

1-7 Oral

INTEGRATION OF METABOLIC MODELING AND LABORATORY EVOLUTION

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One of the interesting and challenging aspects of biology is the fact that various biological components (genes, proteins, metabolites) are highly interconnected where small changes in a single component can influence many other components. This attribute of biology poses a particular challenge to understanding evolutionary biology where mechanistic changes can occur anywhere within the system to give rise to new phenotypes. One tool that can potentially facilitate the analysis of mechanistic changes occurring during biological evolution is a large-scale metabolic model of the system. This talk will cover the conceptual framework for constraint-based metabolic models, their relevance to evolutionary biology, and applications to studying laboratory evolution. Specifically, the benefits and limitations of using a large-scale metabolic model of *Escherichia coli* to study laboratory evolution and to analyze gene expression, metabolic flux, and genome re-sequencing data will be discussed. In addition, the combination of modeling, high-throughput data, and laboratory evolution to prospectively modify organism function for metabolic engineering applications will be presented.