A.R. Boccaccini, M. Stevanovic, N. Filipovic, M. Lukić, Lj. Veselinović, M. Milenković, Development and evaluation of 45S5 bioactive glass based scaffolds coated with selenium nanoparticles or with poly(lactide-co-glycolide)/selenium nanoparticles, *European Symposium and Exhibition on Biomaterials and Related Areas (Euro BioMAT), Weimar, Germany, 2015*.

Development and evaluation of 45S5 bioglass scaffolds coated with selenium nanoparticles or with poly(lactide-co-glycolide)/selenium nanoparticles

Aldo R. Boccaccini[1], Magdalena Stevanović[2], Nenad Filipović[2], Ljiljana Veselinović[2], Miodrag Lukić[2], Marina Milenković[3]

[1]Institute of Biomaterials, Department of Materials Science and Engineering, University of Erlangen-Nuremberg, Cauerstr. 6, 91058 Erlangen, Germany
[2]Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, 11000 Belgrade, Serbia
[3]Department of Microbiology and Immunology, Faculty of Pharmacy, University of Belgrade, 11000 Belgrade, Serbia

In the bone tissue engineering field, there is growing interest in the application of bioglass scaffolds due to their bone bonding ability and osteoconductivity. However such scaffolds still lack some of the required functionalities to enable the successful formation of new bone, e.g. enhanced bioactivity by incorporation of bioactive molecules or growth factors and effective antibacterial properties. A large number of epidemiological, preclinical, and clinical trials suggest that selenium (Se) has significant role in antioxidant protection, enhanced immune surveillance and modulation of cell proliferation. Selenium nanoparticles (SeNp) have also been reported to possess antibacterial as well as antiviral activities. Studies also provide evidence that Se intake may be necessary for bone health. Poly(lactide-co-glycolide) (PLGA) micro and nanoparticles are used for the controlled delivery of several classes of medicaments such as growth factors, antibiotics, antimicrobial agents etc. Uniform, stable, amorphous SeNps have been synthesized and additionally encapsulated within spherical PLGA particles (PLGA/SeNps). Bioglass scaffolds have been synthesized by foam replica method and additionally coated by SeNp or by PLGA with encapsulated SeNp. Samples were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and transmission electron microscopy (TEM). SeNp, Bioglass®/SeNp and Bioglass®/PLGA/SeNp showed a considerable antibacterial activity against Gram positive bacteria Staphylococcus aureus and Staphylococcus epidermidis, one of the main causative agents of orthopedic infections