Seasonal changes in the therapeutic efficacy of human adipose derived stem cells; yes or no?

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Dear Editor

esenchymal stem cells (MSCs) are widely used in pre-clinical and clinical studies for its highest potentials such as availability, pluripotency, growth factor secretion, and lesser ethical limitations. Among different sources of MSCs, human adipose derived stem cells (hADSCs) because of the easy and safe isolation, produce high level of cytokines such as angiogenic factor, and confirmed safety and efficacy in clinical trials, it has become more acceptable in the last decade.(1-4)

In the regenerative medicine, scientists usually looking for the best and most efficient source of stem cell. We have been working on the extraction and cultivation of hADSCs since 2010 (5-10) and noticed that the growth rate and proliferation of these cells seem to be far higher in winter than in other seasons. In addition, it is possible that the secretory function of hADSCs in winter is higher, too. A Possible explanation for this phenomenon may be related to higher adipose tissue metabolism during winter for energy homeostasis and thermal regulation.(11) Thus, high activation of adipose tissue could be reflected in hADSCs. Acceptance or rejection of this hypothesis needs further in vitro studies to clarify the effect of season on the quality and proliferation of the cultured hADACs.

Whenever this hypothesis is confirmed, it is a very pivotal point in the extraction and processing of hADSCs. If these cells are extracted in the season with the most growth and secretion activity, the best results in the regenerative medicine can be achieved through the transplantation of hADSCs. Therefore, designing and performing comprehensive studies is recommended to determine the variables that affect the achievement of the best and most effective hADSCs production.

The study will be designed and performed as in vitro by choosing a reasonable sample size for adipose sampling.

Sampling and isolating of hADSCs will be done in four times, in 15th middle month of each season. It will be done matching method in order to adjust confounders such as demographic information, age, sex, disease, body mass index, extraction of cells time, etc.

The evaluated outcomes can be considered in accelerating of the cell proliferation by recording the time elapsed between the two consecutive passages, number of cell passages without entering the aging stage and amount of secretory activity of the cells (by western blotting-specific cytokines for each sample in each season). Finally, the information is compared between the samples of each season.

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4.9. Author contribution

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