

July 12-13, 2018
Paris, FranceNano Res Appl 2018, Volume 4
DOI: 10.21767/2471-9838-C2-012

ADVANCED NANOMEDICINES FOR MODULATION OF THE INTERACTION WITH BIOLOGICAL BARRIERS

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In drug delivery field, bioavailability and specificity are key challenges in the establishment of advanced products. Nanoparticles have been proposed by our group as valid approaches to provide successful systems to deliver drugs to their site of action, particularly to explore no-invasive, mucosal administration. Besides the proper control of nanoparticle matrix to provide a suitable release of drug payload, the surface of nanoparticles has a major impact on the interaction with biological barriers. We have studied thoroughly the interaction of nanoparticles with cells and mucus regarding their adhesive properties that modulates their mucoadhesive behaviour, ultimately related with passive targeting to mucosae. Understanding how nanosystems interact with individual mucin chains and the 3D structure of mucus is paramount, as a passive functionalization of nanoparticles may concern, exploring different biomaterials as mucus-modulators. Our active targeting approach for nanoparticles has been focused on ligand molecules attached to the surface of nanoparticles to increase the probability of binding to unregulated cell membrane receptors in key local effector sites. New and less-explored receptors are being targeted in engineered nanosystems, providing enhanced local and intracellular levels of drugs, without compromise the safety of the systems. In this talk, application of nanosystems for mucosal delivery of drugs with physiological and social impact, developed in our research group, will be presented.

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