

Editorial: A forecast of the future for biomaterials*

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In September 2005 we held a symposium, at Imperial College London, celebrating the 44 year career and achievements of Professor Hench in the field of bioactive materials. The event was supported by the Department of Materials and the Tissue Engineering and Regenerative Medicine Centre at Imperial College London. The symposium was a two days event including invited keynote lectures and submitted talks from many international leaders in the field who have worked with Professor Hench over the years. There were also many posters from students and researchers from around the UK. The aim of the symposium was to bring together leaders in the field of biomaterials and bioceramics to review the past successes of the field and to look to the future of biomaterials research in general. This special issue features papers based on the topics discussed at the symposium.

Professor Hench's seminal work was his discovery of Bioglass[®] with colleagues at the University of Florida. His work then moved towards materials for regenerative medicine, which brought him to Imperial College London. In this issue, Professor Bill Bonfield (University of Cambridge) reviews Professor Hench's life and how the discovery launched the field of bioactive ceramics, while Professor Hench himself reviews the history of Bioglass[®]. Recent bioactive glass research, including the development of tissue engineering scaffolds and bioactive sol-gel derived glasses

and cell stimulation, is then reported from the groups of Drs. Aldo Boccaccini, Julian Jones and Molly Stevens, who are taking forward the Hench legacy at Imperial College London. Professor Bob Newport (University of Kent) then reports on his collaboration with Professor Hench and how bioactive glasses must be characterised at the atomic level if bioactive mechanisms are to be understood and controlled dissolution rates are to be obtained. Professor Maria Vallet-Regi and co-authors (Universidad Complutense de Madrid) then review her group's research, from sol-gel derived glass fundamentals to bioactive hybrids, which was highly influenced by Professor Hench's work. One of Professor Hench's most recent research interests is the use of Raman spectroscopy to non-invasively monitor *in vitro* tissue growth and cell response. Progress in this technique is reviewed here by Chris Owen, Drs. Gavin Jell, Dr. Molly Stevens (Imperial College London) and Dr. Ioan Notingher (now at University of Nottingham). The issue then changes tack and an excellent thought provoking article by Professor Jim Anderson (Case Western Reserve University, USA), which brings to attention several challenges in biomaterials design and application that are often glossed over by authors. This article is complimented superbly by a review of bone tissue engineering from Dr. Eileen Gentleman and Professor Dame Julia Polak, who co-founded the Tissue Engineering and Regenerative Medicine Centre at Imperial College London with Professor Hench. Professor Wolfram Holand (Ivoclar Vivadent AG) then reviews the clinical applications of glass-ceramics in dentistry and Bob Baier (SUNY, USA) discusses the use of theta surface to assess biocompatibility of biomaterials.

The issue then moves from bioceramics to polymers for tissue engineering applications, with a report on the use of novel scaffold processing techniques, protein delivery and cell response studies from Professor Kevin Shakesheff's team at the University of Nottingham.

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Finally, Professor Mike Horton and Dr. Laurent Bozec (London Centre for Nanotechnology and University College London), report on their work on bio-nanomaterials, specifically the use of a top-bottom approach of using collagen as fibrous tissue scaffolds.

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