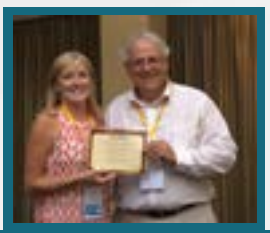
8th Annual Conference and Expo on

Biomaterials

May 10-11, 2023

Zurich, Switzerland






Keynote Forum

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Jeevithan Elango

Universidad Catolica San Antonio de Murcia, Spain

Functional and proliferative effect of hydroxyapatite-germanium dental material in bone marrow mesenchymal stem cells

Hydroxy-Apatite (HA) is a hard mineral component of mineralized tissues, mainly composed of calcium and phosphate. Due to its bioavailability, HA is potentially used for the repair and regeneration of mineralized tissues. For this purpose, the properties of HA are significantly improved by adding natural and synthetic materials. In this sense, the Germanium (Ge) mineral was loaded in HA biomaterial by cold isostatic pressure for the first time and characterization and biocompatibility using Bone Marrow Mesenchymal Stem Cells (BM-MSCs) were investigated. The addition of Ge at 5% improved the solubility (3.32%), stiffness (18.34 MPa), water holding (31.27%) and biodegradation (21.87%) properties of HA, compared to control. Compared to all composite biomaterials, the drug releasing behavior of HA-3% Ge was higher at pH 1 and 3 and the maximum drug release was obtained at pH 7 and 9 with HA-5% Ge biomaterials. Among the different mediums tested, the DMEM-medium showed a higher drug release rate, especially at 60 min. HA-Ge biomaterials showed better protein adhesion and apatite layer formation, which ultimately proves the compatibility in BMMSCs culture. Except for higher concentrations of HA (5 and 10 mg/mL), the different concentrations of Ge and HA and wells coated with 1% of HA-1% Ge had higher BM-MSCs growth than control. All these findings concluded that the fabricated HA biomaterials loaded with Ge could be the potential biomaterial for culturing mammalian cells towards mineralized tissue repair and dental regeneration.

Biography

Jeevithan Elango is affiliated to the Department of Biomaterials Engineering, Faculty of Health Sciences, UCAM-Universidad Catolica San Antonio de Murcia, Guadalupe, 30107 Murcia, Spain.

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