Michał Pikuła, J Stem Cell Res Ther 2018, Volume 8
DOI: 10.4172/2157-7633-C1-031

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In-vitro expanded human adipose-derived stem cells as a model for drug testing and tissue engineering tool

Adipose-derived stem cells (ASCs) are of great therapeutic potential, owing to their vast biological activity. These cells exhibit immunomodulatory, immunosuppressive, pro-angiogenic and pro-regenerative activities. The mechanism of their action is based on the production of various compounds, exosomes, as well as direct influence on other cells. Our research revealed that ASCs may be successfully isolated from plastic and oncological patients. Simultaneously, the immunophenotypic analysis of ASCs showed no difference between these two groups of patients. Due to relatively fast proliferation, ASCs can be easily expanded for pre-clinical and clinical trials. These cells express specific markers of mesenchymal stem cells such as: CD73, CD90, CD105 and no/low expression of CD45, CD19, CD11, CD14. ASCs undergo strong activation in in vitro conditions; however, this process depends on the microenvironment and may be influenced by several factors including potential drugs. In our study, the compounds with pro-regenerative properties increase the expression of antigens such as CD34 and decrease the expression of CD105 and CXCR4. However, significant donor-to-donor variabilities of cells in response to pro-regenerative compounds appear. Therefore, we should aim to increase the number of patients-donors in order to obtain reliable results. In conclusion, ASCs constitute a promising pre-clinical model for the assessment of the activity of potential drugs.

Biography

Michał Pikuła is an Associate Professor at the Department of Clinical Immunology and Transplantology, Medical University of Gdansk, Poland. He received his MSc Degree from University of Gdansk (Molecular Biology, 2003), MPharm from Medical University of Gdansk (Pharmacy Practice, 2005), and his PhD Degree from Medical University of Gdansk (Medical Biology, 2007). He is currently responsible for several projects focused on Experimental Immunology, Tissue Engineering and Regenerative Medicine.

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