

## Guest editorial

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The 21st European Conference on Biomaterials was held in Brighton, UK from 9th to 13th September 2007. The meeting attracted over 500 delegates from 37 different countries. The multidisciplinary nature of the scientists and clinicians attending the conference reflected the impact that the next generation of biocompetent, bioactive biomaterials will have in the field of regenerative medicine. A number of well designed studies were presented that highlighted how the properties of materials could be tailored to produce the biological response required to suit the clinical need.

The meeting explored the latest approaches in the development of high performance biomedical materials through award lectures, invited keynote lectures, oral and poster presentations. The meeting sought to challenge the role of traditional biomaterials in clinical practice and review the latest pioneering developments in material design, evaluation and manufacture for tissue engineering, reconstruction and regeneration.

In particular the meeting sought to encourage scientists, industrialists and clinicians to debate more widely how we can improve the translation of scientific research from the laboratory to the clinic.

In the area of polymer science the conference focussed on the latest developments in polymeric biomedical materials with an opening plenary lecture on synthetic approaches to composite biomimetic, bioresponsive, bioactive biomaterials given by Professor Kevin Healey. A series of sessions on polymers in medicine and surgery focussing on synthetic polymers, polysaccharides, protein-

based biomaterials and hydrogels provide an exciting opportunity to explore the latest developments in synthetic approaches and novel materials.

The growth in the area of functional biology and the importance of this field to tissue engineering and reconstruction was highlighted by the number of papers on stem cell biology and applications and the interest in the plenary lecture on the therapeutic and research potential of human stem cells given by Professor Stephen Minger. The sessions on tissue engineering provided a link between the stem cell biology and other ongoing work into cell material interactions. These tissue engineering sessions focussed on the development of suitable biomaterials as tissue engineering scaffolds and the approaches to controlling the development and integration of tissue within the scaffolds.

In the field of bioresponsive and bioactive materials there were presentations on surface modification of a wide range of materials surfaces to control cellular-material interactions as the community further seeks to understand and control these reactions in order to improve the biocompatibility of materials used in different medical applications. The importance of developing biomimetic materials was also highlighted in a number of sessions and discussed in depth by Dr. Pierre Layrolle in his Jean Leray Award Lecture.

The latest developments in the development of ceramic and composite biomaterials for functional application such as bone reconstruction provided another area where the development of our understanding of functional biology is informing the development of materials to ensure that the next generation of implants have improved mechanical and biological properties. The importance of continuous improvement in biomaterials was highlighted by the 2007 George Winter Award Lecture given by Professor Peter Revell on loose joints—demonstrating the significant

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challenges which still need to be overcome in the orthopaedic field.

Interest in the field of nanoengineering and its applications in biomaterials continues to grow with sessions on nanoengineering and biointeractions and a widening debate on the potential toxicity of nanoparticulate systems. The meeting also saw an increase in presentations on drug and gene delivery as combination medical devices become more common and therapeutic agents are used to more effectively control biological reactions to materials and stimulate growth of particular tissue structures in tissue engineering applications.

To illustrate the important role of clinicians in informing the development of new biomaterials several stimulating invited keynote lectures were presented by academic clinicians which provided an insight into their perspective on the development of biomaterials for maxillofacial surgery (Dr. Ken Lavery), hand surgery (Dr. Antonio Merrolli) and cardiovascular applications (Professor Shervanti Homer-Vanniasinkam). These sessions, combined with those on

in vivo/ex vivo models and pre-clinical and clinical studies, illustrated the importance of both in vivo and clinical evaluation of new materials at an early stage of development.

The meeting also sought to inspire this next generation of biomaterial scientists by hosting the 6th Young Scientists Forum. With a strong link to the translational theme of the conference this year the meeting included a Technology Transfer Round Table Discussion Forum which sought to bring together some of the keynote speakers and some industrialists to discuss how we can improve the translation of research from the laboratory to the clinic looking at the role of academic, industrialists and clinicians in the process.

The papers selected for this special issue are those which the international review panel deemed to be the highest quality and are judged by ourselves as reflecting the range of papers, posters and different themes presented at ESB2007 and illustrating the increasing role of biomaterials in tissue engineering, reconstruction and regeneration.