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The Effect of BMPs and Nano rotile Titanium for Ectopic Osteogenesis in Geloteo Femoral Muscle of Rat and Rabbit

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Background: Tissue engineering is a widespread challenged and controversial discussion field, that has been contained the widespread and complete discussion in recent decades. Further reading, emerging Nanotechnology science that live the dribble of new science in recent decade, with emphasis of properties change and nature of ingredients is one of main scapegoat of tissue engineering discussion.

Objectives: This study was the first to evaluate the effect of BMPs and nanorotile titanium particles on the permeability of muscle cells for ectopic bone formation in Rat and rabbit gluteofemoral muscle.

Methods: This experimental double blind study was conducted on 42 rats divided into 6 groups of 7 each and12 rabbits that divided into 3groups of4 each. The first 3 groups of rats and whole of rabbit(right side of Geloteofemoral muscle) received an injection of 200 ng BMPs with 0.1 mg nano r-titania particles and the remaining 3 groups of rats and whole of rabbit(left side of Geloteofemoral muscle) received 200 ng BMPs in 0.4 mg normal saline. Rats and rabbits were euthanized 7, 14 and 21 days post-operation and evaluated in terms of presence of tissue changes like necrosis, inflammation, and formation of fibrous or calcified tissue under a light microscope with X40, X100, and X400 magnification. The obtained results were analyzed with Hosmer-Lemeshow, chi square and Wilcoxon tests. Results of the 2 groups were analyzed and compared using Mann Whitney U and Kruskal-Wallis tests.

Results: No statistically significant differences were detected between the subgroups of our 2 main understudy groups of rats. But, the two groups of rats and rabbits with BMPs + nanorotile titanium and BMPs alone showed significant differences over time.

Conclusion: Rats do not have sufficient number of efficient receptors for BMPs in muscle tissue. Even by using nanorotile titania particles for increasing the permeability of cells, BMPs was not able to induce muscle cell differentiation to initiate calcification process. While the BMPs can conducted the osteogenesis in rabbit. So Our study suggested the increase of cell penetration by Nano rotile Titanium particles.

Keywords: Nano rotile titanium, BMPs, Ectopic osteogenesis