Jena School for Microbial Communication
Graduate School of Excellence

PhD project title: Combinatorial effects in the heavy metal resistance of streptomycetes

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Abstract:
Actinomycetes and especially the genus *Streptomyces*, have a unique ability to produce a wide range of biologically-active secondary metabolites and play an important role in the pharmaceutical and chemical industry.

Due to the fact, that there has been a decline in the discovery of new metabolites from common soil-dwelling actinomycetes, the screening for new metabolites could be enlarged by extreme habitats like heavy metal contaminated sites which could offer the chance to isolate less common actinomycetes. In these habitats, microbes have to cope with rough conditions such as low pH, high concentrations of heavy metals and salts as well as low nutrient contents and therefore evolved several adaptations like heavy metal resistances and potentially new secondary metabolite pathways.

Studies have shown that heavy metal stress and co-cultivation can induce a shift in the secondary metabolites pattern by activating gene clusters which are silent under standard screening conditions. By knowing this, a strain collection of actinomycete isolates originating from a former mining area will be screened for their potential to produce antibiotics and other biologically-active secondary metabolites under heavy metal stress and co-cultivation. The experiments will be carried out with different bacteria and yeast isolates as well as several heavy metals in a microfluidic system which is developed by partners of the project „BactoCat - Neue Syntheseleistungen durch Kopplung mikroorganismischer und Metallnanopartikel-katalysierter Prozesse in der Mikroreaktionstechnik 031A161B".

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