

Department of Chemical and Environmental Engineering

2015—2016 Seminar Series

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1-2pm

WCH 205/206



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Professor

Biotechnology

Tokyo University of Agriculture and Technology

Biomolecular Engineering for Biodevice Development and for Novel Bioprocess Design

Our strategic research concept is to create novel molecules based on the biomolecular engineering to be applied for the development of innovative biosensing technologies dedicating for healthcare, and also novel bioprocesses based on synthetic biology approaches. In this seminar, I present our current research activities by introducing representative research topics.

- **Biomolecular engineering**

We have been engaged in the development of unique of oxidoreductases, which are the major components of the current electrochemical biosensors. Our interests are not limited to the oxidoreductases, but also several kinases, binding proteins, antibodies, amyloid forming proteins and aptamers are involved.

- **Biosensing technology**

Varieties of biosensing technologies are currently studied and developed in our group, combined with our original biomolecules, mainly based on electrochemical principles; from conventional amperometric enzyme sensors to direct electron transfer principle based autonomous self-powered sensing devices employing variety of electrode platforms; from conventional screen printed electrodes to interdigitated electrode array.

- **Synthetic biology**

We are currently engaged in the project based research, designated as "*CyanofactoryTM*" (Sode serves as the PI). The *CyanofactoryTM* is composed of 1) synthetic marine cyanobacterial host strains, 2) synthetic operons for the production of biofuel-related compounds, and 3) the employment of ionic liquids for downstream processing. Our group is engaged in the development of synthetic marine cyanobacterial host strains, throughout the development of artificial signal transduction system by designing the light sensing gene expression system and riboregulators. The technologies are dedicated not only for the designing of bioenergy production processes, but also for heterotrophic bacteria based bioprocesses for chemical.

BioSketch: Dr. Koji SODE received B.S. in chemical engineering, M.S. in electrochemistry and PhD in engineering at Tokyo Institute of Technology (Tokyo Tech.). During his graduate student period, he engaged as a research fellow at Swiss Federal Institute of Technology, Zuerich (ETH-Z), Biotechnology Institute. He started his academic appointment as Research Associate (Assistant Prof.) at Tokyo Institute of Technology, following at the Research Center for Advanced Science and Technology, The University of Tokyo. In 1990, he was promoted as an Associated Professor, at the Department of Biotechnology, Tokyo University of Agriculture and Technology. In 2000, he was promoted as full Professor in the Department of Biotechnology. During his career at Tokyo University of Agriculture and Technology, he served as the Chair of Department of Biotechnology and Life Science, Director of Center for the Intellectual Properties and Innovations and University Research Administration Center. Currently, he is serving as the Chair of the Department of Industrial Technology and Innovation, Graduate School of Engineering. He has been engaged in the variety of research projects with many pronounced industrial partners, especially in the field of the development of novel biodevices for medical application. He also launched a start-up company, Ultizyme International Ltd., and serving as the science and technology advisor. He is the author of more than 270 peer reviewed papers and holds numerous international patents relating on biosensing molecules and their applications. His current research interests are 1) Biomolecular engineering toward the application for biodevice development and novel bioprocess design, 2) Biodevice development, 3) Synthetic biology; creating novel biocatalyst/microorganisms for green processes.

