

Fine-tuned gene expression knockdown using synthetic small RNA for putrescine and L-proline production in *Escherichia coli*

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The gene expression level in *Escherichia coli* can be regulated by modulating synthetic small RNA (sRNA) expression. Herein, target-binding ability of sRNA was fine-tuned by altering promoters for their expression. Knockdown targets selected by using in silico flux response analysis and rational choice for putrescine overproduction were combined with different promoters to generate sRNA-promoter library which was transformed into the recombinant *E. coli* strains. Consequently, putrescine and L-proline production increased to 42.3 g/L and 33.8 g/L, respectively, by fine-tuned repression of *argF* and *glnA* genes. This fine-tuning sRNA system will be useful to rapidly optimize expression levels of multiple genes. [This work was supported by grants from the Technology Development Program to Solve Climate Change on Systems Metabolic Engineering for Biorefineries from the Ministry of Science and ICT (MSIT) through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) and the Intelligent Synthetic Biology Center through the Global Frontier Project (2011-0031963) of MSIT through the NRF of Korea.]