

Applied Microbiology 2016- The upcoming role of actinomycetes in the strain collection of the Helmholtz Centre for Infection Research - Joachim Wink- Helmholtz Centre for Infection Research

Joachim Wink

Helmholtz Centre for Infection Research, Germany

Abstract

The focus of the HZI has traditionally been on myxobacteria for an extended time but as actinomycetes are still today a very important and successful group for the detection and isolation of novel biological active compounds especially antibiotics, we began to include sort of actinomycetes strains and projects the work of the microbial strain collection group MISG which was founded in 2013. the gathering includes about 2000 reference strains of the category Actinobacteria and more than 1000 new isolates of uncommon genera which are isolated in-house or are a neighborhood of external cooperation. to reinforce the amount of novel antibiotics we attempt to work with uncommon new isolates of Actinobacteria. Therefore we use neglected old isolation methods a bit like the baiting with ceratin and also develop new methods. Besides the screening of novel actinomycetes, the potential of “old” strains remains not completely evaluated. We therefore plan to induce “silent” biosynthetic gene clusters by use of varied chemical and biological inducers and also look on old antibiotics which haven't been developed during the “golden time” of antibiotic research. The compendium of Actinobacteria is additionally a taxonomic outcome of the activities of the strain collection of the HZI. The activities of the microbial strain collection of Actinobacteria within the HZI structure are shown and samples of the varied aims are getting to tend within the talk.

The microbial strain collection of the HZI has its specialise in Myxobacteria and other uncommon microorganisms, especially rare Actinobacteria. Our myxobacterial strain collection comprises approximately 9500, the one among the Actinobacteria 3.000 strains. Many of the new isolates of the last years are coming from unusual habitats and from cooperation's with working groups in many various countries. Among this isolates we found multiple novel species like *Racemicystis persica*, a species of the Myxobacteria isolated from an arid region in Iran. in order to identify it had been necessary to determine a polyphasic approach also for Myxobacteria, including additional physiological, chemotaxonomical and molecularbiological parameters.

Die novel isolates are cultivated under diverse conditions and are extracted. This extracted isolates are used in chemical and biological screening. apart from this the novel isolates along with the strains from the gathering are studied in additional

detail. So it had been found that the isolates that are identified as “*Sorangium cellulosum*” belong to variety of various species with total different secondary metabolite spectra.

Although the isolation of novel species and families significantly increases the probabilities of the invention of novel chemical entities, most of the already known and well described species also harbour an enormous “hidden” biosynthetic potential in their genome. For the induction or enhancement of the assembly of those potential metabolites, our scientists diversify media compositions, work with chemical inductors and alter the external cues and stress factors that influence secondary metabolite production.

During the last decades many pharmaceutical companies have terminated their antibiotic research activities and therefore the general assumption that microorganisms exhibit only minor unexploited potential for locating antibiotics. At an equivalent time more and more of the so called “neglected” genera which were previously difficult to cultivate became more accessible. Advanced and new methods make the screening and detection of their secondary metabolite profiles possible. New species also can be extracted from biological samples using new and uncommon isolation methods.

Despite the tremendous developments originating from genomics, isolation of latest genera and subsequent screening for the assembly of latest metabolites remains the foremost successful way of finding novel antibiotic scaffolds that always exhibit new modes of action. The co-workers of the working party microbial strain collection are specialized on the various steps during this process for the detection of latest active compounds from nature.

Bacterial secondary metabolites offer great potential for the invention and development of leads in anti-infective research. we began to include sort of actinomycetes strains and projects the work of the microbial strain collection group MISG which was founded in 2013. the gathering includes about 2000 reference strains of the category Actinobacteria and more than 1000 new isolates of uncommon genera which are isolated in-house or are a neighborhood of external cooperation. to reinforce the amount of novel antibiotics we attempt to work with uncommon new isolates of Actinobacteria. Therefore we

us neglected old isolation methods a bit like the baiting with ceratin and also develop new methods. one among the foremost promising ways for generating novel antibiotic scaffolds is that the biodiversity guided expansion of existing microbial strain collections at the HZI. Although intensively studied, the actinomycetes, and thus the much less analyzed myxobacteria, are away from being exhausted as resources of novel chemistry. in actual fact, recent developments in reasearch has shown the enormous potential to future discoveries. Besides the screening of novel actinomycetes, the potential of “old” strains remains not completely evaluated. We therefore plan to induce “silent” biosynthetic gene clusters by use of varied chemical and biological inducers and also look on old antibiotics which haven't been developed during the “golden time” of antibiotic research. The compendium of Actinobacteria is additionally a taxonomic outcome of the activities of the strain collection of the HZI. The activities of the microbial strain collection of Actinobacteria within the HZI structure are shown and samples of the varied aims are getting to tend within the talk.