

Characterization of Stem Cells with Lectin Microarray

GlycoStation™ News
July 2009

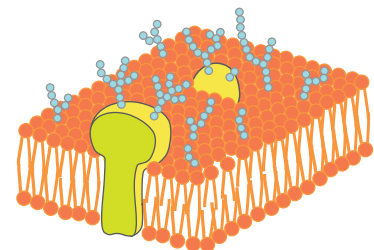
GP Biosciences

Cells in nature are covered with dense and various glycans. Glycans play a role in cell-cell communication, infection and immunity among many biological events. It is known that cell surface glycans are changed in differentiation. In this context, glycans on cell surface are regarded as a face representing each cell type and state. Recently, lectin microarray was developed as a powerful glycan analytical tool which can detect overall changes of glycans in cells and characterize cells including stem cells with a small amount of sample and in a short time.

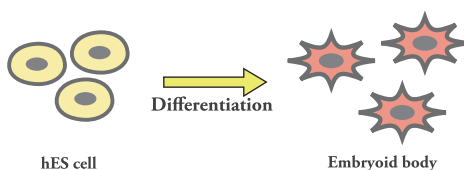
“ Excellent Tool for
Stem Cell Characterization
and Glycan Profiling. ”

Characterization of stem cells is an important issue. Quality control and standardization of the stem cells are strongly needed, when stem cells and its differentiated cells are applied to regenerative medicine. Therefore the criteria of cell which guarantee a quality and reproducibility of cells must be developed.

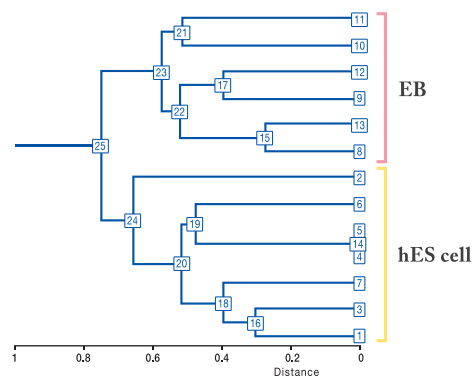
Glycans on cell surface play an important role also in stem cells. For example, SSEA-4, which is one of the specific surface markers of human embryonic stem (hES) cell, is a kind of glycolipid. In this case, glycans also play a crucial role as a face in hES cells. Applying lectin array to glycan profiling of stem cell, it is shown that undifferentiated hES cell and differentiated embryoid body are clearly discriminated with statistical analysis of the lectin microarray results (see the figure below). Also, lectin microarray is able to discriminate between hES cell and embryonal carcinoma cell. Hence we propose applying GlycoStation™ system to stem cell research as a check tool of cells.



Cell surface is covered with glycans.

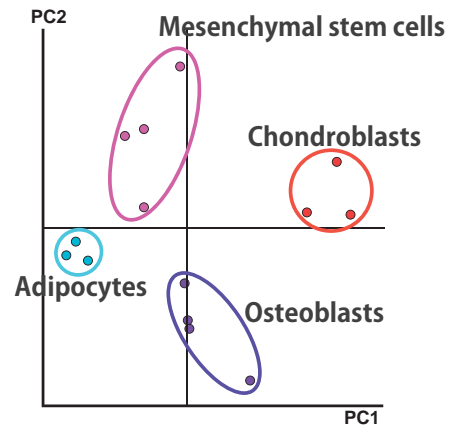
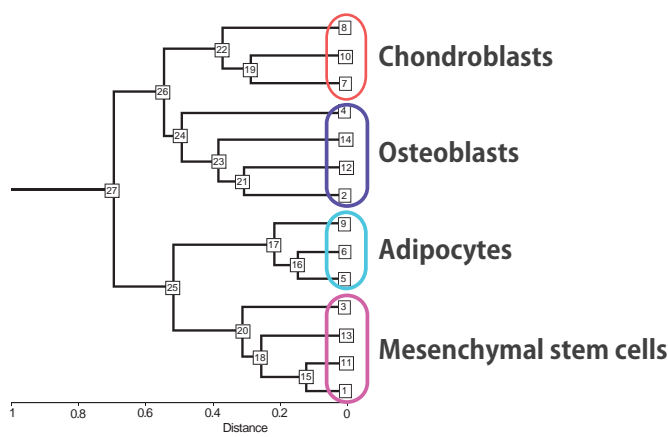


Glycome of cells change in differentiation.



Cluster analysis of hES cell and EB with GlycoStation™

Data provided from Dr. Akihiro Umezawa, National Research Institute for Child Health and Development, Japan.

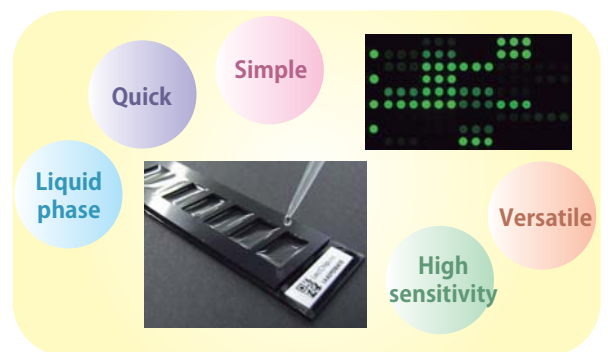


Clustering analysis and principal component analysis of mouse mesenchymal stem cells and differentiated cells with GlycoStation™.

Data provided from Dr. Akihiro Umezawa, National Research Institute for Child Health and Development, Japan.

Furthermore, GlycoStation™ can discern species and stages of cell. The figures above show results of multivariable analysis of mouse mesenchymal stem cells (mMSCs) and differentiated cells, which are pre-adipocytes, chondroblasts and osteoblasts, with lectin microarrays. In principal component analysis and hierarchical cluster analysis using NIA array analysis tool (Chapman, et al. 2001; Sharov, et al. 2005), the cells are divided into each group.

GlycoStation™ system with lectin microarray (LecChip™) is the best tool for profiling glycan structures of cell lysate, glycoprotein and so on. A protocol of GlycoStation™ is simple and no time-consuming.



Products

GP Biosciences Ltd. provides glycan profiling system GlycoStation™ consisting lectin microarray (LecChip™) and evanescent field excitation scanner (GlycoStation™ Reader 1200), and contract analysis service using GlycoStation™.

Lectin Microarray: LecChip™



LecChip™ is a high quality lectin microarray including 45 lectins. You can apply up to seven samples to one chip.

Evanescent Field Excitation Scanner: GlycoStation™ Reader 1200

GlycoStation™ Reader 1200 is the most suited microarray scanner for measuring interactions between glycans and lectins because it can measure fluorescent signals from a microarray in a liquid phase.



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