

Musculoskeletal Disease and Regeneration

May 05-06, 2016 Chicago, USA

Acceleration of de novo early bone defect healing following application of s-nitroso glutathione *in vivo*

Xin Wang^{1,2,3}, Ross Crawford², Paul Masci³ and Yin Xiao²

¹Zunyi Medical College, China

²Queensland University of Technology, Australia

³Translational Research Institute, Australia

Introduction: Rapid formation of a fracture hematoma has been reported to be instrumental for limitation of local hemorrhage within the damaged fracture zone. Previously, studies showed that clots with thinner and denser fibers were present in delayed bone-healing defects compared to ones within natural healing defects, indicating that the intrinsic architecture of the fibrin matrix is most likely to influence osseous union. Here, we tested whether s-nitrosoglutathione (GSNO), a modifier of fiber thickness, can accelerate de novo bone formation process.

Methods: Cylindrical defects (3-mm-diameter, 2-mm-depth) were symmetrically created in rat model. After local injection of different concentrations of GSNO (0, 0.1, 1 and 10mM) within the defects, new mineralized bone tissues were quantitated using micro-CT at day 7 and 28 postoperatively. Furthermore, histologic evaluations were performed with hematoxylin-eosin and safranin-o-staining at the same periods.

Results: Micro-CT scans revealed that bone volume to total volume ratios (BV/TV) were significantly increased by all tested GSNO compared to controls at day 7 ($p < 0.01$). Similarly, there was a significant increase in BV/TV in both 0.1 and 1mM GSNO groups compared to controls at day 28 ($p < 0.05$). However, there was no significant difference in new bone accumulation in 10mM groups ($p > 0.05$). Besides, the histological assessments were consistent with radiographic outcomes.

Conclusions: The local use of 1mM GSNO can substantially facilitate the healing process in both early and late stage, which may be a potential reagent for bone regeneration in the case of large bone defects.

Biography

Xin Wang is undertaking a PhD candidature for 3 years at University Queensland of Technology under supervision from Professor Yin Xiao (Bone group leader). He has published more than 10 conference papers and 4 journal articles in orthopedic fields and has been serving as a reviewer in *Chinese Journal of Traumatology*.

x56.wang@hdr.qut.edu.au

Notes: