A Method of Creating Well-Structured Matrix for Dental Tissue Regeneration

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Technology description

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Well-Structured Matrix for Dental Tissue Regeneration

Overview

Millions of patients have dental caries and periodontal disease which can lead to tooth loss and influence the quality of life for these patients. Current treatments are limited in the ability to recover the biological function of the original tooth. The disclosed invention is a method to prepare biomimetic synthetic matrix that modulates the formulation of new dental tissues with the same structures to those of natural tooth counterparts.

Technology

The invention describes a novel method for preparing a biodegradable, biomimetic matrix which provides structural support and biophysical signals for regenerating dentin, pulp, and other periodontal tissues that have been damaged by dental caries and periodontal disease. The synthetic matrix mimics natural dental extracellular matrix and can lead to a well-organized dental tissue regeneration, including tubular dentin and periodontal ligaments. In addition, the matrix biodegrades as it is replaced by the regenerating dental tissue. This novel technique uses electrospinning and laser ablation to synthesize the matrix for dental tissue regeneration.

This technology is of great interest because current dental caries and periodontal disease treatments are limited in their abilities to regenerate tissue with the same structures and functions to the natural tooth counterparts. The method can be used for clinical treatment to regenerate dental tissue for patients with dental caries or periodontal disease to prevent tooth extraction or further dental diseases.

Advantages

Biomimetic: mimics natural growth of dental tissue
Biodegradable: matrix biodegrades as it is replaced by the regenerated tissue
Tissue regeneration: regenerated tissues have the same structures to their natural counterparts

Institution

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