Preparation and characterization of biopolymer nanogels and growth of cancer cells in their presence

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Abstract

The effect of biomechanical signals induced by a non-toxic and biocompatible gel on Non-Small Cell Lung Cancer cells is investigated in this preliminary study. Gelatin type A, chitosan, and alginate were compared in a quantitative manner by means of rheology, in order to assess the most stable and easily prepared gel in physiological solution conditions for 3D cancer cell culturing. Crucial factors that influence the fabrication of the gel were examined and quantified, including gelation kinetics, reactants’ contact time, and temperature, leading to the development of an optimal research protocol. Alginate was found to lead to the most suitable physiological gels and its effect on the cancer cells was examined using flow cytometry. The results implied that alginate gels interfered with the cancerous cells’ growth rate, as the live cells’ percentage was far lower compared to the reference cell culture. Thus, alginate is a promising material for biomedical engineering applications concerning 3D culturing of cancer cells and its further research and optimization are strongly suggested.

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