

Title

Self-assembling peptides to support remineralisation of tooth lesions – a biomimetic approach

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ABSTRACT

Rationally designed β -sheet-forming peptides that self-assemble to form three-dimensional scaffolds under defined environmental conditions have been shown to nucleate hydroxyapatite *de novo* and to have potential applications in mineralized tissue regeneration. Early reports provided indirect evidence for *in situ* enamel regeneration following infiltration of caries-like lesions with monomeric solutions of the self-assembling peptide P11-4. Following these encouraging results, a first-in-man proof of clinical efficacy study was conducted using P11-4 to determine its effect on class V enamel lesions. Fifteen adult volunteers, each with at least one class V “white spot” enamel lesion received a single application of aqueous P11-4 delivered directly onto the lesion surface. Our hypothesis was that conditions within the lesions would trigger peptide assembly to provide a “matrix” for *de novo* mineral deposition, mimicking the action of enamel matrix proteins during tooth development. Early results suggest that a single application of P11-4 can be beneficial in the treatment of early caries lesions and that self assembling peptides are candidate materials for mineralized tissue regeneration and repair.