The Singapore Bioimaging Consortium (SBIC)
presents a seminar

on

"Solid-state NMR of Conjugated Polysaccharides and Polymers for Biomedical Applications"

Speaker: **Dr Marianne (Marion) Gaborieau**
Research Lecturer, Nanoscale Organisation and Dynamics Group
University of Western Sydney, Australia

Date : **Friday, 9 November 2012**
Time : **11.00am – 12.00pm**
Venue : **SBIC Seminar Room**
11 Biopolis Way
Level 2, Helios Building
Singapore 138667
(Please use Level 1 entrance)

Abstract

Synthetic and natural macromolecules are widespread in our everyday life, from plastics to starchy food, via adhesives, plants or drug delivery systems. Solid-state nuclear magnetic resonance (NMR) is an invaluable tool in the study of polymer materials: it yields molecular information on their structure and dynamics. They demonstrate the quantification of chemical functionalization on synthetic polymeric microspheres with solid-state NMR. These microspheres are widely used as stationary phases for chromatography, and have a strong potential for medical diagnostics or as drug delivery systems. We present the application of this approach to polyEGDMA microspheres functionalised with cisplatin for anticancer drug delivery. Another family of polymers will be presented: polysaccharides are renewable, cheap, biodegradable and biocompatible. Cellulose is the main component of plants and the most abundant polysaccharide. Chitosan is extracted from shrimp and crab shells, and has a strong potential for biomaterials. Grafting synthetic polymers onto chitosan or cellulose enhances their application properties such as mechanical properties and hydrophobicity. Grafting peptides onto chitosan is expected to promote cell adhesion for stem cell culture. Solid-state NMR is applied to chitosan and cellulose conjugates to reveal the grafting and investigate the grafting mechanism.

About the Speaker

Dr Gaborieau is a physical chemist and an analytical chemist. Her PhD work, at the Max Planck Institute for Polymer Research (MPIP, Mainz, Germany) under the supervision of Hans Spiess, was devoted to the characterization of structure and

dynamics in polyacrylics for paints and adhesives by solid-state NMR. She then carried out 5 years of research in Australia and Germany, at the Key Center for Polymer and Colloids (University of Sydney), the Centre for Nutrition and Food Sciences (University of Queensland) and the MPIP. She broadened her expertise to other polymers - polysaccharides such as starch for nutrition and bioplastics, their composites with synthetic polymers for paper coating, functional polymeric microspheres for chromatography and diagnostics - and to other characterization techniques - chromatography and capillary electrophoresis. Her research potential was recognized through the award of an Australian Postdoctoral Fellowship Industry (APDI) by the Australian Research Council. She holds a Research Lectureship in the Nanoscale Organisation and Dynamics Group, and School of Science and Health at the University of Western Sydney since February 2010. Her research is devoted to the characterization of complex (bio)polymers with advanced (solid-state) NMR methods. She has 30 international refereed journal publications, including 5 invited ones. She has 55 oral presentations at conferences since 2002 (including 2 invited keynotes). She is an occasional reviewer for several international peer-reviewed journals in the polymer and the magnetic resonance fields. She has been a visiting fellow at 4 universities and research institutes.

--- Admission is free and all are welcome ---