Biosynthesis of 2-hydroxyacids containing polymers in *E. coli*

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Polyhydroxyalkanoates (PHAs) are polyesters which have general plastic properties, biodegradability and biocompatibility. To produce various polymers for wide range of applications, many hydroxyacids are co-polymerized. One of them, 2-hydroxyacids are nonnatural substrates of the key enzyme of PHA synthesis, PHA synthase. Here, we produced lactate and 2-hydroxybutyrate (2HB) containing PHAs with evolved PHA synthase and propionyl-CoA transferase by metabolically engineered *E. coli*. The evolved PHA synthase from *Pseudomonas* sp. MBEL 6-19 could successfully synthesized lactate and 2HB containing polymers. Further engineering was done to redirect flux toward lactate and 2HB by introducing heterogenous metabolic pathway. It resulted in enhanced PLA, P(2HB), and copolymer production. ["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)."]