Teaching enzymes new tricks - towards a biochemical fixation of sulfur dioxide

Initiative: Momentum - Förderung für Erstberufene

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Since the discovery of the first sulfonamide antibiotics almost 100 years ago, sulfone- and sulfonamide-based drugs have saved literally millions of human lives. Nowadays organic molecules containing a sulfonyl functionality (-SO2-), such as sulfones or sulfonamides, have found widespread use in divers fields ranging from agrochemicals to functional materials and in particular as active pharmaceutical ingredient (API) in medicines. The chemical fixation of sulfur dioxide (SO2) into organic molecules has emerged as versatile tool for a step- and atom-economic synthesis of sulfones and sulfonamides. Interestingly, there are only isolated examples of natural products containing a sulfone or sulfonamide functionality. Apparently, nature lacks the ability to construct the sulfonyl group. Yet a biochemical synthesis of sulfones or sulfonamides using enzymes, nature's own synthetic machinery, holds great potential for a more sustainable synthesis of these medicinally relevant products from renewable building blocks. With the strategic development initiated by the Momentum program the group will extend its current research focus and shift from a pure chemical synthesis of sulfones and sulfonamides towards the biochemical SO2 fixation using enzymes. Therefore, different approaches will be pursued to identify enzymes capable of incorporating SO2 in organic molecules. Rational engineering will then be used to devise novel enzymes for an efficient fixation of SO2 into a broad range of structurally diverse sulfones and sulfonamides. Kontaktdaten: Prof. Dr. Georg Manolikakes Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau Fachbereich Chemie Erwin-Schrödinger-Str. Geb. 54 D-67663 Kaiserslautern Homepage: https://chem.rptu.de/en/wgs/ag-manolikakes Fachgebiet: Chemie Spezialgebiet(e): Organische Chemie

Projektbeteiligte

Prof. Dr. Georg Manolikakes
Rheinland-Pfälzische Technische
Universität Kaiserslautern-Landau (RPTU)
Fachbereich Chemie
Organische Chemie
Kaiserslautern