

HATANAKA LAB.

[Cell Engineering with Carbohydrates and Fluorous Solvents]

Department of Materials and Environmental Science

<http://www.chembio.t.u-tokyo.ac.jp/labs/hatanaka.html>

Biomaterial Engineering

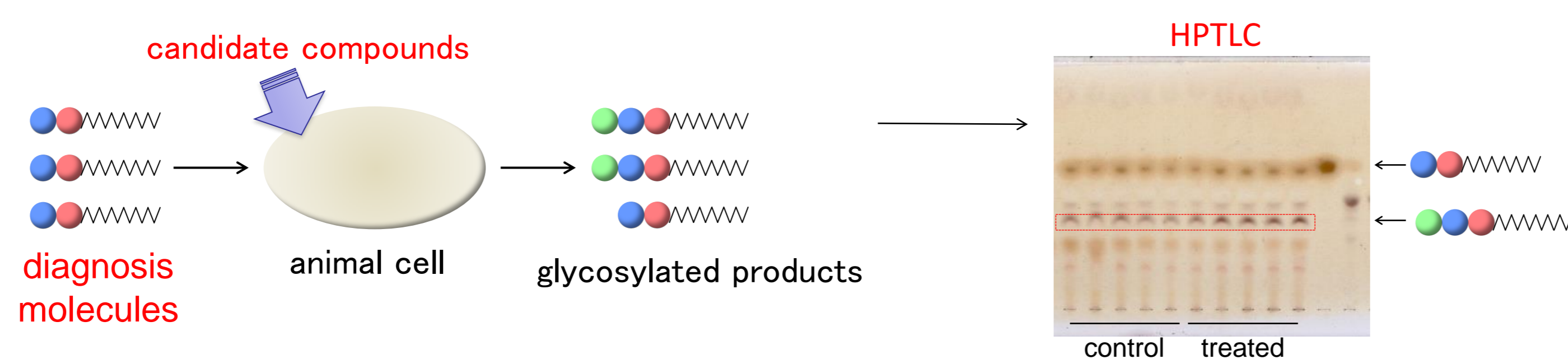
Department of Chemistry
and Biotechnology

Cell Engineering with Carbohydrates and Fluorous Solvents

◆ GlycoCompounds: Novel Method of Searching for Glycosylation-Regulating Compounds

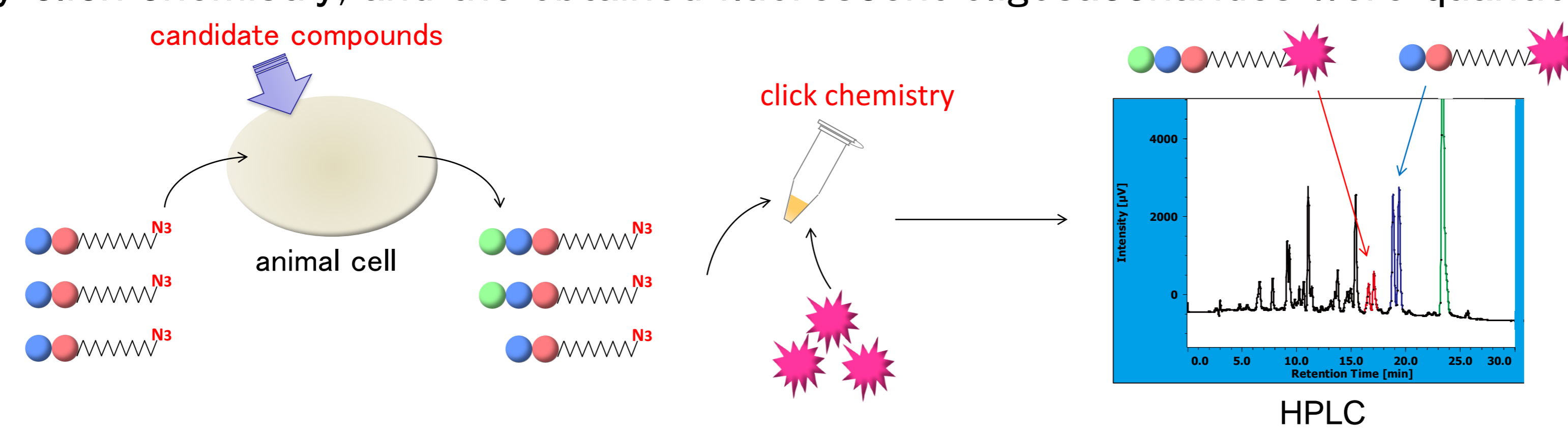
carbohydrate chain abnormality causes a disease → searching for glycosylation-regulating compounds

→ It is difficult to check quantitative change of carbohydrates in a cell. → **monitoring using diagnosis molecule!**

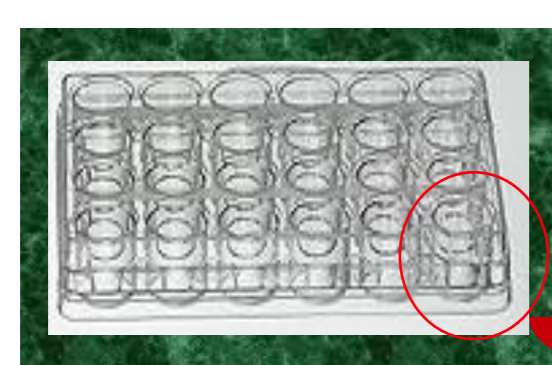


Advantages of this method are (1) detection without cell homogenization, (2) amplification of the signal, (3) detecting the effect on carbohydrate synthesis right after addition of candidate compound.

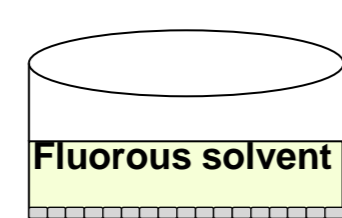
Moreover, the glycosylated products by using azidododecyl lactoside could be conjugated with fluorescent molecule by click chemistry, and the obtained fluorescent oligosaccharides were quantitatively analyzed by HPLC.



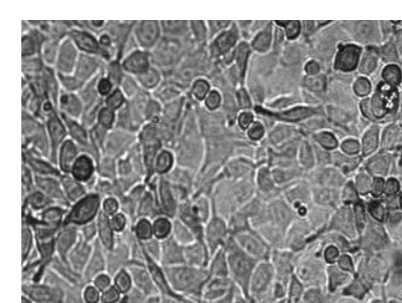
◆ Fluorous Compounds: Cell Culture in Fluorous Solvents



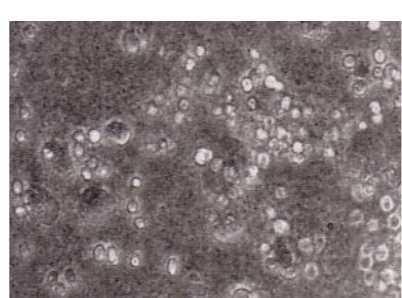
Mouse melanoma B16 cells
5 x 10⁵ cells/well
24-well dish
DMEM-F12 medium (1.5 mL)
37 °C, 5% CO₂



DMEM-F12



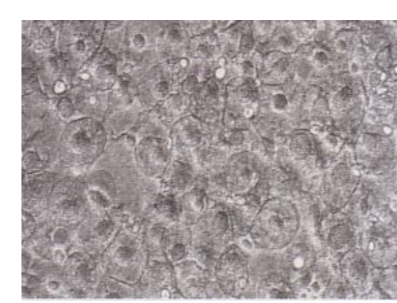
Water (Milli Q)



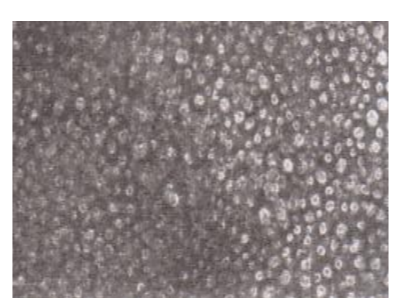
Phosphate Buffered Saline (PBS)



17.5 mM Glucose in water



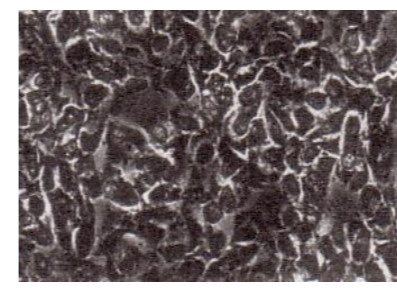
Ethyl pentafluoropropionate



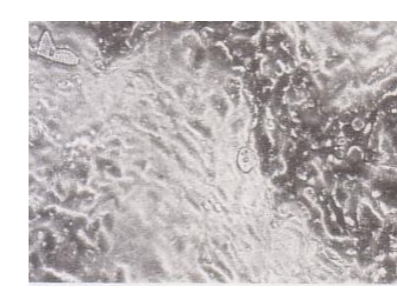
2,2,3,3,4,4,5,5-Octafluoro-1-pentanol



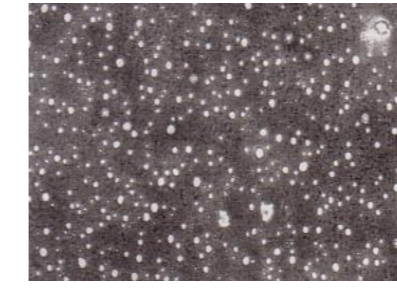
4,4,5,5,5-Pentafluoropentanol



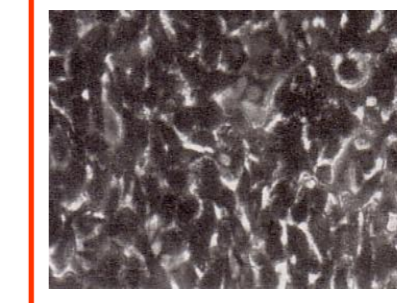
Perfluoromethylcyclohexane



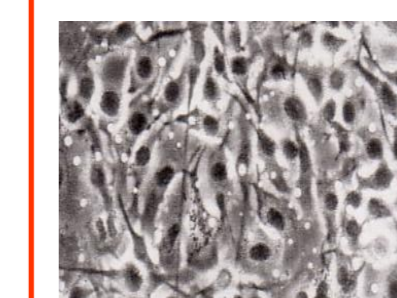
1,1,1,3,3,3-Hexafluoro-2-propanol



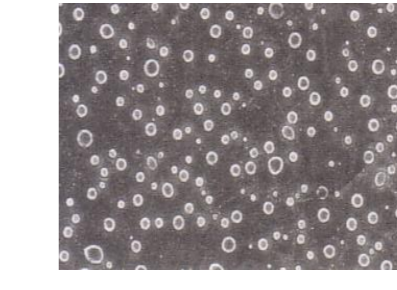
2,2,3,3,4,4,5,5,6,6,6-Undecafluoro-1-hexanol



2,2,3,3,4,4,5,5,6,6,7,7-Dodecafluoroheptanol



3,3,4,4,5,5,6,6,6-Nonafluoro-1-hexanol



Fluorous solvents contain high concentration of O₂.
→ Development of new cell culture system