Synthetic small regulatory RNAs-based bacterial knockdown and its role in engineering microbial production of tyrosine and cadaverine

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A toolkit of synthetic sRNAs for manipulating gene expression was developed in *E. coli*. The target binding sequence of MicC was inserted to the translation initiation region of genes of interest. Knockdown on a fluorescent protein called DsRed2 showed that MicC scaffold-based synthetic sRNA was able to properly repress DsRed2 expression. Furthermore, by knocking down four candidate genes in 14 different strains, we isolated a tyrosine overproducer with a titer of 2 g/L. With a library of 130 synthetic sRNAs, several knockdown targets were identified, resulting in an increased cadaverine production by 55%. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012M1A2A2026556); the Intelligent Synthetic Biology Center through the Global Frontier Project (2011-0031963) of the Ministry of Education, Science and Technology (MEST) through the National Research Foundation of Korea]