# Poly(dopamine) coating of electrospun PLA fibers for bone tissue engineering

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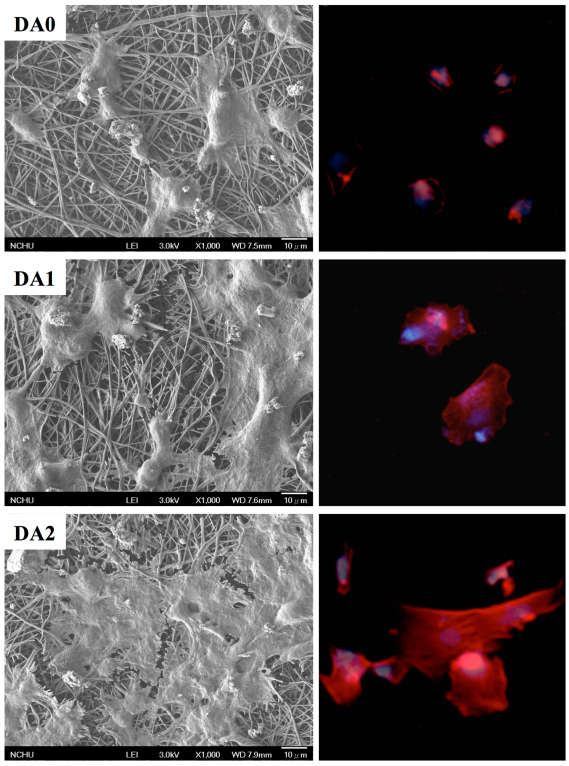
Electrospinning is a versatile technique to generate large quantities of micro- or nano-fibers from a wide variety of shapes and sizes of polymer. The aim of this study is to develop functionalized electrospun nano-fibers and use a mussel-inspired surface coating to regulate adhesion, proliferation and differentiation of human adipose-derived stem cells (hADSCs). We prepared poly(lactic acid) (PLA) fibers coated with polydopamine (PDA). The morphology, chemical composition, and surface properties of PDA/PLA were characterized by SEM and XPS. PDA/PLA modulated hADSCs' responses in several ways. Firstly, adhesion and proliferation of hADSCs cultured on PDA/PLA were significantly enhanced relative to those on PLA. Increased focal adhesion kinase (FAK) and collagen I levels and enhanced cell attachment and cell cycle progression were observed upon an increase in PDA content. In addition, the ALP activity and osteocalcin of hADSCs cultured on PDA/PLA were significantly higher than seen in those cultured on a pure PLA mat. Moreover, hADSCs cultured on PDA/PLA showed up-regulation of the ang 1and vWF proteins associated with angiogenesis differentiation. Our results demonstrate that the bio-inspired coating synthetic degradable PLA polymer can be used as a simple technique to render the surfaces of synthetic biodegradable fibers active, thus enabling them to direct the specific responses of hADSCs.




**References**

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