Advancing Metabolic Engineering through Protein Engineering and Synthetic Biology

By

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Abstract
Natural metabolism provides a variety of important molecules. With metabolic engineering efforts, large-scale production of these compounds such as amino acids and antibiotics has been achieved via microbial synthesis. Recent advances in this field have allowed non-native or artificial biosynthetic pathways to be designed and constructed to synthesize target compounds beyond the confines of natural hosts. While chemical synthesis by metabolically engineered microorganisms is turning into a reality, a grand challenge is emerging, which is how to achieve viable productivities, titers and yields. Within this lecture, selected research projects related to the production of fuels, renewable chemicals and natural products will be presented to demonstrate the protein engineering and synthetic biology approaches we developed to address this grand challenge and enhance metabolic capacities of microbial systems for biotechnological applications.