

5th International Conference on

Tissue Engineering & Regenerative Medicine

September 12-14, 2016 Berlin, Germany

Biological diversity of mesenchymal stromal/stem cells isolated from post-operative tissues

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Multipotent mesenchymal stromal/stem cells (MSC) can be isolated from different tissues. Their morphology, immunophenotype and differentiation potential are dependent on their tissue of origin. MSC isolated from adult human tissues are ideal candidate for tissue regeneration and tissue engineering, however, invasive methods of tissue harvesting is making this procedure uncomfortable for the tissue donors. We analyzed biological properties of MSC isolated from human bone marrow (BM), skeletal muscle and skin from post-operative tissues collected from limbs amputated due to critical limb ischemia. Long-term cultures of MSCs were performed in standard medium. Cells were observed up to 12 passages (P) and examined for phenotype and differentiation potential. Adherent cells, isolated from all examined tissues, express phenotype characteristic for naïve MSC: CD73, CD90, CD105, however their expression down-regulated during follow-up period (after P7). A fraction of MSC isolated from skeletal muscle express myogenic markers: CD56, desmin (up to P7) and dystrophin (expression increased after P7). Co-expression of CD73/CD146, CD90/CD146 and CD105/CD146 was detected on the proportion of adherent cells originated from BM, skeletal muscle and skin, and this suggest that they are proangiogenic progenitors. A fraction of cells expressing CD146 strongly co-expressed PDGFR- α . Cells isolated from examined tissues were capable to differentiate into chondrocytes, osteoblasts and adipocytes. Thus, MSC isolated from BM and skin biologically represent multipotent cells capable to differentiate into different type of tissues, whereas progenitor cells isolated from skeletal muscle have tissue-specific character. Post-operative tissues may serve as an alternative source of MSCs for potential clinical applications.

Biography

Aleksandra Klimczak has completed her PhD and DSc degree from the Institute of Immunology and Experimental Therapy PAS, Wroclaw, Poland. She gained extensive experience in transplant immunology associated with hematopoietic stem cell transplantation and in studies on tolerance inducing strategies in vascularized composite allograft models (Cleveland Clinic, USA). Currently, she is strongly involved in the studies assessing tissue distribution and biological characteristics of MSC originating from different human organs and their potential application in regenerative medicine. She has published 76 papers including 9 book chapters in peer-reviewed worldwide journals.

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