

Genetic engineering tools for fine-tunable gene expression and regulation

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Fine-tuning gene expression is essential for optimization of genetic networks, but conventional methods are time-consuming and laborious. Recently, I developed synthetic sRNA-based gene regulation system and the leader sequence-based gene expression system. In this talk, I introduce a fine-tuning knockdown system by modulating synthetic sRNA expression and by engineering the scaffold. I also introduce promising applications of synthetic sRNAs for corepression of multiple target genes to be manipulated simultaneously to enhance the production of chemicals of interest. In addition, a gene expression system independent of the downstream coding sequence is presented. These gene expression tools allow finely controlling the expression levels of multiple genes simultaneously and are easily implementable because of its simple process of design and construction of modules without laborious modifications. [This work was supported by an NRF grant funded by the Ministry of Science and ICT (NRF-2019R1A2C1088504)]