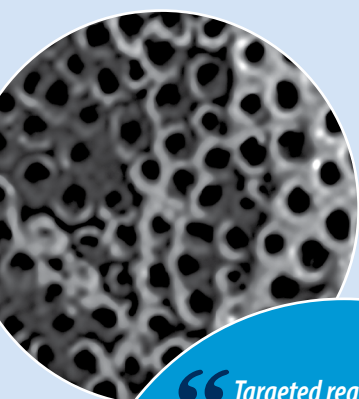


Targeted Remineralization Treatment Using Mineral Loaded Starch Nanoparticle



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“ Targeted regeneration of enamel will allow for more natural repair of dental caries using painless and non-invasive treatment, reducing discomfort during dental procedures, preserving dental tissue and improving long term oral health of patients. ”



<https://greenmark.bio>

Clinical Need

Over \$200 Billion is spent globally on dental caries and its complications, the most prevalent chronic disease worldwide. Disease management is moving away from surgical to a more medical approach, but the challenge is that there are no effective ways to monitor treatment success, and there are no FDA-approved nonsurgical caries treatments. Off-label methods include professionally applied fluoride varnishes, prescription and OTC fluoride toothpastes, and calcium phosphate remineralization agents. However, these are unable to regenerate enamel within the depth of subsurface carious lesions.

Solution

Small fluoride and mineral-loaded starch particles have been developed by GreenMark Biomedical Inc. and its University of Michigan collaborators for treatment of non-cavitated carious lesions. These particles have been designed for targeted delivery to the enamel subsurface. Two caries-targeting products have emerged, one based on fluoride free mineral-loaded particles, and its fluoride-containing analog. Subsurface remineralization was demonstrated for both using enamel density measurements, as well as the occlusion of dentinal tubules, key to treatment of dentinal hypersensitivity.

Competitive Advantage

While traditional fluoride treatments merely impact the extreme surface layer of enamel lesions, targeting to the dominant subsurface lesion is expected to enable a superior non-surgical dental treatment. High localized concentration of minerals and fluoride is expected to facilitate tooth structure regeneration through formation of hydroxyapatite-like crystals, yielding superior remineralization of lesions compared to other available treatments.

ITP Support

The support from the ITP program has helped advance the technology with access to critical expertise and facilities, continued technical, regulatory, clinical and marketing validation.

Clinical Translation Pathway

Publications: Jones et al. Nanoparticle-based targeting and detection of microcavities. [Adv Healthc Mater 2017](#)

Targeted Enamel Remineralization with Mineral-Loaded Starch Particles. [IADR 2021](#)

IP: US10,987,434 Detection and Treatment of Caries and Microcavities with Nanoparticles

Anticipated regulatory pathway: De Novo 510(k) Class II (tooth structure regeneration)

Anticipated commercialization strategy: Direct sales force currently being developed by GreenMark for LumiCare™ product, complemented with distribution agreements with global strategic partner(s).

Michigan-Pittsburgh-Wyss Regenerative Medicine Resource Center is supported in part by the National Institute of Dental & Craniofacial Research of the National Institutes of Health under Award Number U24DE026915 and U24DE029462. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

