富山大学 和漢医薬学総合研究所 天然物創薬学領域
Section of Natural Products & Drug Discovery,
Institute of Natural Medicine, University of Toyama

Master thesis or student project

in Natural Products Chemistry, Enzyme Engineering, Chemistry, or related

Engineering of biosynthetic enzymes to expand the structural diversity of natural product analogs

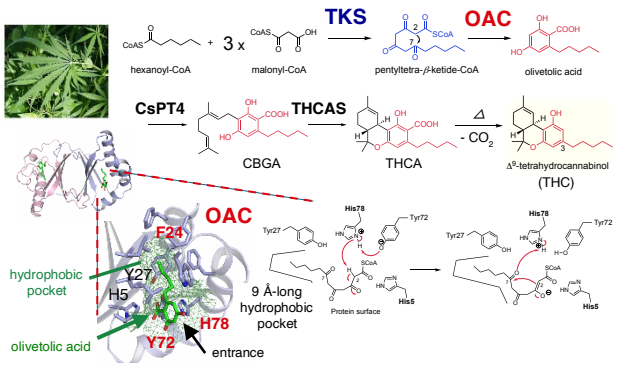
The group

The Natural Products Drug Discovery Group has its focus on the engineering of natural product biosynthetic enzymes to expand the number of potential drug seeds. We employ various methods in many different research fields to develop new biocatalysts.

The project

We develop new biocatalysts to expand the structural diversity of natural product analogues based on the three-dimensional structure of the enzymes. In particular, the biosynthetic enzymes that are involved in the formation of the natural product scaffolds are our target for the engineering. We currently focus on the expansion of the substrate specificities of the biosynthetic enzymes involved in the formation of (1) cannabinoid and (2) Amaryllis alkaloid scaffolds.

Project 1 focuses on the expansion of the diversity of the side chains of the cannabinoid scaffolds. Project 2 focuses on the expansion of the diversity of the Amaryllis alkaloid scaffolds.



Biosynthesis of THC and the OAC crystal structure

The MSc candidate will be guided through the enzyme engineering process and learn techniques to:

- conduct crystallization and X-ray crystal structure analysis of enzymes
- perform site-directed mutagenesis study and purification of enzymes
- analyze enzyme reaction products（LC-MS, NMR, etc.）
- synthesize substrate analogs

Contact

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Further Information of Toyama

Learn more about “Institute of Natural Medicine”

- https://www.inm.u-toyama.ac.jp/en/

Learn more about “University of Toyama”

- https://www.u-toyama.ac.jp/en/
- Leaflet: Outline of University of Toyama
  https://www.u-toyama.ac.jp/en/outline/outline/

Learn more about “Toyama”

- Pharmaceutical industry in Toyama
  https://www.pref.toyama.jp/documents/10385/kusurinotoyamaken_eng2023.pdf