

화학부 정규세미나

An NcAA- and Temperature-controlled Gene Expression System

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Conditional expression of desired gene can be of great importance when the gene product is needed only at the specific circumstance. In this seminar, our recent studies on the non-canonical amino acid (ncAA) auxotrophic bacterial strain will be discussed. Specifically, the main contents will include the engineering of an orthogonal protein-protein interface and selection protocol that can be generally used to construct an ncAA dependent bacterial strain. Additionally, an ncAA- and temperature-controlled gene expression system will be introduced. We recently have identified conditions to regulate the expression of the genes of interest (GOI) in an *Escherichia coli cya* that lacks cyclic AMP production capability. Expression of exogenous tRNA in *E. coli cya* disables cAMP dependent protein expression at 37 °C, whereas the ability for protein expression is restored at lower temperatures below 30 °C. To provide more stringent conditions for GOI expression, fusions with an ncAA *p*-benzoylphenylalanine (BzF) dependent orthogonal protein-protein interface and split units of *Bordetella pertussis* adenylate cyclase were used. The system exhibited the BzF dependency and temperature sensitivity for expression of GOIs including chloramphenicol acetyltransferase and super-folder green fluorescent protein. All the gene expressions were induced well at below 30 °C and 0.5 mM BzF conditions, while suppressed at 37 °C or without BzF condition.

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