**Laser Cutting as a Method of Creating Perforations**

**in Engineering a Regenerative Biomaterial for the Periodontal Ligament**

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Periodontitis is a common and progressive disease characterized by the degradation of the periodontal ligament and alveolar bone that anchors a tooth in place, which often leads to the eventual loss of the tooth. In addition to mechanical stability, the periodontal ligament is important for absorbing forces associated with mastication and providing sensory information about tooth position. Current therapies focus on stopping the progression of periodontitis rather than the regeneration of the tissues and often consist of complicated and expensive dental procedures. In contrast, we are approaching the treatment of periodontitis through a regenerative therapeutics lens which utilizes a triphasic and electrospun gelatin-based biomaterial scaffold that promotes the regeneration of the periodontium through biomimetic design. We are currently focusing on recapitulating the periodontal ligament by creating perforations in our nanofiber scaffolds through laser cutting that mimic the native region. Through an iterative design process, we are refining our laser cutting method fabrication parameters to create these perforations, cell culture seeding methods on to perforated scaffolds, and observing the consequent cell behavior and response.

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