

# Medicinal toothbrush tree yields antibiotic to treat TB in new way

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A compound from the South African toothbrush tree inactivates a drug target for tuberculosis in a previously unseen way.

Tuberculosis causes more deaths worldwide than any other bacterial disease. At the same time as rates are increasing, resistance strains are emerging due, in part, to non-compliance with the treatment required. Many current drugs are nearly 50 years old and alternatives are needed to the long, demanding treatment schedules.

The compound under research, diospyrin, binds to a novel site on a well-known enzyme, called [DNA gyrase](#), and inactivates the enzyme. DNA gyrase is essential for bacteria and plants but is not present in animals or humans. It is established as an effective and safe [drug target](#) for antibiotics.

"The way that diospyrin works helps to explain why it is effective against drug-sensitive and drug-[resistant strains](#) of tuberculosis," said Professor Tony Maxwell from the John Innes Centre.

In traditional medicine the antibacterial properties of the tree are used for oral health and to treat medical complaints such bronchitis, pleurisy and venereal disease. Twigs from the tree are traditionally used as toothbrushes.

Most antibiotics originate from natural sources, such as the [soil bacteria](#) *Streptomyces*. Antibiotics derived from plants are less common, but they

are potentially rich sources of [new medicines](#).

"Extracts from plants used in traditional medicine provide a source for [novel compounds](#) that may have antibacterial properties, which may then be developed as antibiotics," said Professor Maxwell.

"This highlights the value of ethnobotany and the value of maintaining biodiversity to help us address global problems."

The work on diospyrin and related naphthoquinone compounds is being continued by Professor Maxwell as part of the efforts of a consortium of European researchers, More Medicines For Tuberculosis (MM4TB). The collaboration between 25 labs across Europe is dedicated to the development of new drugs for TB.

**More information:** The work is published in the *Journal of Biological Chemistry*: [www.jbc.org/cgi/doi/10.1074/jbc.M112.419069](http://www.jbc.org/cgi/doi/10.1074/jbc.M112.419069).

Provided by Norwich BioScience Institutes

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