

Bileculture Of Bm-Mscs, At-Mscs, Wj-Mscs And Shed

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INTRODUCTION

Fresh placental tissue samples (chorion, amnion, red tissue of placenta and separated villi fiber), after manual preparation and in vitro culture, were harvested according to standard cytogenetics procedures. After cell synchronization by colcemid for 20 min at 37°C (10 µg/ml, Biosera), pellet cells undergo a hypotonic treatment using 0.075 M KCL solution (Merck) for 20 min at 37°C to swell the cells. The

be isolated without any ethical problems using a noninvasive method. Mesenchymal Stromal Cells (MSCs) are a good source for the cell therapy thanks to their properties. It was demonstrated that MSCs have the ability of self-renewal, secret factors that can facilitate tissue repair, and can differentiate into different types of cells, such as chondrocytes, adipocytes, osteocytes, cardiomyocytes, neuronal cells and other. MSCs cells were then fixed in cold Carnoy's fixative solution composed 3:1 methanol and 100% acetic acid (Merck) washed three times to ensure complete removal of cytoplasmic debris. The resulting suspension of metaphase and interphase cells was applied to microscopic slides. FISH was performed with the commercially available probe SE X(DXZ1)/Y (DYZ3) (Kreatech Diagnostics), dedicated for identification of aneuploidy. The procedure was applied according to the manufacturer's protocol. Slides were analyzed using an epifluorescence microscope Imager. Z2 (Carl Zeiss) and documented using an ISIS (Metasystems) Imaging System. Today, there is a new field in the modern biomedicine the cell therapy, in which *in vivo* stem cells are transplanted to compensate for tissue dysfunction and regenerate damaged organs. Stem cells have two main features: self-renewal and the ability to differentiate into other cell types. They are a pool of undifferentiated progenitor cells of various types. The use of stem cells is the most promising direction of the cell therapy. Stem cells are classified into embryonic and

adult stem cells. Embryonic Stem Cells (ESCs) have a high potential for differentiation into many types of cells. The use of ESCs raises ethical questions and is associated with a high risk of cancer development. Additionally, ESCs express HLA, which leads to transplant rejection. In contrast, adult stem cells, for example mesenchymal stromal cells and hematopoietic stem cells can exert very important immunomodulatory effects: they suppress T- and B-cell proliferation and natural killer cells function, and they also limit the expression of the Major Histocompatibility Complex II (MHC II). Thanks to these properties, MSCs can be used in an effective therapy of the Graft-Versus-Host Disease (GVHD). It was shown that MSCs migrate to the sites of tissue injury "Young" MSCs isolated from the placenta show a better proliferation and differentiation ability than "adult" MSCs. For this reason, they have been used in a number of clinical trials Friedenstein was the first to isolate and describe mesenchymal stromal cells from bone marrow. It is known that the number of MSCs in the body, as well as their ability to proliferate and differentiate decline significantly with age. The placenta is a very good source of a range of cells and hence has been attracting a growing interest. Cells can be harvested by non-invasive methods and without any ethical problems. Due to its structure, the placenta contains MSCs of maternal and fetal origin. The decidua basalis is a part of the endometrium adjacent to the myometrium. The decidua basalis is the best supplied with maternal blood and later expands to form the maternal part of the placenta. MSCs are also found in the amnion and the chorion - two fetal membranes, and in the chorionic villi. We attempted to isolate MSCs of maternal and fetal origin from each of these parts of the placenta. If we are able to produce a pure population of maternal MSCs, we will gain the ability to apply a more personalized therapy for themother.

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