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Cellulose Acetate Nanofiber Modification for Regulating Astrocyte Activity via Simple Heat Treatment

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Abstract : Central nervous system (CNS) consists of neuronal cell and supporting cells. Astrocytes are the most common supporting cells and play roles in metabolism between neurons and blood vessel. For this function, engineered astrocytes have been studied as a therapeutic source for CNS injury. In neural tissue engineering, nanofiber has been suggested as an effective scaffold for providing structure and mechanical properties influencing physiology. Cellulose acetate (CA) has been investigated for material to fabricate scaffold because of its biocompatibility, biodegradability and fine thermal stability. In this research, CA nanofiber was modified via heat treatment and its effect on astrocyte activity was evaluated. Adhesion and viability of astrocyte were increased in proportion to stiffness. Additionally, expression of GFAP, a marker of astrocyte activation, was increased via stiffness of scaffold. This research suggests a simple modification method to change stiffness of CA nanofiber and shows cellular behavior affecting stiffness of three-dimensional scaffold independently. For the results, we highlight that the stiffness is a factor to regulate astrocyte activity.

Keywords : astrocyte, cellulose acetate, cell therapy, stiffness of scaffold
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