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Undifferentiated adult human Mesenchymal Cells (ahMSCs) response on a novel graphene coated – nurse´s a phase bio-ceramic

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It is well known that Si- Ca-P bio-ceramics are promising bioactive materials for bone tissue engineering, particularly for bone repair. Recently, it has been reported that graphene can be used as an additive to improve the properties of composites due to its biocompatibility and it has been proposed for a number of biomedical applications. Graphene has remarkable mechanical properties, which makes it potentially a good reinforcement in ceramic composites. It also has unique electrical and thermal properties, which makes it attractive filler for producing multifunctional ceramics for a wide range of applications. It has been shown that Graphene Oxide (Go) and reduced graphene oxide (r-Go) can promote biological interactions due to its many surface functional groups and serve as a carrier for drugs and other biomolecules. In addition, Go regulates the proliferation and differentiation of cultured mesenchymal stem cells. In this work, we have optimized the graphene coating of a Si-Ca-P bioceramic, obtaining scaffolds totally covered by a thin layer of graphene oxide and reduced graphene oxide. *In vitro* assays with adult human mesenchymal stem cells (*ah*MSCs) showed that A-Go stimulates cellular proliferation more than A-Gr the first days of culture. This could support the theory of other researchers that indicates that Go mainly stimulates cell proliferation, while r-Go favors cell differentiation.

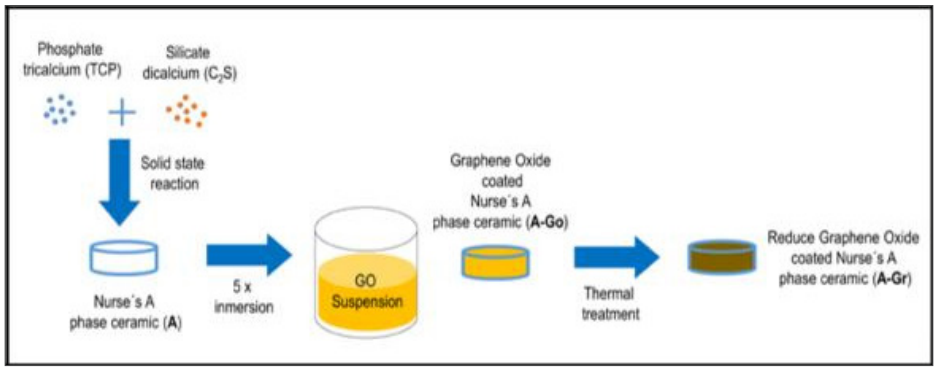

Figure: Synthesis of graphene coated Nurse´s A phase

Biography

Ruben Rabadan Ros is a Post-doctoral Researcher who has his expertise in Tissue Repair and passion in improving the health by the study of Organ and Tissue Regeneration. In his short career, he has focused in bone, ligament and cartilage regeneration, and he has helped to develop scaffolds based on the C2S-TCP phase diagram and combination bio-ceramics with fibroin, specially testing their biocompatibility and osteointegration by *in vitro* and *in vivo* studies.

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