PVDF-PPy Nanofibric Membranes for Peripheral Nerve Lesion Treatments

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Peripheral nerve lesion treatments attract extensive attention. One of the most promising treatments is guidance scaffold [1-3]. It promotes cell adhesion and proliferation and their axonal growth to distal stump. PVDF was chosen as the scaffolding material due to its flexibility and piezoelectric effect. Several research showed that PVDF membrane was capable of stimulating nerve tissue regrowth [4-6]. For the tissue growth, a uniform growth is needed for some case. However, PVDF based membrane promote the localized tissue growth due to the fact that charge generated by piezo effect is dependent on the stress, which is not uniform. Here, a new membrane based on core-shell structure is prepared. The core-shell structure utilized PVDF as the core and conductive polymer, PPy, as the shell. Therefore, charge generated by piezo effect at one location can redistribute through surface of membrane. Coaxial electrospinning was utilized to form two types of flexible PVDF-PPy core-shell nanofibric membranes, random fiber (RF) and aligned fiber (AF). AF was achieved by a rotating collector. This structural anisotropy leads to conductivity in certain direction and also promotes cell regeneration along axonal direction. To achieve optimized result, different specimens were fabricated using different concentration of PPy or PVDF. Morphology of the specimens were observed by Scanning Electron Microscope. Conductive properties of the specimens were studied by Impedance Analyzer.

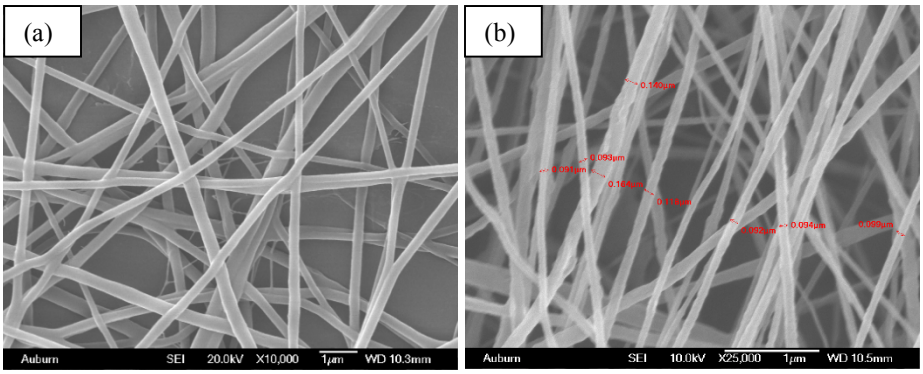

Figure 1. Microstructure of PVDF-PPy nanofibric membranes (a) Random fiber and (b) Aligned fiber

Reference

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