Testing Rates/Voltages of Nanofibrous Mats for Dermal Tissue Engineering

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Regenerating human skin has become an increasingly interesting objective over the past few years. It has become very challenging to regenerate the best artificial skin substitute. The skin is the largest organ of the body and contains different layers. Its multilayered structure presents many challenges in constructing artificial skin. The research outlined in this report focuses on taking the first steps toward generating artificial skin by constructing fibers that are the basic foundation and nourishment for growing skin cells in artificial skin. This research has created an effective and innovative method to produce artificial skin that would be non-invasive, less harmful, less expensive and more comfortable for the patient. Briefly, the nanofiber mats are spun by an electrospinner. A solution of Polycaprolactone (PCL) and Collagen was used to construct the fibers. The goal of this project was to determine the best combination of rate and voltage for a nanofiber mat. By using a rate of 11μL/m and voltage of 15kv the electropsinner created a nanofiber mat that supported optimal growth of Human Dermal Fibroblast (HDF) cells which are the foundation for skin tissue engineering. Thus, by changing the parameters of rate and voltage, an ideal condition for generating nanofiber mats was established and can be used for future experiments generating denser, healthy artificial skin tissue.

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