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Unifying Concepts in Catalysis

UniCat Lecture

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Lecturer: **Prof. José A. Salas**, University of Oviedo, Spain

Title: **Engineering Biosynthetic Pathways by Combinatorial Biosynthesis to Generate Novel Bioactive Compounds**

Abstract: Natural products are an important source of bioactive compounds usually isolated from plants, animals or microorganisms. Microorganisms are producers of a large variety of biologically active natural products, many of which have clinical, veterinary or agricultural applications. Within microorganisms, actinomycetes are the most prolific microbial group in terms of production of bioactive compounds, being producers of approximately two-thirds of all bioactive compounds. Important and useful therapeutic drugs as antibiotics, antifungals, antiparasites or antitumor drugs and also compounds with application in agriculture such as insecticides or herbicides are produced by members of the actinomycetes family. Traditionally, pharmaceutical companies have developed screening programmes in the search for novel bioactive natural products and improving in production yields has been based on mutagenesis and selection programmes. The development of recombinant DNA has opened up the possibility of applying genetic manipulation to engineer biosynthetic pathways in order to generate novel derivatives with potential application. Thus, “combinatorial biosynthesis” has emerged as a new technology in which genes from different biosynthetic pathways are combined either in a producer organism or in an heterologous host to generate recombinant strains containing gene combinations “not previously found in nature”, and able of producing novel derivatives from known bioactive compounds. This technology is especially useful when trying to introduce chemical modifications in bioactive compounds which are not amenable to chemical means. Combinatorial biosynthesis has been applied to compounds belonging to different families of bioactive natural products including polyketides, nonribosomal peptides, indolocarbazoles, etc. The fact that many natural products are glycosylated makes glycosylation an interesting target for combinatorial biosynthesis. Sugars usually participate in the molecular recognition between the bioactive compound and its cellular target. Taking advantage of the increasing experimental evidence of a certain degree of substrate flexibility of glycosyltransferases (particularly with respect to the sugar donor), novel glycosylated derivatives can be generated from natural products. In this communication several examples will be presented on the application of combinatorial biosynthesis to generate novel derivatives from bioactive natural products in actinomycetes.

Date: **Wednesday, 21 July 2010**

Time: **5:15 pm - around 6:45 pm**

Location: **TU Berlin, Institute of Chemistry, Straße des 17. Juni 115, 10623 Berlin Building C, room C 243**

Organiser: Prof. Roderich Süßmuth (TUB)

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat