Systems metabolic engineering for sustainable chemical industry

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Climate crisis is one of the biggest threats to humankind. One of the major causes is our heavy dependence on fossil resources including fossil oil, coal, and natural gas. It is thus imperative to move toward establishing sustainable chemical industry in order to avoid aggravation of climate crisis. Systems metabolic engineering that integrates systems biology, synthetic biology and evolutionary engineering with traditional metabolic engineering allows efficient development of microbial cell factories for the production of natural and non-natural chemicals and materials from renewable resources. In this lecture, I will overview various tools and strategies of systems metabolic engineering. Then, I will showcase how microbial strains can be developed for efficient production of desired chemicals for sustainable chemical industry.