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 due to its 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*. The strategy that combines systems-level metabolic engineering with enzyme engineering was successful in one-step production of PLA and its copolymers in *E. coli*. [This work was supported by the Technology Development Program to Solve Climate Changes (systems metabolic engineering for biorefineries) from the Ministry of Education, Science and Technology (MEST) through the National Research Foundation of Korea (NRF-2012-C1AAA001-2012M1A2A2026556) and by the Intelligent Synthetic Biology Center (2011-0031963) through the Global Frontier Research Program of the MEST.]