

The Effect of Silver Ions Improved Oxydic Glass upon Bone Healing in Rats

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The regenerative capacity of the bone is known to be influenced by some factors like the perfect immobilisation of bone edges, with their correct alignment, and the use of some products that can improve the regeneration and bone remodelling process.

Nine female rats, aged 4 months, weighting between 180-210 grams and clinically healthy were taken into study. Six rats represented the experimental group, while 3 formed the control group. Under general anesthesia, on the femoral diaphysis, a 1,6 mm wide bone defect was achieved by using a stomatological (dental) drill, following method of Oana et al. (2011). In the case of the experimental group, silver ions improved oxydic glass, pulvis obtained at the Departament of Biofisics of FMV Cluj, was placed in situ.

Using histological exams, healing of the bone defect was monitored at 2, 4 and 6 weeks postdefect. In this study, bone regenerative processes followed the „stable fracture repair” principle, according to which there was a direct forming of spongy bone tissue, without endochondral osification.

The results prove that, compared to the control group, the silver ions improved oxydic glass, used on the defects of the experimental group, increased the bone regeneration process speed, by direct osteoblastic stimulation, probably as a consequence of the induced inflammatory process and its biochemical status. In time, cells on the macrophages line were capable of degrading the glass fibres, reducing the inflammatory process, therefore proving that the oxydic glass is biodegradable.

Compared to the control group, the silver ions improved oxydic glass used on the defects of the experimental group, determined the forming of a more resistant bone tissue, presented histologically as bone structure tissue disposed circularly around the fracture area, structures that increase the resistance of the bone fracture area. Already at six weeks postdefect, in the case of the experimental group, forming of hidroxiapatitis crystals was observed, demonstrating a connection between silver ions improved oxydic glass and bone tissue.

Keywords: rats, bone fracture, silver ions improved oxydic glass