Universität Basel

Research Project

PROTEAS - Programming Terpene Cyclization Through Iterative Precursor Assembly

Third-party funded project

Project title PROTEAS - Programming Terpene Cyclization Through Iterative Precursor Assembly
Principal Investigator(s) Tiefenbacher, Konrad ;
Co-Investigator(s) Syntrivanis, Leonidas-Dimitrios ;
Organisation / Research unit
Departement Chemie / Synthesis of Functional Modules (Tiefenbacher)
Department
Project start 01.05.2019
Probable end 30.04.2022
Status Completed

Recent advances in the development of iterative synthetic methodology (“assembly-line synthesis”) have the potential to bring about a paradigm shift in small molecule synthesis, by providing automated protocols similar to those used for oligopeptide and oligonucleotide synthesis. However, a clear limitation of such systems has been the synthesis of topologically complex frameworks. Drawing inspiration from Nature, this project aims to address this issue by providing an innovative protocol for the automated synthesis of complex natural product-like scaffolds. This will be done by combining two cutting-edge methodologies:
(i) the automated synthetic platform developed by the Burke group in the University of Illinois at Urbana-Champaign, which can rapidly provide libraries of small molecules by the iterative coupling of N-methyliminodiacetic acid (MIDA) boronate building blocks, and
(ii) a novel supramolecular capsule catalyst developed by the Tiefenbacher group at the University of Basel, which has the unique capability to catalyse the tail-to-head terpene cyclization, the same transformation employed by Nature to give rise to the myriad of known terpene structures.
The Burke group’s small molecule synthesizer will thus be used to rapidly assemble linear terpenoid precursors, which will then be subjected to tail-to-head terpene cyclization via the Tiefenbacher group’s catalyst to form cyclized terpenoid structures. The project will identify factors that influence the course of the cyclization and develop methods to control it so that desired scaffolds are produced on-demand. At its conclusion, it aims to provide a platform for the automated preparation of natural product-like compounds that will greatly impact chemical biology and medicinal chemistry research.

Financed by
Commission of the European Union

Add publication

Add documents

Specify cooperation partners