

## Biomimetic Mineralization - Novel Strategies for Hard Tissue Regeneration in Dentistry

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### Abstract

The State-of-the-Art for the treatment of decayed dental hard tissue has not changed for many decades and focuses on drilling & filling procedures. Novel non-, or minimal-invasive techniques are pushing on the market with the aim of preserving the tooth structure. Credentis has developed, on the basis of an intelligent self-assembling peptide, a new generation of biomimetic mineralization agents with the ability to effectively regenerate defective enamel or dentin tissue.

This biomimetic mineralization agent, a self-assembling peptide – the main component of Curodont Repair –diffuses into the subsurface porous structure of the decayed tooth. Due to the lesion's chemical environment of low pH and high ionic strength, the peptides assemble into a 3-dimensional scaffold. In the course of weeks, the formed scaffold attracts calcium and phosphate ions from the patient's saliva, first nucleating hydroxyapatite crystals and later supports secondary crystal growth. The self-assembling peptide in Curodont Repair was rationally designed with the aim, to present surface charges in such an arrangement, that *de-novo* nucleation and crystal growth of Hydroxyapatite is triggered and favoured over other forms of calcium phosphate.

*In vitro* studies have shown that the peptides are able to diffuse deep into a lesion body and induce biomimetic mineralization deep within the tooth structure

Clinical studies have shown that within one to six months after a single application of the mineralization agent signs of increased mineralisation in the decayed area can be observed. This has been shown both radiological for proximal caries lesions and visually by decrease in the size of white spot lesions on the surface of the tooth.



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