“EndoGel: A Smart-Material System for Regenerative Dental Applications”

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Dental caries has estimated prevalence of over 90% of adults in western countries. If not treated early, caries can progress from enamel into dentin, leading to necrosis of the dental pulp (the living part of the tooth) which require root canal treatment. Several millions of teeth are treated for 'root canals' each year, and the approach is to completely remove the infected or necrotic pulp tissue and replace it with an artificial cement. This results in complete elimination of the biological response of the tooth, generally leaving it in a weakened state, more prone to fracture and tooth loss. We have developed innovative strategies that have high translational potential for the treatment of caries-affected root canals at different stages of the disease. The proposed technology, EndoGel, consists of an intra-oral application kit for delivery of a patent-pending photo-curable hydrogel material for regenerative applications. The EndoGel is synthesized with a gelatin backbone, and retains a set of biologically active moieties that we have optimized for enhanced cell proliferation, attachment, spreading, viability, vasculature formation, odontogenic differentiation, and many other biological processes. We have also obtained NIH (R01) funding to support many of the basic science developments surrounding this material. Thus we envision that the requested funds will enable us to address specific questions that pertain to product development and commercialization. In summary, we are convinced that the current opportunity will enable us to launch the commercial development of an exciting and feasible solution for an unmet need in dental and craniofacial therapies.