Abstract Title

INTERACTION OF POLYELECTROLYTES AND THEIR MULTILAYER NANOCAPSULES WITH DIFFERENT TYPES OF LIVING CELLS

Symposium Track

Track 9 - Engineering Applications to Nanobiology

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Abstract body

Due to the shortage in donor organs for patients with severe diseases because of organ loss or misfunctioning (diabetes) new techniques for replacement must and have been developed. Apart from tissue engineering approaches also immune protection of xeno- or allo-transplants is a promising route to overcome the organ shortage. In this approach living cells or artificial tissue is microencapsulated with polymers or better polyelectrolyte droplets cross-linked electrostatically [e.g. 1,2]. This technique is more or less successful while the reason for graft failture and malfunction of the coated tissue is not completely understood. The same is true for studies in which surface modification in order to moderate cell adhesion [e.g. 3] or repulsion [e.g. 4] by means of polyelectrolytes play a role. Reasons for the adhesion or repulsion of cells are still under investigation.

Interactions and toxicity between polyelectrolytes and living cells an d also the reasons becomes more and more interesting. For the easy application of polyelectrolyte multilayer directly on the cells as a coating or on surfaces to which later cells adhere one used the electrostatically moderated Layer-by-Layer self-assembly due to charges on the cell or template surface [5]. This very close vicinity between a long-chain molecule with high charge density can cause changes in the membrane composition of the cells as well as influences the membrane potential.

The aim of the present work is to determine the different factors like contact area, charge and transplantation site that influence the cell reaction to a specific polymer. In order to understand the influence of the particles size we tested polyelectrolytes solutions, coated nanogold particles and coated calcium carbonate microparticles for toxicity to a confluent layer of endothial cells of the blood-barin-barrier. Moreover we tested polyelectrolyte in direct contact to a host (rat) and the immune response to the polymer coating. We found that toxicity is influenced by several factors and cannot be tested easily in a model [6].

Keywords

Layer-by-Layer, cytotoxicity, polyelectrolytes, nanoparticles, blood-brain-barrier, immune response

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