

Comparative study of an activity of rat spinal ganglion cells and PC12 cells on the surfaces modified with bioadhesive polymers

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Abstract

We studied the adsorption of bioadhesive polymers (polyornithine, gelatin, laminin) on polystyrene surface by the use of dynamic light scattering. The contribution of biopolymers to resulting zeta potential of the modified surface was assessed. PC12 cells do not exhibit selective adhesion in the presence of foetal bovine serum. Polystyrene with adsorbed polyornithine promotes primary adhesion of PC12 cells cultured in serum-free medium with nerve growth factor. Subsequently adsorbed laminin induces spreading and differentiation of the cells into neuronal direction. Primary neurons isolated from rat spinal ganglion adhere preferentially on the polyornithine-modified surface. On the polyornithine-laminin surface neurons intensively form neuritis that correlates with proliferation of glial cells positive for S100 protein. The results show that PC12 cells and primary neurons exhibit similar response to surface material with the latter cells being more sensitive to this factor. Isolated cell culture can be used to study the relationship between neurite outgrowth and Schwann cells proliferation on different biomaterials.

Keywords

Bioadhesive polymers, Biomaterials, Cell models, PC12 cells, Peripheral nerve, Regeneration