

Implantation of nano bioglass scaffold enhanced with mesenchymal stem cell in rat calvaria

Afsaneh Amiri

Islamic Azad University, Iran

The repair of large segmental bone defects due to trauma, inflammation and tumor surgery remains a major clinical problem. There have been several attempts to combine bioactive glasses (BaGs) with biodegradable polymers to create a scaffold material with excellent biocompatibility, bioactivity, biodegradability and toughness. Mesenchymal stem cells (MSCs) are defined as non-hematopoietic cells that are able to replicate for a long time while maintaining their multilineage differentiation potential.

Rat MSCs were isolated from the femurs of rats. The bone marrow suspensions were cultured in the DMEM medium. BG Nano-powders were synthesized and Gelatin / Bioactive glass nano-composite scaffold was made through Sol-Gel and crosslinked by glutaraldehyde treatment. The BG scaffolds were sterilized, to observe the cytotoxic effects of the BG scaffolds on rMSCs *in vitro*. The proliferation medium of the cultures will be replaced by osteogenic medium. Occurrence of differentiation will be examined by alizarin red staining. Differentiated rMSCs seeded into scaffolds. Two bilateral full thickness defects created in the calvarium of rats. The defects will be filled by nano bioglass scaffolds enhanced with differentiated rMSCs. Evaluation will be performed using histology. Cellular toxicity test results revealed that BG scaffolds has no toxicity. Following alizarin red staining, red mineralizing areas of cultures appeared and revealed that those cells differentiated to osteogenic cells. This research studies have been shown that Nano bioglass scaffold could support MSCs proliferation and differentiation *in vitro*. The present study demonstrates that rMSCs enable bone reconstruction of calvarial defects in an allogenic transplantation model by nano bioglass scaffolds.

Biography

Afsaneh Amiri has completed her Ph.D. at the age of 25 years from Science and Research branch of Azad University in Tehran - Iran and postdoctoral studies from Hallym University School of Medical Science in South Korea. She has been done her teaches and researches as a Professor Assistant in Central Tehran branch of Azad University for more than 15 years. She has published more than 20 papers in reputed journals.

afsaamiri@gmail.com