Alexandria, Va., USA – Today during the 43rd Annual Meeting & Exhibition of the American Association for Dental Research, held in conjunction with the 38th Annual Meeting of the Canadian Association for Dental Research, Daniel Huy Nguyen, The Forsyth Institute, Cambridge, Mass., will present research titled “Novel Pro-Resolving-Medicines in Periodontal Regeneration.”

Uncontrolled host defense mechanisms can significantly impede tissue engineering, regeneration and reconstruction of oral and craniofacial tissues. The anti-inflammatory and pro-resolving actions of lipoxins and resolvins have already been documented in several preclinical models of inflammatory diseases including periodontal disease. The aim of this study was to evaluate the potential of Novel Pro-Resolving-Medicines (NPRMs) containing a lipoxin A4 (LXA4) analog in periodontal regeneration.

Polymorphonuclear leukocyte-derived NPRMs were developed to deliver the LXA4-analog to the site of surgery for the purpose of controlling inflammation and promoting tissue and bone growth. A mini-pig-model of chronic periodontitis was surgically created and progressed into chronic periodontal infrabony defects using wire ligatures. Sites (n=16) were treated with reflection of mucoperiosteal flaps, debridement of the periodontal defect and placement of 1) control, 2) NPRM, 3) LXA4 analog and 4) NPRM+LXA4 analog.

The animals were followed for three months. Clinical evaluations of periodontal measures were obtained and bone blocks were harvested containing surgical sites and subjected to micro-CT, histological and histomorphometric analyses.

Periodic clinical evaluations revealed that LXA4-analog treated groups exhibited complete wound healing with reduced inflammation when compared to control and NPRM-alone. All treatments showed significant pocket depth reductions without any statistical difference. Hematoxylin and Eosin stained sections from NPRM+LXA4 showed a well-organized and newly-formed interproximal bone close to the notch marked at surgery. Linear measurement of the distance between notch and bone crest in NPRM+LXA4 group revealed significant bone fill compared to control (0.6 ± 0.8mm vs. 0.075 ± 0.5mm, respectively; p<0.01). Van Gieson-stained undecalcified sections demonstrated similar findings with new bone and new connective tissue formation at the NPRM+LXA4-treated sites. Further, micro-CT reconstruction of 3D morphology revealed complex anatomical structure and guided histological evaluation.

These findings indicate that NPRMs control local inflammation and accelerate tissue regeneration during wound healing. This study was supported by NIH NIDCR grants DE19938; DE023584, DE018917.

This is a summary of abstract #755, “Novel Pro-Resolving-Medicines in Periodontal Regeneration,” which will be presented on Friday, March 21, 2014, 8 a.m. – 9:30 a.m. at the Charlotte Convention Center, room 203A.

About the American Association for Dental Research
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