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Adipose-derived stem cells as a promising tool for pre-clinical and clinical studies in regenerative medicine

Adriana Schumacher¹, Mirosława Cichorek¹, Maciej Zieliński¹, Paulina Langa¹, Jacek Zieliński², Karolina Kondej², Piotr Trzonkowski¹ and Michał Pikula¹

¹Medical University of Gdansk, Poland

²University of Gdansk, Poland

Currently, adipose tissue represents a rich source of adult stem cells, which are characterized by the high regenerative capabilities. There are many studies which describe the biology and beneficial effects of adipose-derived stem cells (ASCs). Despite these advances, there are still several issues that require further research. Especially important seems to be the influence of age, sex, BMI (Body Mass Index) and accompanying diseases (such as presence of cancers) on the regenerative potential of ASCs. In presented study, ASCs were isolated from human adipose yellow tissue by enzymatic and mechanical methods. Tissues were obtained from oncological and plastic surgical patients (n=12). Flow cytometry was used to determine the cell surface phenotype of cultured ASCs (CD90, CD73, CD105, CD13, CD29, CD44, CD49, CD31, CD34, CD45, CXCR4 and CXCR7). The results showed that the high percentage of cells (more than 90%) express positive markers of ASCs e.g.: CD90, CD73, CD29, CD44 and CD13. However, the expression of selected markers (e.g. CD31, CD34 and CD105) varied among patients. Despite this diversity, the differentiation potential of cells isolated from both oncological and plastic patients was very high (adipogenic, chondrogenic and osteogenic). Our preliminary data indicate that one of the most important factors that could affect the regenerative capacity of ASCs, is BMI. In conclusion, our studies show that adipose tissue is a rich source of stem cells for research. However, it shouldn't be neglected that individual differences among patients can have a potential impact on the biological properties of these cells and their response to different stimulants.

Biography

Adriana Schumacher has completed her MSc from Medical University of Gdańsk. She is currently a PhD student in the Department of Embryology in Medical University of Gdańsk and is involved in the STRATEGMED project "Novel Technologies for Pharmacological Stimulation of Regeneration" (REGENNOVA) financed by The National Centre for Research and Development (NCBR).

aschumacher@gumed.edu.pl

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