

Abstract

Exploiting the Power of Decellularized ECM for Periodontal Tissue Regeneration [†]

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Abstract: Periodontitis is a worldwide prevalent infectious disease that causes the destruction of periodontal tissues and can lead ultimately to tooth loss. The goal of periodontal treatment is to control the infection and reconstruct the structure and function of all periodontal tissues, including cementum, periodontal ligament fibers and alveolar bone. However, most of the treatments, such as the use of membranes and bone grafts, lack bioactive signals that accelerate the process of tissue regeneration and cannot repair the attachment of periodontal tissues to teeth, leading to tooth loss. Therefore, it is imperative to exploit alternative strategies to repair the structure and function of all periodontal tissues. Decellularized extracellular matrix (dECM) has been proven to be a promising biomaterial by providing a suitable microenvironment to support cell proliferation and differentiation. We explored dECM-derived scaffolds, such as sponges, to recreate the cell niche of periodontal tissues. Our findings demonstrated that incorporation of dECM derived from periodontal ligament stem cells (PDLSCs) promoted significant cell proliferation and enhanced osteogenic/periodontal differentiation of PDLSCs. Overall, dECM-scaffolds have the potential to be used as novel ‘off-the-shelf’ biomaterials, providing a biomimetic microenvironment that may contribute to improve health care of patients suffering with periodontal diseases.

Keywords: periodontitis; periodontal tissue engineering; periodontal ligament stem cells; biomaterials; extracellular matrix



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