Editorial

Nanostructured Bioceramics

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With an increase in the world’s population, there are enormous demands annually for various biomedical implants to repair diseased or lost tissues. Conventional tissue replacement materials such as autografts and allografts are associated with several problems, which have triggered the development of novel bioceramic materials during the past three decades. However, it is clear that bioceramics used in a wide range of medical applications still require further improvement. Conventional bioceramics traditionally have maintained a physical function without eliciting specific host tissue responses, whereas modern bioceramics are designed to provide a positive interaction with the host tissue. In that respect, nanobioceramics have become particularly appealing to improve the functionality of conventional microstructured bioceramics in terms of bioactivity and mechanical properties.

This special issue is dedicated to the recent advances in the field of nanobioceramics. The issue includes a contribution by U. Boonyanget al., on the fabrication of bioactive glass particles with controllable structure and porosity via a dual-templatating technique. Another research article by Y. Nakagawa and his group investigated the biological effects of β-tricalcium phosphate particles on the proliferation, toxicity, and calcification of mesenchymal stem cells. A. J. Nathanael et al. at Yeungnam University, Korea, synthesised and studied flower-like hydroxyapatite nanostructures via a polymer-assisted hydrothermal technique. H. Maeda’s group at Nagoya Institute of Technology, Japan, fabricated and studied CaO-SiO2 glass-ceramic spheres with nanosized pores via an electrospay technique. D.-H. Kim et al. demonstrated the potential of using porous spherical magnesium-substituted biphasic calcium phosphate scaffolds as stem cell microcarriers. J. Liu and his group from Kyushu Institute of Technology, Japan, studied the bioactivity and mechanical properties of glass ionomer cement prepared from Al2O3-SiO2 glass and poly(γ-glutamic acid). A research article by J.-C. Chen et al. from Kaohsiung Medical University, Taiwan, studied the biological properties of pearl nanocrystallites. Finally, T. Konishi et al. developed and studied a biodegradable α-tricalcium phosphate cement based on chelating capability of inositol phosphate.

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