Canadian Association of Physicists

Association canadienne des physiciens et physiciennes

Contribution ID: **93** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

Binding of Proteins to a Phytoglycogen-Functionalized Surface Plasmon Resonance Sensor Surface

Thursday, 11 June 2020 12:36 (15 minutes)

Phytoglycogen is a highly branched polymer of glucose produced as soft, compact nanoparticles by sweet corn. Properties such as softness, porosity and mechanical integrity, combined with nontoxicity and biodegradability, make phytoglycogen nanoparticles ideal for applications involving the human body. Many of these applications rely on the binding of small molecules onto phytoglycogen nanoparticles. Surface Plasmon Resonance (SPR) is a sensitive experimental technique, based on the resonant absorption of light within an ultrathin gold film, that can be used to measure the binding kinetics and affinities of small molecules. We have successfully created a stable phytoglycogen-functionalized SPR sensor surface, using 4-mercaptophenylboronic acid as a linker between the gold layer and phytoglycogen. This has allowed us to use SPR to measure the association constant between phytoglycogen and Concanavalin A (ConA) to be $2.87 +- 0.44$ x 10^5 M^{-1} by fitting the data to the Langmuir adsorption model. By measuring the amide bands of ConA bound to phytoglycogen using infrared spectroscopy, we find that ConA maintains a large amount of its native beta-sheet content, suggesting that phytoglycogen helps to preserve its bioactivity.

Primary authors: Ms CHARLESWORTH, Kate (University of Guelph); Mr VAN HEIJST, Nicholas (University of Guelph); Mr AIDAN, Maxwell (University of Guelph); Dr GROSSUTTI, Michael (University of Guelph); Prof. DUTCHER, John (University of Guelph)

Presenter: Mr VAN HEIJST, Nicholas (University of Guelph)

Session Classification: DCMMP Best Student Oral Competition

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)