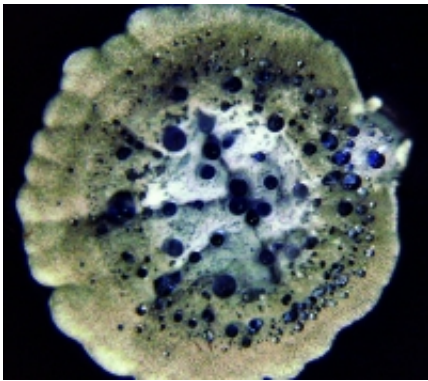


New insights into the production of antibiotics by bacteria

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An antibiotic-producing colony.

Bacteria use antibiotics as a weapon and even produce more antibiotics if there are competing strains nearby. This is a fundamental insight that can help find new antibiotics. Leiden scientists Daniel Rozen and Gilles van Wezel published their research results in the authoritative *Proceedings of the National Academy of Sciences USA* on 28 July 2015.

Antibiotics as weapons in nature

The Leiden scientists discovered that in nature, too, antibiotics act as a weapon against rival bacteria. This seems logical, but remains controversial, because the concentrations in the soil appear to be far too low to act as a weapon against other bacteria. Rozen, Van Wezel and

colleagues made the discovery by measuring the activity of thirteen strains of the antibiotic-producing bacterium *Streptomyces*. They looked at how strains behaved in nutrient-rich as well as nutrient-poor soil. They found that in soil with few nutrients and competing bacteria nearby the *Streptomyces* start to produce more antibiotics in order to protect the food sources available. Computer simulations showed how the strains enter into a lot of 'social interaction' in a nutrient-rich environment, allowing the exchange of genetic material and the creation of new bacterial variants.

Awakening antibiotics

Apart from the fundamental question, it also offers important new insights into the search for new antibiotics, say Rozen and Van Wezel. 'The *Streptomyces* bacteria are able to produce the antibiotics we seek, but they will not do this automatically. You have to, as it were, awaken the antibiotics in the bacteria by stimulating them in the right way. This research shows how the [bacteria](#) can be stimulated to produce antibiotics by growing them in the presence of competing strains.'

Antibiotics important for combating diseases

Antibiotics are an important substance for combating diseases, but pathogens are becoming increasingly resistant to existing antibiotics. The research into new [antibiotics](#) carried out by Gilles van Wezel, Professor of Molecular Biotechnology, is linked to the research at Leiden University which is aimed at developing new drugs. For more information, please consult the research dossier on Effective Drug Development.

More information: *PNAS Early Edition* Monica I. Abrudan, [DOI: 10.1073/pnas.1504076112](https://doi.org/10.1073/pnas.1504076112)

Provided by Leiden University

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