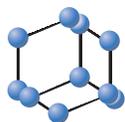


RESEARCH ARTICLE


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SCIENCE**

Improving Bovine Bone Mechanical Characteristics for the Development of Xenohybrid Bone Grafts



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Abstract: Background: The further functionalization of natural existing biomaterials is a very efficient method to introduce additional advanced characteristics on a unique structural composition and architecture.

Objective: As an example, different animal sources, if properly treated, can be used to develop bone xenograft active in hard tissues regeneration. In this sense, it is also important to consider that the selected process has to take into consideration the intrinsic variability of the base material itself and possibly being able to compensate for it.

Methods: In this work we characterize cancellous bovine bone treated by deposition of polymer and collagen and we show that the added components not only lead to a more resistant and more hydrophilic material, but also reduce the conventional correlation between apparent density and elastic modulus, which, in general, is a major source of uncertainty and risk in xenografts usage.

Results: Moreover, though intrinsically reinforcing the material, the deposition process leaves the specific open-porous structure, that allows cells proliferation and vessels ingrowth, basically unaltered.

Conclusion: The final material combines in a single piece and at the same time, mechanical resistance, homogeneous mechanical response and proper structural characteristics that allow further integration within the patient autochthonous tissues.

Keywords: Hard tissues regeneration, xenografts, tissue engineering, biomaterials, bovine bone, biopolymers.

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