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Scientific Innovation

Periodontitis is an inflammation of the periodontium caused by the invasion of pathologic bacteria between the gum and the tooth crown. Further progression of the disease leads to the degradation of collagen fibers of the periodontal ligament and alveolar bone. Severe cases results in tooth lost can result. Due to microbiological colonization and defect size therapeutically intervention is necessary. The new treatment strategy based on an injectable self assembling peptide system serves as an extracellular matrix (ECM) where cells are able to adhere and to proliferate into newly synthesized tissue. In order to figure out which peptides are most suited for the task, the 3D in vitro model system was designed.

PROJECT GOAL

Injected Self-Assembling Peptide (SAP) with the fibrillary structure (Fig1) enhanced the cells migration (Fig 2) and build up of ECM e.g. collagen 1 (Fig 3)

KEY FINDINGS

Migration:
The in vitro model of a periodontal pocket was used to assess the migration distance of periodontal ligament fibroblasts (PDLF) out of the donor compartment. With P11-8 and P11-4 a migration distance of over 2 mm could be reached.

Proliferation and ECM production:
Bone cells grow and build up ECM so they are able to adhere and to proliferate into the newly synthesized tissue.

Business Potential

The global need for periodontal regenerative methods is urgent and huge. Periodontitis is the number 6. disease worldwide. As there is no convincing device on the market that leads to the healing of periodontitis, there is a strong need for a less painful and less invasive treatment than those currently standards.

Conclusion

P 11-4 and P 11-8 are the most suitable candidates for the regeneration of the periodontal defect.

Strength of peptide approach:
- Peptide has a hydrogel-character
- Covers the gap between dentin and gingiva or bone
- Less painful
- Free of animal or human proteins
- Fast application (within 5 minutes)

Changes of peptide approach for regeneration:
- Treatment of mild-moderate periodontitis
- Compatible with other regenerative biomaterials
- Possible to functionalize as a drug delivery system
- Expansion of credentis’ product portfolio