Anna S Vikulina, J Biotechnol Biomater 2019, Volume 9
DOI: 10.4172/2155-952X-C2-114

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The layer-by-layer technology: Design of novel soft, hard and hybrid advanced biomaterials for drug delivery

Now-a-days sequential deposition of naturally derived and oppositely charged biopolymers known as the layer-by-layer (LBL) technology became one of the key modern strategies for generating functional biomaterial coatings for diverse applications such as tissue engeenering, implant coatings and drug delivery. This was largely driven by the power of the LBL approach for biomimetics of extracellular matrix with a high precision at the nanoscale. The LBL technique has been also combined with a variety of soft and hard species including nanoparticles, carbon nanotubes, lipid bilayers in order to endow these hybrid materials with unique properties. More recently the LBL technology has been developed towards the coating of peculiar templates ranging from soft biomaterials (emulsions, liposomes and biological cells) to hard cores of sofisticated geometris (graphene, nanoparticles, inorganic crystals and their assemblies). This talk will focus on the design and applications of hybrid biomaterials made up taking advantage of the LBL approach. Among the variety of unconventional assemblies and architectures, coupling of the LBL coating with lipid and polymeric structures (soft), gold nanoparticles (hard-on-soft) and vaterite calcium carbonate crystals (hard) will be considered. Passive and active (temperature triggered) molecular transport within the LBL assembled structures will be addressed. Perspectives of the use of these hybrid assemblies will be highlighted.

Biography

Anna S Vikulina has completed her PhD in the field of Biological Science in Lomonosov Moscow State University, Russia. Currently, she is Marie-Curie Fellow in Fraunhofer Institute for Cell Therapy and Immunology, Potsdam, Germany. Her research is focused on the development of drug delivery carriers for controlled drug delivery and testing as well as for deciphering the pathways of biological action and transport of drugs. She has been awarded by prestigeous Alexander Von Humboldt and Marie-Curie Fellowships, served as a member of Organizing Committees at international conferences and scientific olympiads. She is also a guest editor in Micromachines Journal.

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