to those seen in untreated pulmonary TB patients. One year after treatment concluded, 50 patients still showed radiological abnormalities. The investigators found that while most lesions decreased in severity and size, only 16 of those patients with such abnormalities were fully cleared of TB lesions; the remaining 34 patients still had significant residual lesions. The researchers also detected TB genetic material in respiratory samples of saliva and mucus from a substantial number of patients deemed to be cured of clinical symptoms at the end of treatment.

The findings show that TB bacteria may persist in the lungs even after patients have finished treatment and are free of clinical symptoms. Although it is unclear how this might affect the risk of disease relapse, the study results underscore the need for new diagnostic methods and

improved TB treatment strategies, according to the researchers.

More information: Stephanus T Malherbe et al, Persisting positron emission tomography lesion activity and Mycobacterium tuberculosis mRNA after tuberculosis cure, *Nature Medicine* (2016). DOI: 10.1038/nm.4177