Multifunctional nanoparticles of hydroxyapatite coated with cholecalciferol-loaded poly(D,L)-lactide-co-glycolide in bone tissue engineering

Nenad Ignjatović1, Zorica Ajduković2, Dragan Uskoković1

1 Centre for Fine Particle Processing and Nanotechnologies, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Knez Mihailova 35/4, 11000 Belgrade, Serbia
2 Clinic of Stomatolgy, Department of Prosthodontics, Faculty of Medicine, University of Niš, Niš, Serbia

Introduction
Multifunctional nanoparticulate systems (MNPs) based on hydroxyapatite coated with drug-loaded biodegradable polymer make a separate group of controlled drug delivery systems in bone tissue engineering. During biodegradation of the polymer, the drug is released, and after the releasing process and biodegradation of the polymer, hydroxyapatite particles become active fillers of the bone defect [1,2].

Synthesis of materials

In vivo tests

Results and discussion

Conclusion
Artificial defects induced in the osteoporotic bone of the rat mandible were successfully reconstructed implantation of HAp/D3/PLGA. The greatest levels of enhanced angiogenesis, vascularization, osteogenesis and bone structure differentiation were achieved upon the implementation of HAp/D3/PLGA systems.

References

Acknowledgement
The research presented in this posters was supported by the Ministry of Education and Science of the Republic of Serbia, under Project No. III45004.