Gastric acid suppressant lansoprazole may target tuberculosis

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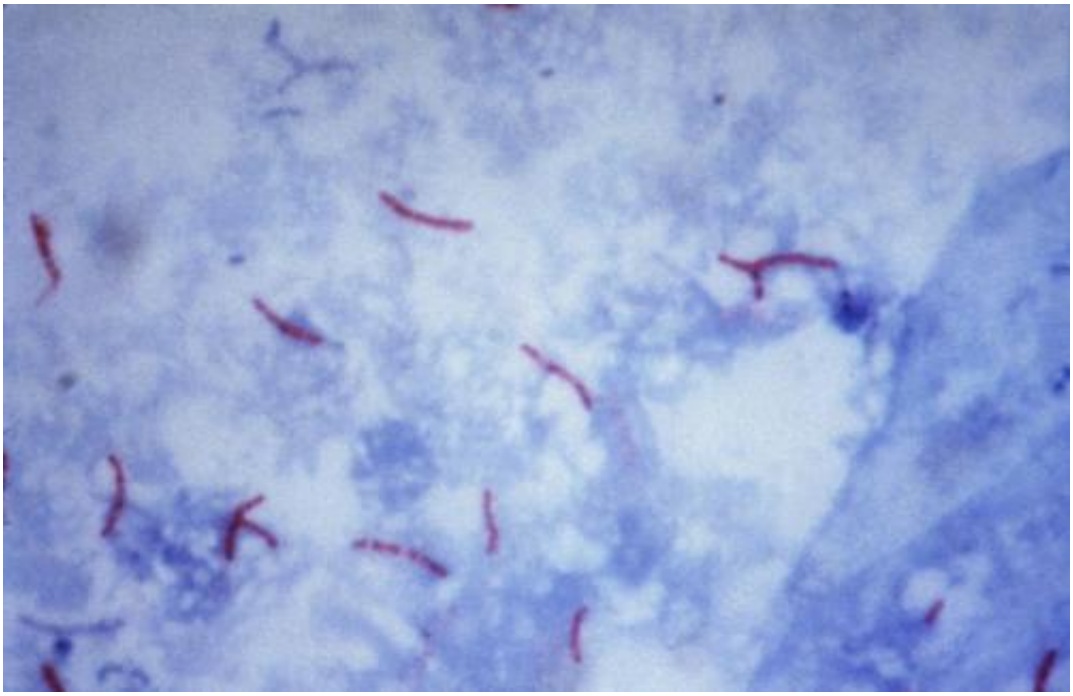

This photomicrograph reveals Mycobacterium tuberculosis bacteria using acid-fast Ziehl-Neelsen stain; Magnified 1000 X. The acid-fast stains depend on the ability of mycobacteria to retain dye when treated with mineral acid or an acid-alcohol solution such as the Ziehl-Neelsen, or the Kinyoun stains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

A cheap and widely used drug, used to treat conditions such as heartburn, gastritis and ulcers, could work against the bacteria that cause tuberculosis (TB), according to new research from UCL and the London

School of Hygiene & Tropical Medicine.

The study, published today in *PLOS Medicine*, found that people who used lansoprazole, as opposed to similar drugs omeprazole or pantoprazole, were a third less likely to develop TB.

In 2016, 10.4 million people fell ill with tuberculosis and it is in the top ten causes of death globally, killing more people than any other infectious disease. In England, there were a total of 5,664 TB cases in 2016 with London accounting for almost 40 per cent of all cases. According to a report by the London Assembly in 2015, one third of London's boroughs exceed the World Health Organisation "high incidence" threshold of 40 cases per 100,000 population per year and some boroughs have incidence levels as high as 113 per 100,000 people per year - significantly higher than countries such as Rwanda, Algeria, Iraq and Guatemala.

"It would be a major breakthrough to find a new drug with useful activity against Mycobacterium tuberculosis and a favourable side effect profile - particularly a drug like lansoprazole, which costs pennies," said first author Dr Tom Yates (UCL Institute for Global Health).

"Laboratory, animal and now epidemiological data are all consistent with lansoprazole acting against the bacteria that cause TB. While it is too early to say whether lansoprazole can be used to treat TB, we think there is a strong case for further study."

The researchers analysed data that had been routinely collected by general practices and hospitals in the UK and compared the incidence of TB in people taking lansoprazole with that in people taking omeprazole or pantoprazole. This research was prompted by a laboratory study, described in a 2015 paper in Nature Communications, finding that lansoprazole was effective at killing Mycobacterium tuberculosis, whilst

other drugs in the same class had no effect.

In total, there were 527,364 new users of lansoprazole and 923,500 new users of omeprazole or pantoprazole. The findings show that, among people using lansoprazole, there were 10 cases of TB per 100,000 person years compared to 15.3 cases among those using omeprazole or pantoprazole.

In many parts of the world, particularly in Southern Africa, Eastern Europe and Central Asia drug resistant tuberculosis is a major problem. Many of the existing drugs used to treat drug resistant TB have unacceptable side effects.

"We know that medications can have unintended effects; often these are harmful, but occasionally we also find unexpected benefits that may offer new hope for difficult to treat diseases," said senior author Dr Ian Douglas, Associate Professor of Pharmacoepidemiology, Electronic Health Records Group at the London School of Hygiene & Tropical Medicine.

"This study highlights how we can investigate possible new uses for medicines using the wealth of information recorded as part of routine healthcare in the UK. Tuberculosis is still a major health problem in many parts of the world, and the results of this study raise the possibility that lansoprazole, a well-established treatment for stomach complaints, may also be useful for treating tuberculosis."

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