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Eutectoids: A new bioceramic materials for bone tissue engineering

Bone tissue engineering provides an alternative way to repair diseased or damaged tissue and to recover its original state and function. In the tissue engineering approach, a highly porous artificial material, or scaffold, is employed as a template to facilitate the cell attachment, proliferation, and differentiation. Therefore, these materials must satisfy the requirements of biocompatible, osteoconductivity, controlled degradation, and provide adequate mechanical properties. A new route for obtaining bioactive ceramic materials, to improve the ingrowth of new bone into implants (osseintegration), is presented. This consitits of attaining eutectoid structures from selected systems bearing in mind the different bioactive behaviour of the phases. To this purpose the subsystem silicocarnotite- α-tricalcium phosphate was chosen because of the first is bioactive and the second resorbable. The eutectoid material is formed by lamellae type microstructure of alternate layers of silicocarnotite and α-triclacium phosphate. The eutectoid material, *in vitro* esperiments, tranforms dissolving the α-tricalcium phosphate phase and forming, by pseudomorphic transformation of the silicocarnotite lamellae, a porous structure of hydroxyapatite, that mimic porous bone. The procedure developed by the authors opens the opportunity to obtain a new family of bioactive materials, with improved osseointegration, for which the general name of bioeutectoid® is proposed.

Recent Publications

1. D W Hutmacher (2000) Scaffolds in tissue engineering bone and cartilage, Biomaterials 21: 2529-2543.
2. Martinez I M, Velasquez P and De Aza P N (2012) The sub-system α-TCPss-Silicocarnotite within the binary system $Ca_3(PO_4)_2$-Ca_2SiO_4. J.Am.Ceram.Soc. 95(3):1112-1117.

Biography

P N de Aza has received her Doctoral degree in Chemistry-Ceramin 1995. She did a Postdoctoral stage at the IRC in Biomaterials at the Queen Mary 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.

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