

ENZYME EVOLUTION IN SYNTHETIC BIOLOGY: A KEY ROLE FROM PROOF-OF-CONCEPT TOWARDS PRECISION FUNCTION

Yan Feng, Shanghai Jiao Tong University, China
yfeng2009@sjtu.edu.cn

Enzyme evolution plays an important role in generating the novel catalytic functions of the enzymes for the desired reactions and thus provides a promising route for bio-manufactures. Here, we give examples for discovering and optimizing the promiscuous enzymes and exploring their uses in reprogramed biosynthetic pathways of Ginsenoside Rh2 and 2-Amino-1,3-propanediol. Through engineering the aminotransferases and the glycosyltransferase in vitro based on their catalytic mechanisms, we successfully repurposed the biosynthetic pathways for high production outcomes in vivo in hosts including *Saccharomyces cerevisiae* and *Escherichia coli*. These works demonstrate that enzyme evolution combined with the metabolic engineering is an efficient approach for environmentally friendly productions of pharmaceuticals and chemicals.