【Integrated Science and Innovative Science（Comprehensive fields）】

Multi-dimensional Omics on Brain Anatomy

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【Outline of survey】

Immunohistochemistry for proteins and *in situ* hybridization for mRNA are used for the observation of biomolecules with a microscope. However, these techniques can only observe the already-identified biomolecules. We developed a new mass spectrometric microscopy which can observe various biomolecules at once with molecular weight. Our preliminary data showed dynamic distribution of the lipids, glycolipids, and proteins. In this study, we will make mouse brain mass imaging ATLAS. In addition, we will try to analyze mouse development, aging, sex, feeding, and the response for physiological stimulations. We use neurodegenerative disease model mice to establish our analytical system. Further, analysis of human postmortem brain will be in scope. Finally, we will try pathological analysis of postmoterm brains of human psychiatric diseases patients.

【Expected results】

The constituent elements of brain are water, lipids, proteins, glycolipids, nucleic acids, and others in the order of weight percentage. Because the techniques for observing the distribution of lipids and glycolipids had been limited, these distributions were hardly described. Our preliminary data with mass microscopy shows that lipids and glycolipids distributed dynamically. Thus, our survey will open a new field. Moreover, we can expect the discovery of new biomolecules by analyzing human neuronal diseases including schizophrenia.

【References by the principal researcher】

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- Shimma, S., Sugiura, Y., Hayasaka, T., Zaima N., Matsumoto, M., and Setou, M. Mass imaging and identification of biomolecules with MALDI-QIT-TOF-based system. ***Anal. Chem.*** 80, 878-885, (2008)

【Term of project】 FY2008－2012	【Budget allocation】 **78,100,000 yen** (direct cost)

【Homepage address】

http://www2.hama-med.ac.jp/w3a/mifrc/mole-ana/setou/ja/index.html