

## Isolation, Characterization and Differentiation of Rat Adipose Tissue Derived Mesenchymal Stem Cells

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**Introduction:** Mesenchymal stem cells have the potential of self-renewal and differentiation into different cell types, including blood cells, heart, nerves and cartilage, and have unlimited power for division. These cells can be obtained from cord, before implantation from fertilized cells and also from various tissues of adults although the differentiation power and the ability to reproduce other cells are different. The use of these cells in the biological sciences, embryology and genetics are considered further. The aims of this study are extraction and characterization of stem cells with respect to differentiation of these cells into bone and fat cells in order to investigate the potential use of them in animal experimental models of stroke and heart attack and then in the case of the proper response at the bedside.

**Methods:** An incision was made in the abdomen and about one gram of fat tissue was removed. After splitting under the hood, pieces of fat transferred into a sterile falcon tube and collagenase was added. The tube was put inside a water bath (37 ° C) for digestion fat components. After centrifugation the cells were extracted and cultured. After the third passage, the cells were placed in the appropriate osteogenic and adipogenic differentiation culture. To ensure the accuracy of the extraction method, the cell surface markers of the stem cells derived from human adipose tissue were analyzed by flowcytometry.

**Results:** Staining with Oil Red and Alizarin Red showed that stem cells extracted by the aforementioned method have the ability to differentiate into bone and fat cells respectively. The results of floctometry showed that CD34 and CD44 markers were negative and CD45 and CD105 were positive consistent with the immunological properties of Mesenchyma stem cells.

**Conclusions:** This study showed that the mesenchymal stem cells derived from adipose tissue have the potential to differentiate into other cell types and due to the aims specified for continuation of this research, these cells can be used in the animal experimental models of stroke and myocardial infarction.

**Keywords:** Adipose tissue, Mesenchymal stem cells, Rat.

Poster Presentation

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