Metabolic phenotyping of cyanobacteria with increased biofuel productivity

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Project Goals: This project aims to identify and remove bottleneck reactions that limit carbon flux towards synthetic pathways in engineered autotrophic systems. The long-term goal is to develop an integrated experimental and computational workflow that can be progressively used to enhance the performance of industrially pertinent autotrophs.

To quantitatively assess *in vivo* autotrophic metabolism, our lab has previously developed isotopically nonstationary ^{13}C-MFA (INST-MFA) (*1-4*) and applied it to assess the photoautotrophic metabolism of cyanobacteria (*4*) and plant leaves (*5*). More recently, we combined INST-MFA with rational metabolic engineering to improve the productivity of an isobutyraldehyde producing mutant of the cyanobacterium *Synechococcus elongatus* PCC7942 (*6*).

This presentation describes our further efforts to examine the metabolic phenotypes of strains with improved isobutyraldehyde productivity. Our work demonstrates the promising utility of INST-MFA at guiding the metabolic engineering of autotrophs intended for industrial applications.

References

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