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Nanofibers based of titanium nanotubes as scaffolds for maintenance and differentiation of electrostimulated neural PC12 cells

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Various peripheral nerve injuries represent a relatively common medical problem caused by trauma, tumor resections or reconstructive surgery. Although the peripheral nervous system possesses the capacity for regeneration and repair, in many cases Walleian degeneration occurs, which leads to a limited functional recovery. In order to obtain therapeutical alternatives, without the complications presented by the use of autografts, a series of materials have been proposed, of which they point out the use of electro-active nanofibres which can guide axonal extension and pro-move of cellular migration. Several studies have demonstrated the possibility of using the PC12 cell line as model of electro-stimulation and differentiation to neural phenotype, which are grown in nanofibers as scaffolding material and exhibit a prolonged directed neurite outgrowth of the alignment direction of the nanofibers. In our research, we have developed a series of nanofibers produced by electrospinning, based on the use of titanium nanotubes and various polymeric matrices, including; polycaprolactone, polyvinyl alcohol and nanocellulose, which are capable of stimulating the neural differentiation of the cellular model composed of PC12 cells, those that show neurite growth as indicative of the effectiveness of differentiation. Our results show that the differentiation of PC12 cells depends on the concentration of titanium nanotubes, the polymer matrix and the diameter of the nanofibres.

Biography

Y Olguín has obtained his PhD in Biotechnology. He is working in the area of the generation of nanometric structures, both for the formation of biosensors and new materials for different private initiatives. Currently, he is a Researcher at Andres Bello University, in Chile, where he works in the generation of materials for the engineering of nervous tissue. He is the author of several articles.

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