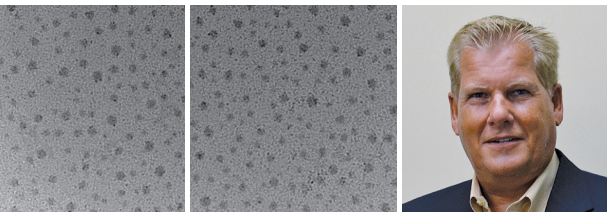


# Targeted Remineralization Treatment Using Mineral Loaded Starch Nanoparticles



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*“Targeted nanoparticle based 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.”*

<http://greenmark.bio>

## CLINICAL NEED

Dental caries, caused by the demineralization of enamel, is the most common chronic disease worldwide. While caries is often treated surgically, recent treatment methods include the non-invasive approach of mineral ions and fluoride delivery using professionally applied fluoride varnishes, prescription and over-the-counter fluoride toothpastes, and calcium phosphate-based remineralization agents. However, these treatments are unable to regenerate enamel within the depth of subsurface carious lesions.

## SOLUTION

GreenMark Biomedical Inc. has developed targeted biodegradable nanoparticles capable of delivering minerals and fluoride specifically to enamel, for in-office treatment of non-cavitated carious lesions (“pre-cavities”). The same technology platform is also being used in the development of a diagnostic product which illuminates carious lesions using a standard dental curing lamp to allow earlier detection of pre-cavities. The nanoparticles consist of starch, readily degraded by natural amylase enzymes in saliva, and their specific adhesion defines the interior lesion sub-surface morphology. While traditional fluoride treatments impact the surface of enamel lesions, this targeted delivery of minerals and fluoride to the dominant subsurface lesion is expected to enable a superior non-surgical dental treatment.

## COMPETITIVE ADVANTAGE

High localized concentration of these minerals and fluoride is expected to facilitate tooth structure regeneration through nucleation and targeted formation of hydroxyapatite-like crystals to improve efficacy, lower the required therapeutic dose, and minimize reliance on patient compliance, yielding superior remineralization of lesions compared to other available treatments.

## ITP SUPPORT

The support from the ITP program is expected to advance the technology with continued technical validation and development of regulatory and marketing strategies.

## CLINICAL TRANSLATION PATHWAY

### Publications:

Nanoparticle-Based Targeting and Detection of Microcavities. Adv Healthc Mater 2017.

### Intellectual Property:

US15/331,408 Detection and treatment of caries and microcavities with nanoparticles

### Regulatory Pathway:

Anticipated: Device, 510(k)

### Commercialization Strategy:

In development with the MPWRM Commercialization/Market Needs Core and dental marketing partner firm

### Product Launch Strategy:

In development with the MPWRM Commercialization/Market Needs Core and dental marketing partner firm

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