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The influence of collagen membranes and tetracycline on the PDGF-BB expression and osteoblast amount in bone defects healing: Experimental study in mice

Agus Susanto^{1*}, Susi Susanah², B.P. Priosoeryanto³,
Mieke Hemiawati Satari⁴

¹Department of Periodontics Faculty of Dentistry Universitas Padjadjaran, Indonesia

²Department of Pediatrics Faculty of Medicine Universitas Padjadjaran, Indonesia

³Department of Veterinary Clinic Reproduction and Pathology Faculty of Veterinary Institut Pertanian Bogor, Indonesia

⁴Departement of Oral Biology Faculty of Dentistry Universitas Padjadjaran, Indonesia

Abstract : Introduction: Collagen membranes have been used in Guided Tissue Regeneration and Guided Bone Regeneration methods. Collagen membranes immersed in a tetracycline solution before the application is able to slow down the degradation of the membrane. Tetracycline is an antibiotic that has widely used in periodontal treatment, with an antibacterial effect that inhibits an MMP matrix which giving therapeutic advantages in the regenerative procedures. The objective of the study was to evaluate the effect of collagen and tetracycline membranes on the tissue regeneration by analyzing the PDGF-BB expression and osteoblast cells in the bone healing process. **Methods:** This study was an experimental study conducted on 48 male Wistar rats, divided into four treatment groups. The P1 group was the group with collagen membrane added with tetracycline; the P2 group was with collagen membrane collagen without tetracycline; the P3 was without any collagen membrane or tetracycline; the P4 group was without membrane but with tetracycline. Animal testing was conducted to see the effect of collagen and tetracycline membranes on wound healing by measuring the PDGF-BB expression, and the number of osteoblasts. Bone defects were made in the mandibular bones of mice, the PDGF-BB expression was analyzed by immunohistochemistry, and the histologic number of osteoblasts was analyzed with HE histological preparations. The examination or measurement of these parameters was performed on the third, seventh, fourteenth, and twenty-first days. All data were collected and analyzed statistically by using the ANOVA and t-test. **Results:** From the statistical analysis were obtained that the PDGF-BB expression among the treatment groups was $p = 0.0003$; the number of osteoblasts $p = 0.001$. The results of the correlation analysis of the PDGF-BB expression with osteoblast number was $p = 0.001$; $r = 0.64$. **Conclusion:** Collagen membrane with tetracycline was able to increase the PDGF-BB expression and the number of osteoblasts in the wound healing process.

Keyword : Collagen membrane, PDGF-BB expression, wound healing, osteoblast.

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