

PROCEEDINGS**Electroactive Biomaterials for Stem Cell Regulation and Wound Healing****Hanbai Wu^{1,*}**¹City University of Hong Kong (Dongguan), Dongguan, 523000, China

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ABSTRACT

In recent decades, electroactive biomaterials have demonstrated significant advantages in the fields of stem cell regulation and tissue repair. Their unique feature lies in their ability to mimic the natural electrophysiological microenvironment of the human body by generating weak electrical signals in response to mechanical stimuli. This effectively promotes stem cell adhesion, proliferation, and directed differentiation, ultimately achieving efficient tissue regeneration. To address the limitations of traditional wound dressings, such as low healing efficiency, single functionality, and insufficient anti-infection capacity. Our team employed electrospinning technology to fabricate electroactive nanofiber membranes using biocompatible piezoelectric materials, including polyvinylidene fluoride (PVDF) and polylactic acid (PLA). These nanofiber membranes combine excellent flexibility, electroactivity, and multifunctionality. They can respond to or conduct weak electrical signals under physiological conditions, precisely replicating the natural electrical microenvironment of human tissues. This approach offers a novel strategy and technical pathway for the precise regulation of stem cells and the repair of various types of wounds.

KEYWORDS

Biomaterials; surface treatment; stem cell regulation; wound healing

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