NUS National University of Singapore | Department of Pharmacy, Faculty of Science

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S4A Level 3 Rooms A & B

Synthesis of advanced self-assembly nanobiomaterials for drug delivery applications: Can we balance innovation and translatability?

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Biography: Prof. Alejandro Sosnik received his Pharmacy degree from the University of Buenos Aires in 1994. After two years, he moved to Israel, receiving a Ph.D. in Applied Chemistry (polymeric biomaterials) from Hebrew University of Jerusalem (2003). In 2003-6, Prof. Sosnik spent a postdoctoral in the University of Toronto, Canada. Between 2006 and 2013, he was Assistant Professor of Pharmaceutical Technology at the University of Buenos Aires and Investigator of the National Science Research Council of Argentina. In 2013 he was appointed Associate Professor at the Technion-Israel Institute of Technology, where he founded the Laboratory of Pharmaceutical Nanomaterials Science. His research focuses at the interface of drug crystallization and processing, polymer chemistry, biomaterials science, nanotechnology and microtechnology, drug delivery and therapeutics. Prof. Sosnik is co-author of over 120 peer-reviewed articles, reviews and book chapters in areas of pharmaceutical research and development and innovation, and co-inventor in three patents.

Abstract: Poor aqueous solubility of drugs is one of the most challenging drawbacks in pharmaceutical product development. Different nanotechnology platforms have been developed to improve the biological performance of those drugs. Polymeric micelles (PMs), nanostructures generated by the spontaneous arrangement of amphiphilic copolymers blocks above the critical micellar concentration, have emerged as one of the most versatile ones owing the high diversity of hydrophilic and hydrophobic blocks and the chemical flexibility to tailor the amphiphilic structure (1). The low physical stability of PMs upon dilution in the biological environment is the most striking drawback. Moreover, PMs were mainly utilized for the intravenous administration of antitumorals drugs and not for mucosal routes because of two main limiting drawbacks: weak interaction with mucus and inability to sustain the release of the encapsulated payload over time. Finally, despite their high chemical functionality, PMs are not often designed to actively target specific cells populations. In this presentation, I will overview the different strategies pursued in my laboratory to design novel amphiphilic nanomaterials with improved features and thus, extend the application of this nanotechnology platform in drug delivery.

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References

1. Sosnik A, Temperature- and pH-sensitive polymeric micelles for drug encapsulation, release and targeting, In: Smart Materials for Drug Delivery, Alvarez-Lorenzo C, Concheiro A (Eds.), Royal Society of Chemistry, London, Chapter 5, pp. 115-147 (2013).

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