

8th International Conference on

TISSUE SCIENCE AND REGENERATIVE MEDICINE

September 11- 12, 2017 Singapore

Cytotoxicity evaluation of biological and synthetic materials for bone regeneration**Elena V Kuevda¹, Elena A Gubareva¹, Timofei E Grigoriev², Yuriy D Zagoskin², Ramazan Z Nakokhov¹, Ivan S Gumenyuk¹, Alexander S Sotnichenko¹, Dmitry P Puzanov¹, Sergey V Krasheninnikov² and Sergei N Chvalun²**¹Kuban State Medical University, Russia²National Research Centre "Kurchatov Institute", Russia

Bone regeneration is a multi-round and complex process combining scaffold creation and cell source selection. Several polymeric sponge and gel synthetic materials with different pore sizes seeded with rat bone marrow-derived stem cells (MSCs) and adipose stem cells (ASCs) were used as bone biodegradable grafts. Mineral substance powder of rat longitudinal bones was used as a control, MSCs and ASCs seeded on the plastic flasks were used as a positive control for cells attachment and growth. Grafts biocompatibility was tested with XTT test after 48 hours incubation under standard conditions. Cell viability and scaffold cytotoxicity indices were calculated in percentage. Almost all gel-based scaffolds demonstrated affinity to ASCs, cell viability indices varied from 6.72% to 78.17%, cytotoxicity indices spread from 6.13% to 37.57%. For MSCs seeded gel grafts cell viability was completely the same and varied from 5.87% to 47.75%, cytotoxicity of the scaffolds was from 4.25% to 32.45%. All sponge-based grafts showed high biocompatibility and ASCs affinity with cell viability about 67.88% and cytotoxicity about 29.16%. MSCs viability on the sponge scaffolds was about 54.27%, cytotoxicity was 15.94%. The control cell viability data for bone mineral powder was 70.76% for ASCs and 19.49% for MSCs; cytotoxicity for ASCs was 30.17% and 18.84% for MSCs. Thus, both stem cell lines preferable attached to sponge grafts which maintained the 3D structure of the bone with the adhesion not only on the top of the scaffold but inside. ASCs seemed to be less particular about the 3D organization of the material so MSCs are preferable to use at the initial step of graft evaluation to choose the best stereochemical bone mock polymer. Sponge-based scaffolds have enough capabilities to become promising source for tissue-engineered bone construction after additional investigation.

Biography

Elena V Kuevda has completed her MD and PhD from Kuban State Medical University in Russia. She works as a Researcher in the Laboratory of Fundamental Research in the field of Regenerative Medicine at the Kuban State Medical University in Russia. She has published more than 40 papers in reputed journals both in Russia and abroad.

elenakuevda@yandex.ru

Notes: