

Human Adipose-Derived Stem/Stromal Cells from Children or Adults?

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Dear Editor-in-Chief,

Since the emergence of regenerative medicine choosing the best source for extracting stem cells has been one of the most important challenges. Discovering a cell type with the highest efficiency and the least side-effects is one of the priorities of scientists active in this field. Of all the cells, mesenchymal stem cells have been and still are of interest to the researchers for use in pre-clinical and clinical studies due to being easily accessible, pluripotency, secretion of numerous growth factors, low risk of immunological rejection, and not having ethical issues for clinical use. Of all mesenchymal cells, human adipose-derived stem/stromal cells (hADSCs) are more safely and easily accessible, produce more growth factors compared to other mesenchymal stem cells, have the ability to differentiate to various cell lines, secrete high levels of angiogenic factor and their feasibility, safety and efficacy have been confirmed. Therefore, in the last decade, it has received more attention from researchers, compared to other cell sources (1-3). Since distribution and function of adipose tissue is versatile and changes at any age during the lifetime (4), it is expected that at different ages, hADSCs also show different functions and abilities. Therefore, it is hypothesized that autologous implantation is not necessarily always the best choice. Autologous transplantation of hADSCs is only the best choice in ages that these cells have the optimum efficacy. If it is determined in what age these cells have the highest efficacy, choosing the type of implantation (autologous or allogeneic) will be an important factor in achieving the best response to treatment. This matter is even more important regarding pediatric diseases. The results of Guasti et al. study in 2012 showed that a smaller volume of lipos aspirate is needed for extracting hADSCs from children's adipose tissues compared to adults (20 to 30 times less). In addition, many growth factors required for tissue repair are secreted in children's hADSCs, but not in hADSCs of adults; and hADSCs of children carry more markers of differentiation to various cell lines compared to hADSCs of adults. Therefore, they concluded that hADSCs of children have higher plasticity to differentiate into multiple cell lineages compared to their adult type and are better choices for cell therapy of diseases in children (5). What is sure is that autologous use of children's hADSCs is the best choice for stem cell therapy. In addition, in a study Liao et al. aimed to evaluate autologous bone marrow mononuclear cells in treatment of children with traumatic brain injuries and showed that this treatment method leads to a reduction in the intensity of organ damage and neurointensive care duration significantly decreases (6). But can allogeneic use of children's hADSCs for adults be the best choice? This is a question that definitely cannot be answered without performing further preclinical and clinical studies in this field.

Key Words: Adipose-derived, Adults, Children, Stem cells, Stromal cells.

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