

1. Dynamic development of functional glycomics:

Present state of the MEXT project

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The MEXT “Functional Glycomics” group study is a five-years project from 2002 to 2006, and consists of 12 members and 27 applied members who have been renewed in 2005. It is composed of 3 groups entitled as follows, 1. Regulation of protein functions by carbohydrate chains. 2. Functional regulation of molecular complexes by glycosylation. 3. Molecular mechanisms for diseases based on glycosylation disorders. The aim of the 1st group is to understand the roles of carbohydrates at the molecular level in the functions of glycoproteins and also in the carbohydrate-protein interactions in various biological reactions. The aim of the 2nd group is to focus on sugar chain functions, especially GAGs’ ones exhibited when molecular complexes with protein ligands are formed. The aim of the 3rd group is to investigate the molecular mechanisms of the diseases derived from the glycosylation disorders with focus on the roles of membrane microdomains. In particular, there are outstanding progresses in the function analyses of MBP ligands, *O*-mannose type glycans, GPI-anchors in cytokine receptors, GAGs of proteoglycans in neurons, glycolipids in nervous systems and α 1,4GlcNAc in *H. pylori* infection. New synthetic mechanisms of GAGs, *O*-glycans and GPI-anchors, and mode of carbohydrate recognition with ubiquitin ligases have also been elucidated.