High-level cadaverine and tyrosine production by *Escherichia coli* through synthetic small regulatory RNA down-regulations on metabolic network

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Small regulatory RNAs (sRNAs) are gene expression regulators that act on post-transcriptional phase of bacterial gene expression. Here, we developed synthetic sRNA system to down-regulate the gene expression for metabolic engineering. The target mRNA binding region of MicC, one of the well-studied sRNAs in *Escherichia coli*, was replaced with translation initiation sequence of our target genes. We found that the MicC scaffold based synthetic sRNA was successful in repressing the expression of the fluorescence protein DsRed2. Synthetic sRNAs were used for metabolic engineering to enhance the production of tyrosine and cadaverine. By screening 14 different strains which harboring one or combination of the synthetic sRNAs targeting *ppc*, *tyrR*, *csrA*, and *pgi*, we isolated a tyrosine producer producing 2 g per liter of tyrosine. With a library of 130 synthetic sRNAs, we screened knockdown targets that increase cadaverine productivity substantially. Repression of the gene *murE* led to a 55% increase in cadaverine production compared to the base strain. (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557, ISBC (2011-0031963))