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Aula Magna

Roma Via don Carlo Gnocchi, 3

New Trends in Biomaterials Research - Potential of Bioceramics

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ABSTRACT

The development of new biomaterials for medical applications has become a need in the present. A significant numbers of biomaterials including metals, ceramic, polymers, composites and some nanomaterials exist and are used for current and potential applications in different medical specialities like orthopaedics, dentistry, cardiovascular surgery, general medicine. This review focuses on the currently used biomaterials as well as the novel technologies used for biomaterials processing, with a special attention to the bioceramics.

The surface properties of the implants have been recognized to play an important role in interactions with human tissues and cellular response. The surface modification and adhesion phenomena will be reviewed and discussed with particular reference to their relevance in biomaterials-tissue interactions phenomena.

Different practical examination of surface modified biomaterials will be presented in order to show the advantage given by the advanced microscopically techniques used for surface analysis. Emerging nanobiomaterials and nanotechnologies and all of its outstanding features have the potential to add new dimension in medicine. Nanoparticles of various compositions represent the most widespread use of nanoscale units in medicine and some of them are currently being used in different applications, especially in dentistry. In addition, some concerns and limitations of the currently and novel biomaterials and further research on it will also be discussed.

In conclusion, extensive studies on some promising biomaterials are essential in terms of biocompatibility, structure and properties in order to make them clinically viable. This review focuses on some potential and promising biomaterials and ongoing research on them.

SHORT C.V.

Professor Dr. Ing. habil. Iulian Antoniac is a materials science engineer working in the field of biomaterials and medical devices. Professor Antoniac is the leader of Biomaterials Group from Faculty of Materials Science and Engineering, University Politehnica of Bucharest, Romania. He completed his PhD in Materials Science and Engineering from University Politehnica of Bucharest (UPB), Romania, in 1998.

After several specialization in laboratories from Switzerland, Portugal, France, and USA, on surface analysis, implant design and biomaterials characterizations, his scientific interest spans from the synthesis and characterization of biomaterials and interactions with living tissues, retrieval implant analysis, ceramic coatings on metallic biomaterials, to the biodegradable magnesium alloys, new composites and scaffolds based on nanostructured and biologically inspired biomaterials for bone regeneration.

Also, he received in 2013 his post-doctoral degree in Materials Science and Engineering from UPB, and completed his habilitation in 2015 (habilitation thesis was focused on Orthopedic Biomaterials). His professional and scientific activity comprises: handbooks/textbooks (8) including publication of a book entitled "Biologically Responsive Biomaterials for Tissue Engineering" (Springer, 2012), papers published in SCI journals (50), papers in the conference proceedings (180), inventions (7), international or national research projects (76), member of the scientific committee of different meetings (30), president of international conferences (6), member of the International Editorial Board and reviewer for many journals and conferences on biomaterials and bioceramics, member of different scientific associations.

Also, he is the vicepresident of the Romanian Society for Biomaterials (SRB) and past president of the International Society for Ceramics in Medicine (ISCM). Professor Antoniac has been invited to deliver plenary or keynote lecture to different international conferences, coordinate many Erasmus agreements and give invited talks in other universities.