Contribution ID : **126** Type : **Oral**

Structural Insights into the Mechanism of Heat-Set Gel Formation of Polyisocyanopeptide Polymers

Thursday, 12 November 2020 09:00 (30)

One of the key factors influencing the mechanical properties of natural and synthetic extracellular matrices (ECM) is how large-scale 3D gel-like structures emerge from the molecular self-assembly of individual polymers. In this talk, I will report the new results on structural characterization of ECM-mimicking polyisocyanopeptide (PIC) hydrogels using small-angle neutron scattering (SANS). The evolution of structure as a function of concentration and background ions across the Hofmeister series will be examined. More specifically, the process of polymer assembly is uncovered by probing the structural features of the heat-set gels and correlating them with their rheological and micromechanical properties. The molecular parameters obtained from SANS show dramatic changes in polymer conformation which map onto the temperature-induced changes in rheological and micro-mechanical behaviour. The formation of larger structures are linked to the formation of cross-links (or chain bundles), whilst the onset of their detection in the SANS is putatively linked to their concentration in the gel. These insights provide support for the 'hot-spot' gelation mechanism of PIC heat-set gels. Finally, it is found that formation of cross-links and heat-set gelling properties can be strongly influenced by ions in accordance with Hofmeister series. In practice, these results have significance since ions are inherently present in high concentration during cell culture studies; this may therefore influence the structure of synthetic ECM networks.

Speakers Gender

Male

Level of Expertise

Experienced Research

Do you wish to take part in the poster slam

No

Primary author(s) : GAVRILOV, Mikhail (The University of Queensland, Brisbane)

Co-author(s) : GILBERT, Elliot (ANSTO); Prof. ROWAN, Alan (AAustralian Institute for Bioengineering and Nanotechnology, University of Queensland); LAUKO, Jan (ANSTO); Dr YAKUBOV, Gleb E (University of Nottingham)

Presenter(s) : Dr YAKUBOV, Gleb E (University of Nottingham)

Session Classification : Biomedicine & Food Science

Track Classification : Biomedicine & Food Science