Title: **Xenogeneic decellularized extracellular matrix-based biomaterials for peripheral nerve repair and regeneration**

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Abstract:
Peripheral nerve injury could lead to either impairment or a complete loss of function for affected patients, and a variety of nerve repair materials have been developed for surgical approaches to repair it. Although autologous/allologous tissue-derived biomaterials remain preferred treatment for peripheral nerve injury, the lack of donor sources has led researchers to explore more other biomaterials. As a reliable alternative, xenogeneic decellularized extracellular matrix (dECM)-based biomaterials have been widely employed for surgical nerve repair. The dECM derived from animal donors is an attractive and unlimited source for xenotransplantation. Meanwhile, as an increasingly popular technique, decellularization could retain a variety of bioactive components in native ECM, such as polysaccharides, proteins and growth factors. The resulting dECM-based biomaterials preserve tissues' native microenvironment, promote Schwann cells proliferation and differentiation, and provide cues for nerve regeneration. Although the potential of dECM-based biomaterials as a therapeutic agent is rising, there are many limitations restricting its use, such as poor mechanical strength and tenability. Incorporating dECM into some synthetic materials may endow dECM-based biomaterials with better mechanical properties. These hybrid biomaterials hold the advantages of both types of materials, including the machanical and material properties of synthetic materials, and bioactivities of dECM. Similarly, the scaffolds also manifest the disadvantages of both materials, for example, the host inflammatory response to many synthetic materials and the biological variability of dECM. Thus, there are still many problems to be solved for peripheral nerve repair with dECM-based biomaterials in the future.