Development of specific biopolymer scaffold formulations for supporting the growth and possible differentiation of sea cucumber Parastichopus tremulus cells.

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Résumé

Marine – derived polymers and bioactives are gaining increasing importance for the development of novel biomaterials, pharmaceuticals and biomedical device product alternatives. This is due to their unique and enhanced bioactivity, biocompatibility and, in some cases, providing specific interactive surfaces which can facilitate cell adhesion and proliferation. Currently, there are relatively few developments in marine cell cultures, and specific scaffold biomaterials supporting their growth and differentiation are of key importance. In our work we have focused on the development of a novel scaffold biomaterial, composed of a mix of bioactive peptides and fucoidan from the sea cucumber *Parastichopus tremulus*. This scaffold aims to support the establishment and possible differentiation of body wall cells, derived from the same species. For the purpose, different combinations of four custom synthesized bioactive peptides and fucoidan, isolated from the body wall of *P. tremulus,* as well as collagen I from skin of three commercially important Atlantic fish species (*Gadus morhua*, *Pollachius virens* and *Hippoglossus hippoglossus*), have been used for plate coating. Fucoidan has been isolated using preparative ion exchange chromatography (FPLC). As a control during the coating and cell growth trials cold water fish gelatin at 2% has been used. The increase of cell numbers, changes in cell size and morphology and attachment to the scaffold surface were monitored in several different culture media during the evaluation of the efficiency of the novel biopolymer formulations.

Mots-Clés: sea cucumber, Parastichopus tremulus, cell culture, scaffold, biomaterials, bioactive peptides, collagen, fucoidan

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