

Nano-polycaprolactone fibers gellation with gelatin ground substance: Engineered skin extracellular matrix aims for using as tissue engineering skin

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This research is focused on the design of effective scaffold containing fiber and ground substance for dermis layer of skin. In this study, used Polycaprolactone(PCL) and gelatin as ECM fiber and ground substance, respectively. The blending of PCL/Gelatin scaffold at various of concentration of polymer in the order of 12 wt% PCL and 5 wt% Gelatin (1:1, 1:2 and 2:1) in tetrafluoroethanol (TFE) solvent compared with 12 wt% PCL alone. The mixtures were then fabricated with various electrospinning parameters was studied. In order to enhance a material pore size supporting cell migration, modified ground surface was electrospun using rubber pattern to obtain a proper woven fibers sheet. The efficient ground substance was then created by gellation of the gelatin fiber to insert the sheet. Morphology observation presented the successful of the ground substance creation that the scaffold structure occurred gels infiltrated between fibers absolutely by optical microscope and scanning electron microscope (SEM). The other characterization including pore size, porosity, cytotoxicity test, water absorption, the biodegradation and mechanical strength was studied also. For cellular biocompatibility test, our engineered scaffold was co-cultured with primary human fibroblasts. The results showed that the migration and proliferation of cell can be found. Taken together, our preliminary result shows that addition of ground substance component, gelatin, can support cellular migration and proliferation, which are important factors for wound healing. Further study is to co-culture dermal scaffold with primary human keratinocyte cells to create epidermis layer to be full-thickness skin for advance clinical application.

Biography

Oraphan Chaisiri has completed Bachelor's Degree of Medical technology from Mahidol University, and is studying Master's Degree of Biomedical Engineering in same university

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