

# 20<sup>TH</sup> ANNUAL WORLD DENTAL SUMMIT

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### **Innovative nanostructured biomaterials for hard tissue implants**

For early biomaterials, it was required to have a combination of physicochemical properties, suitable to replace human body tissues and to be biologically inert. Recent advances in cellular proteomics and genomics paved the way to the 4th generation of biomaterials, known as biomimetic and smart, and to their application in regenerative medicine. Titanium is extensively used for dental implants due to its outstanding mechanical characteristics and acceptable biocompatibility. However, properties of (metal implant/native hard tissue) interface can be improved, if titanium is properly treated and/or coated by bioactive materials, with the scope to optimize the long-term characteristics of implant and to elicit an improved cellular response. Among bulk materials, scaffolds, coatings and cements, doped calcium phosphates and glass-ceramics are investigated. Substituted calcium phosphates can endow coatings with particular properties from antibacterial to the magnetic one whereas, the focus point of bioactive glass-ceramic materials is their ability to continuously exchange ions with physiological liquids and to release appropriate trace elements stimulating cellular response, aimed to activate genes responsible for osteogenesis and tissue regeneration. The results of the present study suggest that novel nanostructured coatings can be particularly relevant for new strategies in tissue regeneration and replacement, ensuring necessary structural, chemical, morphological and mechanical characteristics, and improving the osseointegration of dental implants. Following the requirements of the modern biomedical technology, the novel research strategies in biomaterials field are nowadays directed towards biomaterials possessing characteristics suitable for drug delivery and for the controlled release of active principles, especially against infections.

### **Biography**

Julietta V Rau is Head of the Research Group at Institute of Structure of Matter-Italian National Research Council, Rome. She is an Author of more than 110 publications in international journals. She is Chair and Organizer of the biennial BioMaH "Biomaterials for Healthcare" international conference, member of international scientific committees of various international conferences and Editorial Board Member of several international journals. Her research interests include "Innovative biomaterials for regenerative medicine, bioactive nanostructured coatings for dental implants and cements for hard tissue applications".

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