# ENCAPSULATION OF HUMAN ADIPOSE-DERIVED STEM CELLS IN GELATIN-METHACRYLATE BASED HYDROGEL FOR TISSUE ENGINEERING APPLICATIONS

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The encapsulation of stem cells in biodegradable hydrogels provides numerous features in biomedical applications. Therapeutic potential of adipose derived stem cells (ASCs) and biomaterials has been explored for treatment of orthopedic ailments, cartilage regeneration and neurodegenerative diseases. Encapsulation of cells in scaffolds facilitates three-dimensional modelling of the tissue in cases where well-defined spatial distribution of cells is desired for implantation. Methacrylamide-modified gelatin (GelMOD) as a derivate of collagen, one of the major extracellular matrix (ECM) components, is a hydrogel with excellent bio-interactive properties, including enzyme degradability, which is crucial for natural processes of ECM remodeling. The aim of our study was to investigate the long-term survival of stem cells encapsulated in this hydrogel. We used hTERT immortalized human adipose-derived mesenchymal stem cell line (ASC/TERT1) with a differentiation potential similar to the corresponding ASC cells. ASC/TERT1 were encapsulated in 5% of GelMOD with 60 % degree of substitution using 0.6 mM Lithium(2,4,6-trimethylbenzoyl)phenylphosphinate (Li-TPO-L) as photoinitiator by means of UV polymerization at 365 nm. During a 3-week period, ASC/TERT1 survival was 70 %, furthermore cells were stretching out and proliferating in the material. We demonstrated that GelMOD is a material that mimics the natural three-dimensional extracellular matrix and provides a friendly environment for the cells, offering numerous attractive features for tissue engineering and therefore could be used for creating cell-laden microtissues and microfluidic devices.