

# Frontier Pharmaceuticals to Be Explored by Young Scientists: Systems Biology-Based Drug Discovery and Development

M-14

**Organizers:** Fumiyoshi Yamashita (Graduate School of Pharmaceutical Sciences, Kyoto University)  
Sumio Ohtsuki (Graduate School of Pharmaceutical Sciences, Tohoku University)

A drug interacts with a specific functional molecule in the body and modifies its function. This is a "biochemical" action of the drug, but not a "biological" action as a drug function. To validate new drug targets, it is important to understand the biological function that will result from such a biochemical interaction. This requires a comprehensive understanding of the structure and system dynamics of biomolecular interaction networks. In addition, a network of functional molecules governing the pharmacokinetics/dynamics of drugs should be taken into account, since the metabolic fate of drugs is strongly associated with their safety and efficacy. Although a number of molecular-level mechanisms of biological systems have been elucidated with progress in molecular biology, such knowledge does not necessarily provide an understanding of "biological" systems as systems. To understand complex biological phenomena at the system level, a multidisciplinary approach, involving molecular biology, analytical science, computer simulation, and informatics, is required. In this mini symposium, leading young investigators from different fields will discuss new knowledge and technologies, with reference to their meanings in the drug research field.