Fine-Tuned Knockdown Method Using Synthetic Small Regulatory RNA in *Escherichia coli*

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Small regulatory RNA (sRNA) is a regulator of physiological gene expression in bacteria. sRNA includes a target binding sequence which is complement to target mRNA and this sequence provides target recognition and knockdown activity. Binding of sRNA to mRNA forms a bulk bi-molecule complex which prevents ribosome binding and translation. When sRNA and mRNA form a complex, Hfq, a sRNA chaperone protein, assists binding and recruits RNase E for degradation of mRNA. Based on this mechanism, we developed synthetic sRNAs to repress the expression of genes of interest in Escherichia coli. Binding energy of target binding sequence was proportional to knockdown activity. Fine-tuned knockdown system was constructed using binding energy calculation of target binding sequence. [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]