Seminar

Mutagenesis-based High Throughput Evolution Engineering for Smart Integrative Biobreeding of Cell Factories

by

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Abstract

Development of rapid and powerful mutagenesis and high throughput adaptive evolution tools is of importance for creation of smart cell factories by discovery of novel functional genes or biological dark matters and genome-phenotype association using integrative approaches. ARTP (atmospheric and room temperature plasma) mutagenesis system developed by our group can directly cause complex genome mutation including chain break and bases mutation via a unique mechanism. Mechanistic study and various practical applications in cell breeding demonstrated that ARTP mutagenesis is a powerful tool for microbial evolution engineering. For developing an integrated platform capable of combing ARTP mutagenesis and high throughput adaptive evolution, we further developed a microdroplet-based microbial culture (MMC) system which can be operated automatically with high throughput culture on microchips, good repeatability, online detection of growth states, reprogrammable software, automatic addition of gradient chemical factors. The ARTP mutagenesis together with MMC system is an enabling platform for smart integrative biobreeding by further combining with genome editing technology.

Date: 7 November 2018 (Wednesday)

Time: 1500

Venue: Room 5583 (Lifts 27-28)
Speaker’s biography

Prof. Xin-Hui XING received his B.S. from South China University of Technology in 1985, and Ph.D. from Tokyo Institute of Technology in 1992. He had been Assistant Professor at Tokyo Institute of Technology from 1992 to 1998, and Associate Professor at Yokohama National University from 1998 to 2001. He was selected as a full professor by the 100-Talent Scholar Program of Tsinghua University in 2000 and joined Department of Chemical Engineering since then. He was appointed as the director of Institute of Biochemical Engineering in 2002. He had been the vice department chairman from 2009 to 2018. His research field covers biobreeding technology and instrumentation, high throughput technology, enzyme engineering, environmental biotechnology and bioenergy. He serves as the editor of Journal of Bioscience and Bioengineering, associate editor of Biochemical Engineering Journal, and editorial board of several domestic and international journals.