Fast Evolution of *Escherichia coli* Using RNA Device

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Although great progress has been made in rational approach, strain improvement still requires the optimization of the biological system itself. Combinatorial approach is, however, limited by the method isolating high producer from the library. Among the various methods available currently, selection by the physiology associated with the growth is known to be the most efficient. However, most physiological features to be improved such as biochemical productions are not easily associated with the growth. In this study, we developed a RNA device to express as a selective phenotype with response to the intracellular biochemical level which is not associated with the growth against the selective pressure. As a model, lysine synthetic pathway was optimized in *E. coli*. For the optimization of lysine synthesis, From the parental strain, anaplerotic pathway catalyzed by PEP carboxylase encoded by *ppc* was re-optimized by selection of its optimal expression level among the promoter library. By combining RNA device which responds to the intracellular lysine level, optimal *ppc* expression level for lysine synthesis was easily selected.