Day / Date / Time:
Tuesday
3 July 2012
12:00pm – 1:00pm

Venue:
Dept of Microbiology Seminar Room
Blk MD4, Level 3,
5 Science Drive 2,
Singapore 117597

Convener:
Prof Naoki Yamamoto

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High Sensitive Detection Of Viruses Using Sugar-Chain Based Nanotechnology

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Abstract

Sugar-chains are increasingly being recognized as important partners in receptor-ligand binding and cellular signaling, and also known as low affinity receptor molecules for the viral infection. To analyze the sugar-chain's function at molecular level, we developed two tools, sugar chain-immobilized chip (named Sugar Chip), and sugar-chain immobilized gold nano-particle (SGNP). Sugar Chip can be used for the sensor chip of surface plasmon resonance apparatus for high-throughput analysis of proteins or viruses. SGNP can be used for the visual detection, since SGNPs lost the plasmon absorption when the interaction occurred between sugar-chains on SGNP and analyze in solution. Recently, it was found that SGNP was also useful for the capturing and concentration of viruses at a very low concentration. In the seminar, I will explain those two tools, and talk about the sugar-chain binding property and super high sensitive detection of influenza virus, human herpes virus (HHV), noro virus, and human immunodeficiency virus (HIV) using these tools. The detection method can be applied for improving the viral diagnostic and medical treatment. The tentative results of the on-going clinical researches will be also discussed.

Selected Publications

1. Suda, Y., Arano, A., Fukui, Y., et al., Immobilization and Clustering of Structurally Defined Oligosaccharides for Sugar Chips: An Improved Method for Surface Plasmon Resonance Analysis of Protein-Carbohydrate Interactions, Bioconjug. Chem. 2006; 17: 1125-1135.

2. Wakao, M., Saito, A., Ohishi, K, et al., Sugar Chips immobilized with synthetic sulfated disaccharides of heparin/heparan sulfate partial structure, Bioorg. Med. Chem. Lett. 2008; 18: 2499-2504.

3. Nakamura-Tsuruta, S., Kishimoto, Y., Nishimura, T., and Suda, Y., One-step purification of lectins from banana pulp using sugar-immobilized gold nano-particles, J. Biochem. 2008; 143: 833-839.

4. Saito, A., Wakao, M., Deguchi, H., et al., Towards the assembly of heparin and heparan sulfate oligosaccharide libraries: efficient synthesis of uronic acid and disaccharide building blocks, TETRAHEDRON 2010; 66: 3951–3962.

5. Zhang X, Nakamura-Tsuruta S, Haruyama M, et al. Super high sensitive detection of viruses using sugar-chain immobilized gold nano-particles (SGNP). Polymer Preprints 2012; 53: 671-672.