

Contact

► Bio-Catalysis for Drug Development

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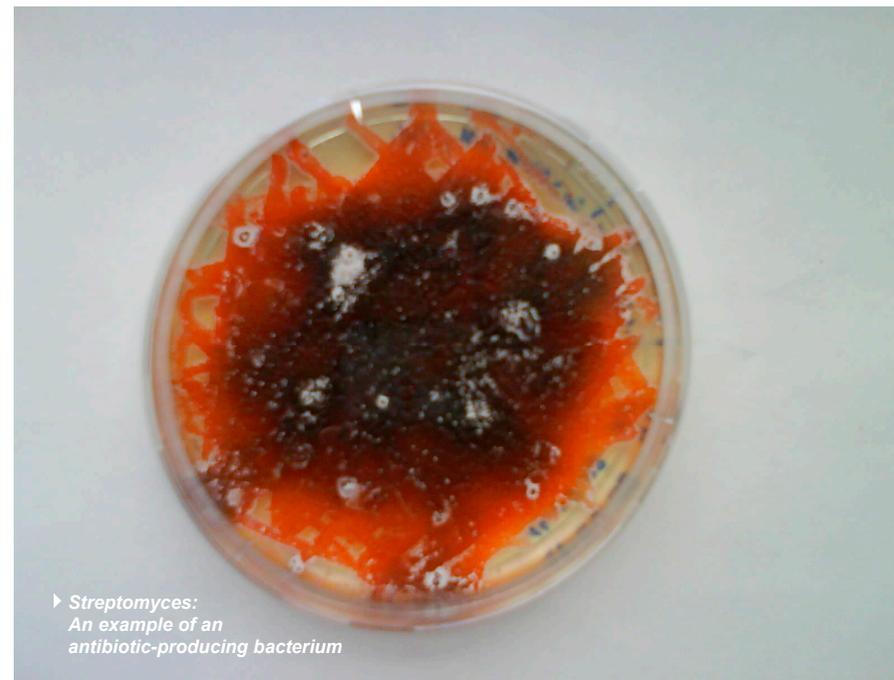
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► Project-involved institutions



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Bio-Catalysis for Drug Development



► *Streptomyces:*
An example of an
antibiotic-producing bacterium

► Medical practitioners have been observing a growing resistance to antibiotics by bacteria in clinics. UniCat is searching for alternatives.

► Antibiotics from bacteria and fungi

Bacteria and fungi are currently being studied by the group of Prof. Süssmuth for their production of antibiotic metabolites. These micro-organisms are important producers of natural substances with anti-bacterial properties.

To understand the effectiveness of natural substances with anti-bacterial properties, these produced substances must first be isolated and characterised. The highly purified extracted substances are then subjected to bio-profiling, which for example reveals anti-bacterial, anti-viral or anti-tumour effects. The other questions that need to be addressed relate to bio-synthesis, i.e. the structure of these often highly complex molecules created by nature. Of great importance is the question of usability, e.g. their suitability for use as an antibiotic.

► Fire blight threatens fruit plantations

One current issue is the search for an agent to combat fire blight, which is a bacterial contagion that threatens apple and pear plantations. Fire blight was originally an apple tree disease known in the United States. Meanwhile it has spread throughout the entire European continent and to New Zealand.

Alone in Europe the damage caused by fire blight is estimated at more than 300 million euros.

► Path of infection

The bacteria are transmitted through intermediate hosts such as juniper, insects and birds. They gain entry via tree blossoms. The blossoms and branches become infected and die. Fire blight spreads rapidly through a fruit tree plantation, and in the worst cases only a complete clearing of the plantation succeeds in eradicating the problem.

Only the streptomycin antibiotic is available as an antidote. As a liquid solution, it is sprayed over the apple blossoms to kill off the fire blight pathogen. This antidote is also used in human medicine, and thus there is a risk that this antidote could find its way into the human food supply chain via honey bees. As a result, resistance in humans could arise, and the antibiotic would then be useless as a medicine.

► Metabolites from *Bacillus amyloliquefaciens*

In 2007 Berlin scientists, under the leadership of microbiology Prof. Dr. Rainer Borriss of the HU Berlin, mapped out the genetic code of *Bacillus amyloliquefaciens* and analysed the produced metabolites.

UniCat is now searching for the metabolites of the bacteria *Bacillus amyloliquefaciens* together with the Borriss workgroup and two other industrial partners. These could be used to combat the fire blight disease. During metabolism the bacteria secrete a wide variety of effective substances. They help the fruit bearing trees and kill the fire blight pathogen.

The *Bacillus* is already being fermented at an industrial scale by ABiTEP company in Berlin-Adlershof and the formed spores are being used as plant strengthening agents.