Metabolic Engineering for the production of renewable fuel and chemical

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ABSTRACT

Increasing atmospheric CO_2 concentration and the fluctuation of fossil fuel supply have led to significant efforts in the synthesis of commodity chemicals from renewable resources. Parallel with the emerging global interests in the production of renewable chemical, advanced biofuel, and natural product, my research has focused on the design and optimization of biobased products from a variety of renewable feedstock such as biomass, protein waste, CO_2 and light energy using a combination of synthetic biology and metabolic engineering approaches. This talk will introduce the concept of strain and pathway design via a few examples: 1) development of the substrate-decoupled redox selection platform and its application for enzyme bioprospecting and evolution, 2) engineering a self-regulated 1-butanol fermentation system in E. coli via natural fermentation response, 3) various metabolic engineering strategies toward achieving high-titer production using 2,3-butanediol and itaconic acid as examples.

BIOGRAPHY

Claire Shen received her B.S. degree from the Department of Chemical and Biomolecular Engineering at University of California, Los Angeles (UCLA) with Magna Cum Laude in 2006. She then continued her study at the Department of Chemical and Biomolecular Engineering at UCLA and obtained her Ph.D. degree in 2011, specializing in metabolic engineering and renewable fuel/chemical production under the supervision of Dr. James Liao. She joined the Institute for Genomics and Proteomics at UCLA during her post-doctoral research from 2011 to 2013. Dr. Shen joined the Department of Chemical Engineering at National Tsing Hua University as an assistant professor in the December of 2013. Her current research interests include biobased chemical and fuel from renewable sources, design of synthetic pathway, assembly of novel pathway in unique hosts, and directed evolution of production system to achieved novel functions.