

KUDO LAB.

Bioinspired Synthetic Organic Chemistry
– Learn from Metabolic Reactions, and then Surpass Them



Department of Materials and Environmental Science

Synthetic Organic Chemistry

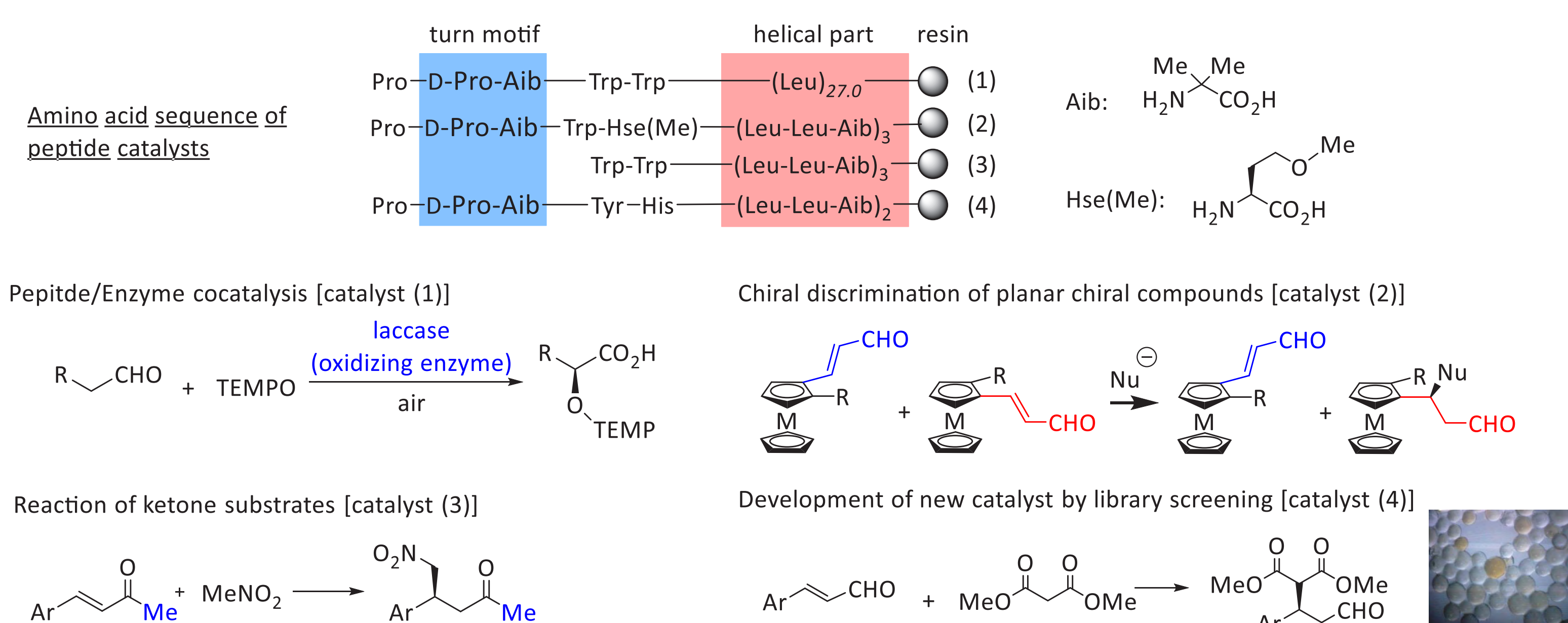
Department of Chemistry and Biotechnology, Graduate School of Engineering

<https://www.iis.u-tokyo.ac.jp/~kkudo/enindex.html>

(1) Peptide Catalysis – To Learn from Function of Enzymes

Enzymes efficiently catalyze various reactions in living organism. However, enzymes catalyze only the biogenic reactions, hence are not directly applicable to industrial production. To solve this problem, we developed peptide catalysts because the peptides consist of amino acids, just as enzymes do. We found some reactions that are unique to peptide. This research might shorten the synthetic route of fine chemicals and is expected to contribute to waste reduction and energy saving in chemical industry.

- ◆ Catalyze reactions under ambient conditions
- ◆ Catalyze otherwise difficult selective reactions
- ◆ Catalysts could be easily recovered and reused
- ◆ Library screening method is applicable



(2) Polyketide Synthesis – To Learn from Biosynthetic Mechanism

In organisms, various compounds are synthesized from simple building blocks, which are then utilized for biological activities. Many of these compounds exhibit pharmacological activities beneficial to us, making the development of efficient synthesis methods crucial. We are developing methods to synthesize a class of natural products called polyketides following the biosynthetic routes. This approach not only allows the synthesis of various polyketides but also enables the synthesis of non-natural polyketide derivatives that serve as seeds for drug discovery.

