Cell Research (2008) 18:s161.

www.nature.com/cr

Isolation, cultivation and characterization of human somatic stem cells from adult skin, adipose tissue and bone marrow

U Riekstina[1], I Cakstina[1], R Muceniece[1], G Jankovskis[2], J Ancans[1]

[1]Laboratory of Bioanalytical Methods, Faculty of Biology, University of Latvia; [2]Institute of Experimental and Clinical Medicine, University of Latvia

It has been proposed that stem cells are responsible for provision of continuous homeostasis of our tissues and organs, which lifespan is partially determined by the stem cell pool quality, proportional distribution and local micro-environmental factors. The overall aim of this study was to assess the potential of different adult human tissues- skin (from different body locations), adipose tissue and bone marrow- to serve as the potential sources of somatic stem cells for application in biomedicine. These tissue sources have been reported previously to contain multipotent somatic stem cells and several isolation protocols have been published. Our study set the target to test published protocols on adult human tissue samples and to compare the outcome, with additional methodological variations. We undertook experimental optimization of primary cell culture conditions beyond the use of bFGF, EGF and B-27 additives, isolation of somatic stem cell population using different cell culture techniques, characterization isolated population by immunohistochemistry (IHC), induction of differentiation and RT-PCR. It was found that all sources of tissue tested in this study yielded high numbers of multipotent somatic stem cells capable of differentiation into neuronal and mesenchymal cell lineages. Interestingly, some adherent, non– hematopoetic stem cell populations were found to be CD34 positive by IHC, and CD133 expression was confirmed by RT-PCR. Furthermore, this study indicates that even in aged adult human body (age over 60 years) there are multiple tissues that contain potent stem cells. Novel, personalized medical therapy methods are under development based on progress in isolation, characterization, *in vitro* propagation and specific delivery methods of adult stem cells.

***Keywords*:** adult stem cells, mesenchymal stem cells (MSC), tissue stem cells

Cell Research (2008) **18**:s161. doi: 10.1038/cr.2008.251; published online 4 August 2008

Correspondence: Ancans J
E-mail: Janis.Ancans@lu.lv