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In vitro biocompatibility and cell permeability study of biodegradable nanoparticles made of amino acid based poly(ester amide)

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Amino Acid Based Biodegradable (AABB) polymers are promising materials for sophisticated biomedical applications. We have already carried out a systematic study of the AABB polymers NPs' fabrication using a cost-effective method - nanoprecipitation (polymer deposition/solvent displace¬ment) from organic phase into water phase containing a surfactant. This study revealed that in terms of particles size, stability and biocompatibility the best appeared to be: as AABB polymer — poly(ester amide) composed of L-leucine, 1,6-hexanediol and sebacic acid — 8L6, as a solvent (organic phase) — DMSO, and as a surfactant — Tween 20. For *in vitro* biocompatibility assessment of the NPs several established cell lines have been used. In the initial experiments cytotoxicity level of the NPs has been checked only at one time point – after 24 h incubation with the NPs.

As a continuation of our research, we now have checked the biocompatibility of NPs made from 8L6 AABB polymer at longer incubation periods: up to four days of incubation (96 h). The experiments have been performed using three established cell lines, previously used by us for biocompatibility study at 24 hour time-point: A549 – human alveolar epithelial type II cells derived from lung carcinoma, Hepa1-6 – mouse hepatoma derived cells, RAW264.7 – mouse leukemic monocyte macrophage cell line. In parallel, NPs inside the outer, capsule-like layer of hepatic spheroids have been assessed using TEM. According to the obtained results, after 24 hours of incubation, NPs were visible as discrete particles inside the inner layers of hepatic spheroids.

Biography

Temur Kantaria has his expertise in the preparation and characterization of nanoparticles on the basis of amino acid based biodegradable poly(ester urea)s (MS thesis, 2015). Currently as a PhD student he is engaged in the preparation, modification and characterization of new biodegradable nano- and microparticles on the bases of amino-acid-based ester polymers (poly(ester amide)s and poly(ester urea)s).

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