Rational Design of Flavonoid Production Routes Using Combinatorial and Precursor-Directed Biosynthesis

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Projects

Developing molecular tools for the de novo assembling of biosynthetic routes
Details

Elucidation of the biosynthesis of Sphingolipid inhibitors in *Aspergillus fumigatus* and *Aspergillus niger*
Details

Abstract

Combinatorial biosynthesis has great potential for designing synthetic circuits and amplifying the production of new active compounds. Studies on multienzyme cascades are extremely useful for improving our knowledge on enzymatic catalysis. In particular, the elucidation of enzyme substrate promiscuity can be potentially used for bioretrosynthetic approaches, leading to the design of alternative and more convenient routes to produce relevant molecules. In this perspective, plant-derived polyketides are extremely adaptable to those synthetic biological applications. Here, we present a combination of an *in vitro* CoA ligase activity assay coupled with a bacterial multigene expression system that leads to precursor-directed biosynthesis of 21 flavonoid derivatives. When the vast knowledge from protein databases is exploited, the herein presented procedure can be easily repeated with additional plant-derived polyketides. Lastly, we report an efficient *in vivo* expression system that can be further exploited to heterologously express pathways not necessarily related to plant polyketide synthases.

Identifier

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