Systematic differential glycan analysis targeting restricted regions of formalin-fixed tissue specimens

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Glycome is defined by the glycosylation machinery with which each cell is equipped, and this differs between species. It is evident that cells show drastic change during cell progression and differentiation associated with tumorigenesis and malformation. Glycan-targeted histochemical approaches to analyze molecular and cellular dynamics provide useful clues to answering questions about glycan functions associated with pathology, and thus lead to find specific glycoproteins that can be useful markers with respect to disease. This implies that development of glyco-biomarker discovery will require differential glycan analysis in a number of clinical specimens where disease lesions and normal regions from the same tissue sections are compared. Although laser micro-dissection is a key technology to permit differential analysis of N-glycans and glycolipids extracted from a small portion of tissue specimens, relatively large tissue specimens are required for conventional profiling techniques such as mass spectrometry and liquid chromatography. In this presentation, we will describe a simple but powerful method using an ultra-sensitive lectin microarray, which enables rapid and systematic differential glycan analysis targeting restricted regions of formalin-fixed tissue specimens. Using this advanced technology followed by an objective statistical analysis, we can select lectin probes to best fit subsequent enrichment procedures to identify target glycoproteins that discriminate diseased and normal regions in the tissue specimens. This work was supported by Medical Glycomics (MG) project in New Energy and Industrial Technology Development Organization (NEDO) in Japan.

Keywords: Glycan, Glycome, Tissue specimen