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Editorial

Nanodentistry

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Nanotechnology in dentistry has drawn many scientists' and clinicians' attention to significant advances in the diagnosis, treatment, and prevention of oral disease. Also, nanomaterials in dentistry have been studied to overcome the physical and chemical characteristics of conventional dental materials. These interesting facts are the motivation of this special issue. The presented issue provides a variety of topics in the field of dentistry such as novel nanofilled composite resin, the cytotoxicity of nanoparticles deposited on orthodontic bands, the osseointegration of 3D nanoscaffold, and nanosurface treated implant.

This special issue focuses on papers that lay emphasis on nanotechnology and nanomaterials in today's advancing dental society and are categorized by four main topics. The first topic is the biological feasibility of TiO_2 nanotubes. Two papers relating to the in vivo assay of TiO_2 nanotubes, one by Y.-A. Yi et al. titled "The Evaluation of Osseointegration of Dental Implant Surface with Different Size of TiO_2 Nanotube in Rats" and one by C.-G. Kang et al. titled "Osseointegration of Implants Surface-Treated with Various Diameters of TiO_2 Nanotubes in Rabbit," proposed that the difference in TiO_2 nanotube size may influence new bone formation and osseointegration in rat and rabbit. In particular, C.-G. Kang et al. reported that 70 nm TiO_2 nanotubes showed osseointegration activity at the beginning of implantation and 30 nm TiO_2 nanotubes provided excellent bone formation at late stage. Clearly, these two studies are of fundamental importance in understanding the size effect of TiO_2 nanotubes on the osseointegration in vivo. In addition, S. W. Yoon et al.'s paper titled "Improving the Osteoblast Cell Adhesion on Electron Beam Controlled TiO_2 Nanotubes" introduced the enhanced cell attachment cultured on TiO_2 nanotubes treated by electron-beam irradiation to overcome the limitation of nanotube sizes. Therefore, TiO_2 nanotube is expected to play an important role in controlling the osseoconductivity of implant with strategic fabrication. Second topic is the combination effect of novel nanotechnology and commercial implant. Two papers, one by J.-S. Lim et al. titled "Plasma Treated High-Density Polyethylene (HDPE) Medpor Implant Immobilized with rhBMP-2 for Improving the Bone Regeneration" and one by K. Kim et al. titled "Evaluation of Osseointegration Ability of Porous Polyethylene Implant (Medpor) Treated with Chitosan," provided the latest technologies in the field of nanotextured surface treatment combined with conventional commercial implant. Third topic is nanotechnology in dental materials. The studies of nanofilled composite resin, one by T.-Y. Park et al. titled "Evaluation of Degradation in Nanofilled Adhesive Resins Using Quantitative Light-Induced Fluorescence" and one by W.-C. Chen et al. titled "Surface Modified Characteristics of the Tetracalcium Phosphate as Light-Cured Composite Resin Fillers," introduced the development of novel nanofilled composite resin and its clinical implication. In particular, the paper by T.-Y. Park et al. provided the new understanding of the degradation of nanofilled composite resin from the viewpoint of fluorescent qualitative analysis. The last topic is the biocompatibility of nanosized dental materials. B.-H. Kim et al.'s paper titled "Biological Effect of Gas Plasma Treatment

on CO_2 Gas Foaming/Salt Leaching Fabricated Porous Polycaprolactone Scaffolds in Bone Tissue Engineering" has performed the biological assessment of 3D nanoscaffold fabricated by novel method. J.-H. Lee et al.'s paper titled "Cytotoxicity Comparison of the Nanoparticles Deposited on Latex Rubber Bands between the Original and Stretched State" has revealed the probable harmfulness of Ni and Zn nanoparticles released from expanded orthodontic band.

All papers in the present issue demonstrate devoted research efforts in the field of nanotechnology and nanomaterials in dentistry. We sincerely hope that the readers will find this issue informative and useful for their research.

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