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E-SITE-Experimental facilities of small intestinal tissue engineering

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The small bowel has long been considered as a "forbidden" organ to transplant and in fact, is the last of the splanchnic viscera to have acceded to the clinical area. Early clinical experience was almost universally unsuccessful. Although, in 2015 the 5-year graft survival of the small bowel transplantation is closed to 65-70% in some centers, the widespread application of this procedure is still limited by the relatively high rate of complications. The majority of potential candidates for intestinal transplantation are those adult and child patients who have short-bowel syndrome after extensive intestinal resection or malfunction. Therefore, there is a significant need for tissue engineering and regenerative medicine approaches aimed at generation of implantable or *in situ* forming tissues and organs. In tissue engineering approach, cells are seeded in a biodegradable matrix or scaffold. Nanomaterials and the stem cell technology have a key role to play in tissue replacement. For these purposes, 3D printed grafts (POMaC Polymer: Useable for cardiomyocytes, fibroblasts, endothelial cells – to build layered structures) or Laser printing of Three-dimensional Multicellular Arrays for studies of cell-cell and cell-environment interactions are usable for these purposes. For the evaulation of biological effects of 3D graft, the scaffold with and without adipose tissue stem cells (ASCs) should be used for implantation of small segment of the bowel in experimental animal models.

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The effect of blood shipping on the survival and functionality of PBMCs

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Processing and storage of PBMCs (peripheral blood mononuclear cells) is a newly emerging field within biospecimen research. Due to the steadily growing demand for high quality living cells in translational medical research, including clinical trials, there is an increasing interest in studying the variables that influence the survival and fitness of PBMCs under different conditions. Here, the effect of blood-shipment on the viability, phenotype and functionality of PBMCs is presented. Blood was collected from healthy volunteers at a distal location and in the central laboratory. PBMC were isolated and stored. Analysis was carried out post-cryopreservation. The effect of blood shipping and pre-processing delay on immune cell phenotype and function (proliferation and cytokine production) has been investigated on cellular and subcellular levels. Major immune cell subsets and particularly the functionality of T-cells were analyzed. While NK and B-cell frequencies were altered due to pre-processing transportation, T-cell subsets largly retained their phenotype and function. We identify proliferation assay as a robust read-out for monitoring fitness of T-lymphocytes in multi-center studies and report cytokines in which production is altered and thereby are not suitable read-outs in studies where blood is collected from multiple sites and transported to central processing. We highlight the importance of appropriate controls and careful test-running when planning read-outs for multicentric studies. Higly standardized central processing can be of an advantage despite the logistical challenges.

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