

Project No.: 17005
Core Institution in Japan:Osaka University

**JSPS Core-to-Core Program -Strategic Research Networks-
FY2009 Research Report**

Project No.	17005
Research Theme	Human disease-related functional glycomics initiative
Duration of Project	2007/4/1 - 2010/3/31
Core Institution in Japan	Osaka University

Implementing Organizations

Country	Japan
Core Institution	Osaka University
Co-Chair (name and title)	Naoyuki Taniguchi (Endowed Chair Professor, Professor Emeritus)
Number of Cooperating Institutions	27
Cooperating Institutions	The University of Tokyo, Nagoya University, Kochi University, Yamaguchi University, Sapporo Medical University, Tokai University, Kinki University, RIKEN, Aichi Cancer Center Research Institute, National Institute of Advanced Industrial Science and Technology, Tokyo Metropolitan Institute of Gerontology, Osaka Medical Center and Research Institute for Maternal and Child Health, Ritsumeikan University, Fukushima Medical University, Tohoku Pharmaceutical University, Soka University, Kyoto University, Hyogo College of Medicine, Hyogo University of Health Sciences,Osaka Medical College, Kagoshima University, Saga University, Aichi Gakuin University,Kyoto Sangyo University,Miyagi Cancer Center Research Institute, National Cancer Center Research Institute, Tokyo Institute Technology

Country	USA
Core Institution	The Scripps Research Institute
Co-Chair (name and title)	James C. Paulson
Number of Cooperating Institutions	14
Cooperating Institutions	The Burnham Institute, University of Washington, The State University of New York at Stony Brook, Johns Hopkins University, University of California, Indiana University, University of Georgia, Albert Einstein College of Medicine, University of Iowa, Yale University, National Institutes of Health, University of New Hampshire, Boston University School of Medicine, University of Alabama at Birmingham
Matching Fund	NIH/NIGMS The Consortium for Functional Glycomics

Country	Germany
Core Institution	German Cancer Research Center
Co-Chair (name and title)	Wilhelm von der Lieth (Professor) * Since Prof. von der Lieth passed away, Dr. Frank Martin took over this position until March/2010
Number of Cooperating Institutions	8
Cooperating Institutions	Hannover Medical University, University of Muenster, Freie University Berlin, University of Kiel, University Goettingen, University Stuttgart, University of Giessen, Max Plank Institute (Dresden)
Matching Fund	European Commission (EUROCarbDB)

Result of Program Implementation

The Human Proteome Organization (HUPO), established 8 years ago, is an international consortium of national proteomics research associations, government researchers, academic institutions, and industrial partners. HUPO promotes the development and awareness of proteomics research, advocates on behalf of proteomics researchers throughout the world, and facilitates scientific collaborations between HUPO members and Initiatives. The Human Disease Glycomics/Proteome Initiative (HGPI; Naoyuki Taniguchi, Chair) supported by JSPS core to core grant is to define community standards for data representation in functional glycomics in relation to diseases. The goal is to facilitate data comparison, exchange, and verification, through which a new generation of biomarker based on the change of carbohydrate structure will be identified.

In the fiscal year 2009, we held HGPI meeting twice in Germany (November10; Koeln) and USA (March 4-5;Athens) together with our partner organizations.

Achievements in FY2009 (Self Review)

International standardized protocol for analysis of O-linked glycan chain was reviewed and amended seriously by over 15 mass-spectrometry experts in HGPI committee, based on their independent experiments, and was published this year. This result has a great impact not only for glycobiology, but for other fields which have potentially contact with functional glycomics, such as a research of biomarkers.

Wada, Y., A. Dell, S. M. Haslam, B. Tissot, K. Canis, P. Azadi, M. Backstrom, C. E. Costello, G. C. Hansson, Y. Hiki, M. Ishihara, H. Ito, K. Takechi, N. Karlsson, C. E. Hayes, K. Kato, N. Kawasaki, K. H. Khoo, K. Kobayashi, D. Kolarich, A. Kondo, C. Lebrilla, M. Nakano, H. Narimatsu, J. Novak, M. V. Novotny, E. Ohno, N. H. Packer, E. Palaima, M. B. Renfrow, M. Tajiri, K. A. Thomsson, H. Yagi, S. Y. Yu, and N. Taniguchi. 2010. Comparison of methods for profiling O-glycosylation: Human Proteome Organisation Human Disease Glycomics/Proteome Initiative multi-institutional study of IgA1. *Mol Cell Proteomics*. 9:719-727.

Many young investigators and students joined HGPI international meeting and had valuable international experiences by communicating with researchers abroad.

Future Plan (Measures toward Achieving Research Objectives)

By the support of JSPS Core-to-Core program for the last 5 years, we have established two essential protocols for glycobiology, i.e., the structural elucidation of N-linked or O-linked glycan chains, which are validated internationally.

N-linked glycans:

Wada, Y., P. Azadi, C. E. Costello, A. Dell, R. A. Dwek, H. Geyer, R. Geyer, K. Takechi, N. G. Karlsson, K. Kato, N. Kawasaki, K. H. Khoo, S. Kim, A. Kondo, E. Lattova, Y. Mechref, E. Miyoshi, K. Nakamura, H. Narimatsu, M. V. Novotny, N. H. Packer, H. Perreault, J. Peter-Katalinic, G. Pohlentz, V. N. Reinhold, P. M. Rudd, A. Suzuki, and N. Taniguchi. 2007. Comparison of the methods for profiling glycoprotein glycans—HUPO Human Disease Glycomics/Proteome Initiative multi-institutional study. *Glycobiology*. 17:411-422.

O-linked glycans:

Wada, Y., A. Dell, S. M. Haslam, B. Tissot, K. Canis, P. Azadi, M. Backstrom, C. E. Costello, G. C. Hansson, Y. Hiki, M. Ishihara, H. Ito, K. Takechi, N. Karlsson, C. E. Hayes, K. Kato, N. Kawasaki, K. H. Khoo, K. Kobayashi, D. Kolarich, A. Kondo, C. Lebrilla, M. Nakano, H. Narimatsu, J. Novak, M. V. Novotny, E. Ohno, N. H. Packer, E. Palaima, M. B. Renfrow, M. Tajiri, K. A. Thomsson, H. Yagi, S. Y. Yu, and N. Taniguchi. 2010. Comparison of methods for profiling O-glycosylation: Human Proteome Organisation Human Disease Glycomics/Proteome Initiative multi-institutional study of IgA1. *Mol Cell Proteomics*. 9:719-727.

Now with these methods in our hands, we have to step forward onto biomedical/translational researches, such as identifying biomarkers.

The effort to send young investigators and students to international glycobiology meetings such as HGPI will be continued to have them valuable international experiences.