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Systems Biology and Synthetic Biology in Japan

Groups, Projects, Developments

Succeeding to the report "Systems Biology in Japan" in BIOforum Europe in February 2005, recent activities of Systems Biology and Synthetic Biology are described and summarized here. The number of research groups that work on Systems Biology is increasing steadily in these years, although not so rapidly compared to the USA and Europe. Thus, Japan is now seeking for a new direction. Concerning Synthetic Biology, several groups are focusing on developments and applications with unique approaches.

There are big movements in the genome/post-genome era. "From Molecular Biology to Systems Biology" [1-3] towards "Synthetic Biology" [4], and Japan has a long history in these fields.

In 1995, M. Itaya proposed the "Genome Engineering" at the Mitsubishi Chemical Life Science Institute; and the "Accelerated Evolutionary Engineering" project, headed by Y. Fushimi, under the NEDO (New Energy and Industrial Technology Development Organization)

started in the same year. In 1996, the E-Cell project was launched at the Tomita Laboratory at Keio University, and the development of the KEGG began at the Kanehisa Laboratory at Kyoto University. Two years later, the Kitano Symbiotic Project was launched as one of the ER-ATO projects of JST (Japan Science and Technology Agency). H. Kitano used the word "Systems Biology" in this project for the first time in the world.

All of these activities have been continuing or expanding until now, and a lot of other projects or research groups in various fields started within a few years, for example the Leading Project for Biosimulation and the Genome Network Project.

Japan played an international role in these fields, and several important meetings had their premieres in Japan: The first ICSB (International Conference on Systems Biology) was held in Tokyo in 2000 and the first RTK (Receptor Tyrosine Kinase) consortium meeting took place at RIKEN Yokohama in 2005. In the same year, the first Annual Meeting of the Metabolomics Society was held in Tsuruoka, and the first PCSB (Future Challenges for Systems Biology) Workshop took place in Tokyo this February.

In December 2004, Japan welcomed a delegation from the USA/WTEC (World Technology Evaluation Center) which conducted a survey on Systems Biology in Japan [5].



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US Panel for the Survey of Systems Biology in Japan in Dec.2004 (at Yokohama)