Metabolic engineering of *Escherichia coli* for production of L-tryptophan using synthetic biology tools

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Current metabolic engineering is limited by the ability to finely and predictively express pathway enzymes and to screen superior and optimized variants from library. Here, we present synthetic biology tools which settled above problems to produce L-tryptophan from *Escherichia coli*. First, we amplified metabolic flux of L-tryptophan pathway using a predictive model for gene expression level, UTR Designer, that can precisely predict expression level of gene based on folding energy of specific features in mRNA secondary structure. UTR sequences of bottleneck enzymes of the pathway were re-designed. Then we optimized the producing strain using a riboswitch-based screening tool, riboselector, that can modulate expression level of selective marker gene in response to the target molecule. Riboselector for L-tryptophan was able to enrich superior variants from vast library which were constructed from rationally engineered strain. We claim here that high-performance producing strains could be engineered using novel synthetic biology tools.