

# Enhancing antibacterial effects of bioactive glasses by phytotherapeutic agents

Aldo R. Boccaccini

*Institute of Biomaterials, University of Erlangen-Nuremberg, 91058 Erlangen, Germany*

## Abstract

Bioactive glasses (BGs) are promising biomaterials for a variety of medical applications, including bone filling granules, small bone implants, dental and orthopedic coatings as well as scaffolds for soft and hard tissue engineering. An extra functionality of BGs, especially considering their ability to release biologically active ions in a controlled manner, is their antibacterial effect. The combination of BGs with other biomaterials, such as polymers and natural biological agents, is being increasingly investigated to provide additional antibacterial behavior in antibiotic free strategies. In this presentation, a series of novel BG-based scaffolds coated with natural polymers loaded with phytotherapeutic molecules will be discussed. The combination of a series of antibacterial agents, including icariin, curcumin, daidzein, propolis, lawson, manuka honey, with BGs will be presented demonstrating the positive effect of the dual release of biologically active ions and plant derived biomolecules in terms on antibacterial properties, considering both gram positive and negative bacteria. Synergistic effects of antibacterial ions released from BGs (e.g. Ag, Cu, Zn) and the applied phytotherapeutic agents will be discussed, which should lead to future strategies involving the design of BG-phytotherapeutic combinations exhibiting a reduction of the concentration of both components below possible toxic level by keeping antibacterial effects.

## Biography

Aldo R. Boccaccini is Professor of Biomaterials and Head of the Institute of Biomaterials at University of Erlangen-Nuremberg, Germany. He is also Visiting Professor at Imperial College London. His research activities are in the broad area of glasses, ceramics and composites for biomedical applications. He has co-authored more than 850 scientific papers. His work has been cited more than 36,000 times (Scopus®). Boccaccini is Fellow of the Institute of Materials, Minerals and Mining, American Ceramic Society, Society of Glass Technology and European Ceramic Society. He is the Editor-in-Chief of the journal "Materials Letters" and founding Editor of "Biomedical Glasses". He has received numerous international awards, including the Materials Science Prize of German Materials Society and Turner Award of International Commission on Glass. He is also a member of the World Academy of Ceramics, National Academy of Engineering and Applied Sciences of Germany and advisor to the Science and Technology Ministry of Argentina. Boccaccini serves in the Executive Committee of the Federation of European Materials Societies and in the Council of the European Society for Biomaterials.

