

## Epigallocatechin-3-gallate improves the biocompatibility of bone substitutes in dental pulp stem cells

### ABSTRACT

In case of critical-sized defects in bone, the use of biomaterials may be required in order to restore adequate bone amount, quality, and morphology. Recently, some investigations suggested that Epigallocatechin-3-gallate (EGCG), can have beneficial effects on bone metabolism, including the regulation of imbalances between osteoblast and osteoclast activity, the increase of osteoblast proliferation, and the improvement in osteogenic differentiation. The aim of this study was to assess the *in vitro* effect of bovine (BioOss®, Geistlich Pharma AG., Wolhusen, Switzerland), porcine (OsteoBiol® Gen-Os®, Tecnos®, Giaveno, Italy) and beta-tricalcium phosphate (Cerasorb M®, Curasan, Kleinostheim, Germany) bone substitutes, and their combination with polyphenol epigallocatechin-3-gallate (EGCG), upon cultured dental pulp stem cells (DPSCs). The effects were evaluated based on cell viability/cytotoxicity assay (MTT, cell viability staining test), cell migration, scanning electron microscopy (SEM), and alkaline phosphatase (ALP) activity. Even if BO and CE produced negative effects upon cell viability and migration, and GO and CE resulted in deficient cell adhesion, all the tested biomaterials showed no negative effects upon ALP activity. EGCG promoted an overall increase in ALP activity and reverted the cytotoxic effect and the loss of migration capacity in the BO and CE groups, and improved cell adhesion in the GO and CE groups.

### CONCLUSIONS

In their conclusion, the Authors underlined that the main limitation of the study was the fact that the results obtained could not be compared with those of other studies, due to the lack of similar publications. Anyway, based on the results, they concluded that *“the use of EGCG, thus, appears to be a promising strategy for restoring and enhancing the osteoconductive properties of BO, GO, and CE in bone regeneration treatments”*.

### LABORATORY TESTS

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### Material tested

BONE SUBSTITUTE  
**OsteoBiol® Gen-Os®**