Seminar Announcement

IN VITRO RECONSTITUTION OF SYNTHETIC METABOLIC PATHWAYS WITH THERMOPHILIC ENZYMES

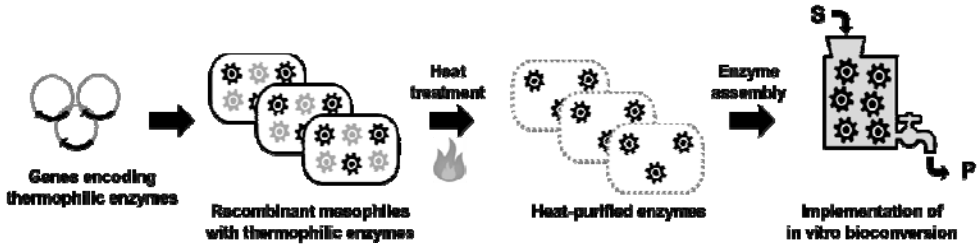

FIG. Schematic illustration of basic procedure of *in vitro* metabolic engineering

ABSTRACT: Our group has been developing a novel platform technology, designated as "*in vitro* metabolic engineering", for biocatalytic production of useful chemicals. In this technology, multiple enzymes derived from thermophiles and hyperthermophiles are assembled to reconstitute a synthetic metabolic pathway *in vitro* (FIG). Use of thermophilic enzymes enables us (i) a simple preparation of desired enzymes by the heat-treatment of recombinant mesophiles expressing their genes, and (ii) a long-term operation of *in vitro* bioconversion owing to the excellent stability of thermophilic enzymes. This technology is applicable to any kind of thermophilic enzymes as long as they can be functionally expressed in a mesophilic host, and thus potentially applicable to the biocatalytic production of any kind of chemicals or materials. In our previous studies, we have demonstrated one-pot conversion of glucose, glycerol, and colloidal chitin to pyruvate [1)], L-lactate [2,3)], L-malate [4)], and 1-butanol [5)] through *in vitro* metabolic pathways. Besides them, we have developed some supporting technologies for expanding the feasibility of *in vitro* metabolic engineering, such as (i) co-expression system of multiple thermophilic enzymes for their simultaneous heat-purification [6)] and (ii) *in vitro* salvage synthesis of NAD(H) for the long-term use of the cofactors [7)].

References

[1)] Honda, K. et al. (2017) *J. Biosci. Bioeng.*, 124: 296-301
[2)] Ye, X. et al., (2012) *Microbial Cell Fact.*, 11: 120
[3)] Jaturapaktrarak, C. et al. (2014) Bioresour Bioprocess, 1: 18
[4)] Ye, X. et al., (2013) *J. Biotechnol.*, 164: 34-40
[5)] Krutsakorn, B. et al., (2013) *Metab. Eng.*, 20: 84-91
[6)] Ninh, P.H. et al., (2015) *Biotechnol. Bioeng.*, 112: 189-196
[7)] Honda, K. (2016) *Metab. Eng.*, 35: 114-120

Department of Biotechnology

Graduate Seminar

WHEN

Nov 22, 2017
1.30 pm – 3 pm

WHERE

L03

Faculty of Science, Mahidol University

WHO

Kohsuke Honda

Synthetic Bioengineering Laboratory, Department of Biotechnology, Graduate School of Engineering, Osaka University, Japan

COURSES

SCBT591, 592
Special Topics in Biotechnology I, II
SCBT594, 595, 596
Advanced Topics in Biotechnology I, II, III

ALL WELCOME