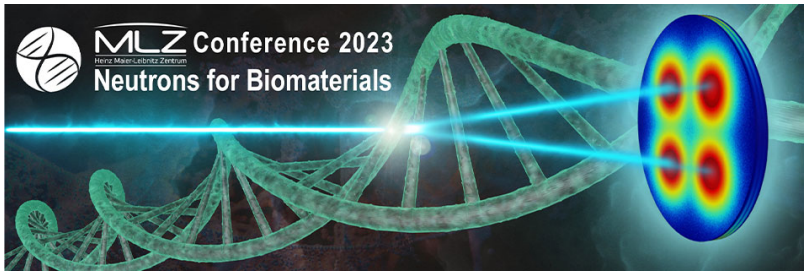

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Targeted drug delivery through nanoparticle optimization by small angle scattering

Monday, 22 May 2023 16:20 (20 minutes)

Effective therapeutics may be enabled by drug targeted delivery and optimized cellular penetration. Ideally drugs are specifically directed to the site of action to minimize side effects and optimize the therapeutic action. Off target drug delivery decreases the therapeutic index of a particular pharmacological treatment, particularly in the case of cyto-toxic drugs. In this work we have explored nanoparticles self-assembled from designer block co-polymers under specific solvent conditions as drug carriers. These particles offer an effective method to partition small hydrophobic drug molecules which can then be administered and target specific sites in the body. Small angle X-ray (SAXS) and neutron (SANS) scattering have provided important microscopic information to further optimize the delivery of drugs through the tailoring of particle morphology. Small angle scattering is ideally suited to probe particle structure and arrangements in situations which are close to physiological milieu. This perspective has been used to link particle morphology to two important aspects of targeted delivery: as a means to modulate the hydrodynamic interaction in blood flow for enhanced vascular delivery; and together with the locus of drug solubilization, these aspects have been correlated with cellular uptake and cytotoxicity.

Primary authors: Dr CAO, Cheng (University of NSW); GARVEY, Christopher (MLZ); Dr LOVEGROVE, Jordan (University of NSW); Prof. STENZEL, Martina (University of NSW)

Presenter: GARVEY, Christopher (MLZ)

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