SMALL RNA AGRB REGULATES LAC OPERON EXPRESSION IN
ESCHERICHIA COLI

Chang-Kyu Yoon¹; Hey-Min Kim¹; Young-Ha Park¹; Yeon-Ran Kim¹; Yeong-Jae Seok¹,²

¹Department of Biological Sciences and Institute of Microbiology, Seoul National University, Seoul 151-742, South Korea; ²Department of Biophysics and Chemical Biology, Seoul National University, Seoul 151-742, South Korea.

The small non-coding RNAs (sRNAs) have been known to integrate environmental stimuli and inner cell stress response in many bacterial species. sRNAs mainly act as post-transcriptional regulator via antisense base pairing with target mRNAs independent on distance from the target. *E. coli* has several pairs of sRNA-mRNA involved in various sugar metabolisms. Most of them are known for typical *trans*-acting sRNAs which have base pairing sequence complimentary to near the Shine-Dalgarno sequence of target mRNA. Expression of lactose metabolic enzymes is controlled by lactose repressor dependent on presence of lactose at the transcriptional level. Although this manner of transcriptional control remains uncontroversial, little is known for post-transcriptional regulation of gene included in the lac operon by sRNAs. In this research, we found that sRNA named AgrB might regulate the gene coding β-galactosidase (*lacZ*) in the lac operon. Especially, AgrB has two distinctive characteristics, unlike other regulatory sRNAs. First, AgrB has a 15-base pairing sequence complimentary to the coding sequence, but not SD sequence, of *lacZ*. Second, many Hfq-dependent typical sRNA have a seed region, at the end 5’ that can bind to mRNA but AgrB has its antisense sequence in the middle of it. AgrA, which is mapped just upstream of *agrB*, has little effect on the regulation of *lacZ* although it has almost the same nucleotide sequence with AgrB and the two sRNAs are only 6 nucleotides different. In the absence of *agrB*, expression level and stability of target mRNA increased, resulting in elevated activity of β-galactosidase. Much remains to be learned about exact base pairing between AgrB and *lacZ* mRNA.

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