De Aza P N et al., J Material Sci Eng 2017, 6:4(Suppl)
DOI: 10.4172/2169-0022-C1-071

In vitro behavior of nurse's A phase$_{ss}$, a new calcium silicophosphate ceramic for bone tissue engineering

De Aza P N[1], **Rabadan-Ros R**[2], **Mazón P**[1], **Serena S**[3], **Sainz M^{a}A**[3] and **Meseguer-Olmo L**[2]
[1]Universidad Miguel Hernández, Spain
[2]Universidad Católica San Antonio de Murcia, Spain
[3]Instituto de Cerámica y Vidrio, Spain

In the present study, a new single phase Si-Ca-P based ceramic (called Nurse´s Ass) was obtained and it´s *in vitro* behaviour for potential bone tissue regeneration was explored. Porous Si-Ca-P (Nurse´s Ass) single phase ceramic was obtained from high temperature sintering of γ-dicalcium silicate and β-tricalcium phosphate previously synthetized. The apatite-mineralization ability and dissolution rate have been systematically studied by immersion of the material in simulated body fluid (SBF) for several periods of time. A massive formation of a new dense calcium deficient hydroxyapatite (CDHA) layer was observed at the SBF-sample interface. Adjacent to the dense CDHA layer a porous structure has been developed parallel to the interface which is formed by pseudomorphic transformation of the Si-Ca-P (Nurse´s Ass) into CDHA. In addition, cell attachment test showed that the new material supported the adult human bone marrow-derived mesenchymal stem cells (hMSCs) adhesion and spreading; the cells established close contact with the ceramic surface in an extended culture of 28 days (Figure 1). In view of the results, Nurse´s Ass ceramic should be an effective substrate promoter of bone tissue regeneration suitable for bone tissue bioengineering. Future performance should be led using standard biomaterials, such as Si-HA or Si-TCP. The Nurse´s Ass biological performance should be investigated as proposed in International Standard ISO-10993-5.

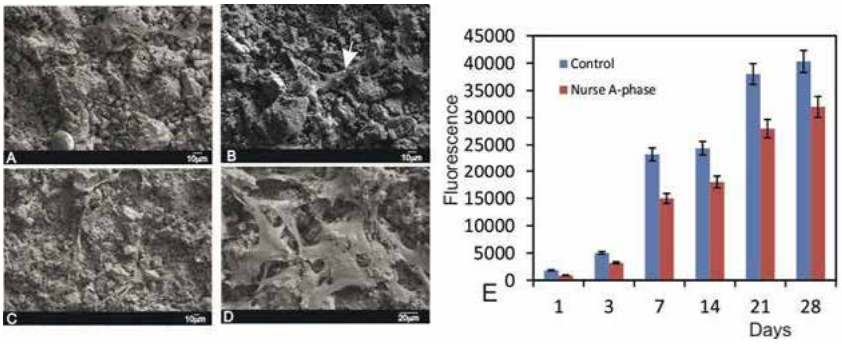

Figure 1: SEM images of the hMSCs-A cultured in standard conditions on Nurse´s Ass ceramic surface at (A) 24h, (B) 7 days (C) 15 days (D) 28 days. and (C) Proliferation rate of hMSCs seeded and cultures on ceramics and plastic at all-time points. Data represent the Mean ± SD, [* ($p<0.05$)].

Biography

De Aza P N studied Chemistry-Ceramics at the Santiago de Compostela University, where she received her Doctoral Degree in 1995. She did a Postdoctoral stage at the IRC in Biomaterials at the Queen Mary & Wetsfield College, University of London (UK) working on *in vitro* and *in vivo* behavior of Bioceramics. At this moment, she is the Chair of the Materials Science, Optic and Electronic Technology Department, Professor of Materials Science and Metallurgical Engineering and Researcher at the Bioengineering Institute at the Miguel Hernandez de Elche University.

piedad@umh.es

Notes: