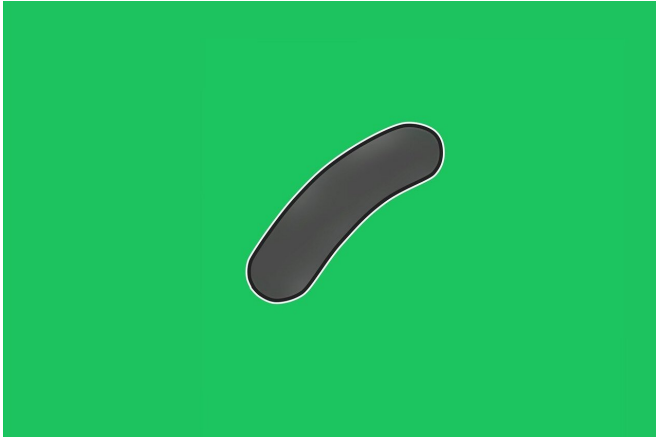


New animal model shows effective treatment for latent tuberculosis

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A major goal of tuberculosis (TB) research is to find a way to treat people with the latent (or inactive) form of the disease to keep them from developing symptomatic TB. A breakthrough study using a new animal model developed for this purpose showed a combination of two classes of antibiotics can wipe out this hidden threat. The study was published in the *American Journal for Respiratory Clinical Care Medicine*.

Deepak Kaushal, Ph.D., Director of the Southwest National Primate Research Center, and Jyothi Rengarajan, Ph.D., Associate Professor of Medicine at Emory University and the Yerkes National Primate Research Center, served as co-principal investigators of the 10-month study. Using [rhesus macaques](#), the scientists were able to create a model of latent TB that resembles what occurs when a person is infected with *Mycobacterium tuberculosis* (Mtb), the bacteria that causes TB, but does not develop active disease. The bacteria are "hibernating" in the lungs, Dr. Kaushal explained.

"People with [latent tuberculosis infection](#) remain a

source of disease because they can potentially reactivate at any point in time," Dr. Kaushal said. Complicating factors like an HIV infection, diabetes, aging or other diseases can trigger the latent bacteria to become symptomatic and infectious again. The [current treatments](#) for latent TB are lengthy. Many patients do not finish the course of therapy. Dr. Kaushal believes a shorter course of treatment would be beneficial.

Using low-dose infection through an aerosolization chamber, scientists gave the nonhuman primates enough TB to create a latent infection. The scientists then treated half of the animals with a once-weekly combination of antibiotics isoniazid and rifapentine for three months; the other half was untreated. This is likely the first report modeling LTBI treatment in nonhuman primates.

Afterward, the animals were infected with SIV (Simian immunodeficiency virus), which mimics HIV in humans, to test whether the [drug treatment](#) cleared bacteria from their lungs. Of the monkeys that had no treatment for latent TB, 70 percent developed active TB after SIV infection. None of the monkeys that had the three-month course of antibiotics developed active TB after SIV infection suggesting the treatment cleared the bacteria and prevented reactivation.

"The antibiotic treatment we used for this study is a new, shorter regimen the CDC recommends for treating humans with latent tuberculosis, but we did not have direct evidence for whether it completely clears latent infection" says Dr. Rengarajan. "Our experimental study in macaques showing almost complete sterilization of bacteria after treatment suggests this three-month regimen sterilizes humans as well."

This is the first time rhesus macaques were used as a model of latent TB treatment. Dr. Kaushal said the animal will be an important model for testing other TB treatment regimens going forward.

Around the world, TB claims more lives than any other infectious disease. In the U.S. alone, about 13 million people develop latent TB each year, and 15,000 to 20,000 people are diagnosed with active TB annually. Globally, close to one quarter of the population (1.8 billion) is infected with TB, according to the World Health Organization.

In an accompanying editorial published in the same journal, Dr. Andrew Vernon of the Division of TB Elimination at the Centers for Disease Control & Prevention and Dr. William Bishai of the Center for Tuberculosis Research at Johns Hopkins University write the application of this drug regimen "could presage a major step forward in TB prevention and control." They call the results of the study "dramatic."

The study was conducted at Tulane and Emory as part of a Tuberculosis Research Unit (TBRU) U19 award to Emory University (Program Directors: Henry Blumberg MD, Emory and Joel Ernst, MD, UCSF), and includes additional collaborators at Emory, UCSF and University of Florida from the TBRU-ASTRa study group.

More information: Taylor W. Foreman et al, Isoniazid and Rifapentine Treatment Eradicates Persistent Mycobacterium tuberculosis in Macaques, *American Journal of Respiratory and Critical Care Medicine* (2019). [DOI: 10.1164/rccm.201903-0646OC](https://doi.org/10.1164/rccm.201903-0646OC)

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