Pathway optimization through 5'-UTR redesign for enhanced production of L-tyrosine in *Escherichia coli*

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L-tyrosine is a commercially important compound in the food, pharmaceutical, chemical, and cosmetic industries. Here, we redirected metabolic pathway by fine-tuning gene expression levels to improve L-tyrosine production in Escherichia coli. To optimize the L-tyrosine biosynthetic pathway, a synthetic constitutive promoter and a synthetic 5'-untranslated region (5'-UTR) were introduced for each gene of interest to allow for control at both transcription and translational levels. Carbon flux rebalancing was achieved by controlling the expression level of PEP synthetase using UTR Designer. The L-tyrosine productivity of the engineered E. coli strain was increased through pathway optimization resulting in 3.0 g/L of L-tyrosine titer, 0.0354 g L-tyrosine/h/g DCW of productivity, and 0.102 g L-tyrosine/g glucose yield. Thus, we demonstrates that fine-tuning of metabolic engineering by 5'-UTR redesign is an effective strategy for improved production of L-tyrosine.