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Development of nanocomposite materials for biomedical applications

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The biomaterials with unique physicochemical behaviors are currently attracted for different biomedical applications such as surgical materials, implants and replacement devices. An increasing demand for newer surgical implants in prosthetic and orthopedic applications requires engineering of nanostructured materials with enhanced biological properties. The high purity nanobiomaterials like titania nanocomposites (TiO_2-Chitosan, TiO_2-Graphene, etc.), metal oxides doped hydroxyapatite (nano silicon doped HAp), nanobioactive glass composites (NBG glasses) etc., are synthesized over wide range of compositions using conventional methods. Comprehensive characterizations of the prepared nanobiomaterials are used to explore the properties like mechanical strength, anticorrosive, antimicrobial, biocompatibility, *in vitro* bioactivity, etc., and to confer the optimized composition, to meet out the demand exist in biomedical field. The toxicological behavior of the prepared nanocomposites is assessed through *in vitro* studies using simulated body fluid and animal cell lines, while the in vivo studies using zebrafish. The optimized concentration of nanobiomaterials is further coated on commercial implants namely stainless steel (SS304) and Ti alloy to validate their efficiency in conferring the properties like anticorrosive and antimicrobial, biocompatibility and bioresorbability. Similarly, the nanocomposite materials are used as dental fillers and dental carries prevention applications. The obtained results reveal the promising applications of these nano biomaterials as potential candidate in tissue engineering and bone regenerative applications.

Biography

V Rajendran is the Professor and Director of R&D and Centre for Nano Science and Technology, K. S. Rangasamy College of Technology, India. He has published more than 204 research papers in peer reviewed international journals, 125 papers in conference proceedings, 25 text books, 2 research books, 1 monograph, 1 compendium book, 14 edited research books, 7 edited conference proceedings and 15 patents.

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