

Realization of Common Platform Technology, Facilities, and Equipment that creates Innovative Knowledge and Products

Construction of a foundation for simulation analysis for understanding glycan function

Project Leader : Kiyoko F. AOKI-KINOSHITA
Professor, Faculty of Science and Engineering, Soka University

R&D Team :

Database Center for Life Science (DBCLS) Joint Support-Center for Data Science Research (DS) Research Organization of Information and Systems (ROIS)



Summary :

The purpose of this project is to develop a foundation for systems glycobiology, aiming towards revealing the biological function of glycans by performing computer simulations of glycan-related pathways. Firstly, the metabolic and signaling pathways in which glycans are involved will be analyzed, and the basic model for predicting glycan function will be established and verified with experiments. Specifically, simulations of (1) glycan biosynthesis pathways, (2) glycosylation mechanisms, (3) glycan-related signaling pathways, and (4) interaction networks of glycans and the extracellular matrix will be performed. By establishing these simulation models, similar techniques can be applied to other post-translational modifications (PTMs) and metabolic pathways, eventually leading to simulations at the cellular level. Traditional systems biology research has focused on analysis at the DNA level and genetic systems modeling, but important PTMs such as glycans have been ignored. In this project, we focus on proteins and PTMs in order to establish the foundation towards a novel simulation system that encompasses both intercellular and extracellular PTMs.

