

Efficient Generation of Neurosphere with High Passages (57 Passages) from Adipose Derived Stem Cells (ADSCs) Using Bioactive Substance TNT, a Promising Protocol for Multiple Treatment Modality

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Abstract

Spinal cord injury (SCI) is a serious condition that affects millions of people worldwide. The most causes for the SCI are motor vehicle accident (43%). Recent advances in stem cell research have brought closer the possibility of repairing the spinal cord. Cell therapy is an option in replacing the lost cells in the injured spinal cord. Adipose derived stem cells (ADSCs) are one of the kinds of stem cells that can be differentiation into neurosphere. Previous studies used the toxic factors and complicated methods. Here, we apply a nontoxic and efficient method of rat mesenchymal stem cells (MSCs) into neurosphere. As well as, the neurosphere can be differentiated in to glial and neural cells. Primary rat ADSCs were isolated from Wistar rats (200–300 g). Then MSCs derived ADSCs, cultured by DMEM medium supplemented with 10% fetal bovine serum. These cells evaluated by specific markers of MSCs and ADSCs such as; CD49, CD90, CD105. By bioactive substance TNT then MSCs differentiated in to neurosphere in 4 groups that these groups compared with morphology. This differentiation do with nontoxic factor and by dose response of: 1 M, 0.1 M, 0.01 M and 0.25 M and time course at 72 hours. Diameter and number of this neurosphere evaluated every day in 4 groups. MSCs isolated from ADSCs then evaluated by immunocytochemistry that expressed CD90 (80%), CD49 (70%) fibronectin and negative marker CD45. Diameter and number of Neurosphere by 0.1 ng/ml was optimal dose for expansion. Cell therapy is an option in replacing the lost cells in the injured spinal cord. Source of patients need multiple delivery of cells in order to achieve the wanted results.

Keywords: Stem Cell Therapy, CD45, Neurosphere, Bioactive Substance TNT.

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