Microbial Production of Lactate-Containing Polymers in Metabolically Engineered *Escherichia coli*

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Polylactic acid (PLA) has been considered as a good alternative to petroleum-based plastic as it possesses several desirable properties such as biocompatibility, biodegradability, and compostability. For biosynthesis of PLA, we introduced the heterologous metabolic pathways including evolved propionyl-CoA transferase and PHA synthase and engineered based on *in silico* genome-scale metabolic flux analysis. Several target genes were inactivated and reinforced to redirect flux toward lactate. It resulted in enhanced synthesis of PLA and P(3-hydroxybutyrate-*co*-LA) in *E. coli*. In this study, the strategy of combined systems-level metabolic engineering and enzyme engineering allowed one-step production of PLA and its copolymers in *E. coli*. [“This work was supported by the Technology Development Program to Solve Climate Changes from National Research Foundation of Korea (Development of systems metabolic engineering platform technologies for biorefineries; NRF-2012-C1AAA001-2012M1A2A2026556) and Intelligent Synthetic Biology Center (2011-0031963) of Korea through the Global Frontier Research Program of the Ministry of Education, Science and Technology (MEST).”]