Faculté de pharmacie

Séminaire de l'axe

« Formulation et analyse du médicament »

Université de Montréal

« Biomaterials to Detect and Treat Disease »

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À l'invitation de la professeure Suzanne Giasson

My laboratory has focused on methods to detect and treat disease, primarily in the area of cardiovascular disease – the leading cause of death in the Western world. We were the first to report the generation of micropatterned cell sheets, which can be oriented and stacked into layers to generate hierarchical structures that mimic native tissue organization. This is important because tissues are known to exhibit complex yet organized structures that have been shown to underlie proper physiological function. In addition, we mechanically condition these cell sheets to mimic normal developmental processes. These studies are important not only for understanding the role of external mechanical force on cell response, but have practical use in future development of engineered tissues for pediatric vascular surgical repair that have the potential to grow with children suffering from congenital defects and would eliminate the need for repeated surgeries. We have also integrated the fields of biomaterials science and engineering with biophysics and colloid/polymer science into the nascent field of theranostics – combined therapeutics and diagnostics. One of our major accomplishments has been to enhance ultrasound contrast agent stability by incorporating novel polymerizable lipids and by optimizing (through theory and experimental validation) the polymeric surface coating of the microbubble. Such advancements are critical for success of translating targeted microbubbles to the clinic because current in vivo circulation lifetimes are much too short. We have also recently investigated effectiveness of ultrasound drug delivery systems in blood vessels-on-a-chip platforms. These studies provide an alternative to costly preclinical animal studies as 'on-chip' vessels possess many in vivo characteristics of blood vessels.