Preliminary study: Differentiation of bone marrow mesenchymal stem cells to neuronal-like cells through treatment with β- mercaptoethanol and confirmation through morphological features

Anbarieh, S.¹, Maizatul Fazilah, A.R.¹, Ramin, K.¹, Shamsul Azlin, A.S.¹, Durriyyah Sharifah, H.A.¹ and Asmat, S.²

¹Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia and ²International Center for Chemical and Biological Sciences, University of Karachi, Karachi, Pakistan.

anbariehsaadat@siswa.um.edu.my

Bone Marrow Mesenchymal Stem Cells (BM-MSCs) have extensive self-renewal capability. Mesenchymal Stem Cells (MSCs) could be differentiated in vitro into specific cell types through induction by certain compound in the culture medium. This preliminary project investigated the commonly used synthetic compound in cell culture, β-Mercaptoethanol (BME), as inducer in differentiating BM-MSCs into neuronal-like cells. Initial isolation of MSCs from Sprague Dawley’s bone marrow was followed by characterizations of confluent BM-MSCs. At P0 unattached and floating cells were seen. Morphologically these cells were roundish and spherical in shape. Within the first couple of days of culturing (P1) spindle shaped cells with projections were observed. Continuous reduction in quantity of the roundish cells and the increase of morphologically altered fibroblast-like cells indicated the development of BM-MSCs. The latter type of cells were subsequently treated with 5μL of BME after reaching 70% - 80% confluency. After a maximum 29 hours of treatment, morphological changes were observed under inverted microscope with magnification of 10X, 20X and 40X. Treated BM-MSCs demonstrated apparent neuronal-like morphological features. Cytoplasm of cells were seen having retracted towards nucleus forming cell bodies, while dendrite-like branches were projected out from cell bodies. Besides the evolvement of multipolar cells, physical connectivities were formed by these neuronal-like cells. Thus, neuronal morphological features and physical connections between cells suggested the differentiation and the existence of neuronal-like cells from BM-MSCs after treatment with BME. This study indicated the ability of BME to serve as a good inducer in differentiating BM-MSCs into neuronal-like cells.