

Title: “Small biomaterial molecules achieving mighty outcomes”

Polymeric biomaterials are extensively used in the biomedical field because of their versatility in biological, chemical, and physical properties, which allow us to form and process them into all sorts of shapes that fit the needs of the application, e.g. scaffolds for tissue engineering bone, skin, heart valves; shunts and catheter lines; dental restorative materials; plates and screws for bone repair, etc. One feature that most of the materials in the latter applications have is that they are of high enough molecular weight, referred to as polymers versus oligomers (very low molecular weight) or macromolecules (very high molecular weight), to be physically self-supporting. This self-support feature results primarily through the additive Van der Waal's forces rather than covalent crosslinks which are typically associated with macromolecular structures. Over the past three decades, the Santerre lab has focussed extensively on the lowest molecular weight category of polymers, and more specifically oligomeric urethanes and diols (OGU and OGD, respectively), in order bring about innovative biomaterial technologies to the health care field. These small molecules cost pennies to synthesize but are immensely effective in biological function because of the diverse chemistry that they can carry, and their ease of mobility due to their size, hence giving them ease for commercial scaling and high economic value. OGUs and OGDs have been used to address blood contact challenges, infections, tissue engineering interface challenges, hard and soft tissue regeneration, and achieve drug delivery (pharmaceutical and biologicals). In all instances the materials have been patented, and have achieved or advanced towards commercialization through venture start up initiatives led by trainees from the lab. This talk will describe these mighty small oligomers and discuss their impact in the biomaterials field.