

4th International Conference on Tissue Science and Regenerative Medicine

July 27-29, 2015 Rome, Italy

Adhesion, growth and osteogenic differentiation of human adipose stem cells isolated by liposuction under low and high negative pressure

Lucie Bacakova¹, Nikola Krocilova¹, Jana Havlikova¹, Martin Parizek¹, Hooman Motarjemi², Martin Molitor² and Roman Gabor³

¹Academy of Sciences of the Czech Republic, Czech Republic

²Bulovka Hospital, Czech Republic

³VUHZ Joint-Stock Company, Czech Republic

Adipose-derived stem cells (ASCs) are promising for cell therapies and tissue engineering. Adipose tissue with these cells can be obtained by a relative non-invasive method (example, liposuction). The quality and quantity of ASCs can be influenced by the amount of negative pressure during liposuction. In this study, we focused on ASCs isolated from lipoaspirates taken from the same patient (a 43-year-old woman) under low negative pressure (-200 mmHg, LP) or high negative pressure (-700 mm Hg, HP). The ASCs were isolated by a method described by Estes et al. Flow cytometry performed in the 2nd passage revealed that the cells contained markers typical for ASCs; only the population obtained under LP was more heterogeneous. The number of isolated ASCs and their subsequent proliferation activity *in vitro* was higher in cells obtained under HP. These differences persisted in passaged cells (tested up to 3 passages) after freezing and thawing of cells and also after seeding on Ti-Al-4V samples with various surface modifications (example, grinding, polishing, grit blasting and tarnishing) developed for construction of bone implants. However, when confluent ASCs were exposed to osteogenic medium (containing ascorbic acid, dihydroxyvitamin D₃, dexamethasone, beta-glycerol phosphate and L-glutamine) for 5 days, the osteogenic cell differentiation measured by intensity of fluorescence of collagen I, alkaline phosphatase and osteocalcin was more pronounced in cells obtained under LP. Thus, ASCs obtained under both pressures have specific advantages and their choice depends on their application i.e., if their rapid growth or early differentiation is needed.

Biography

Lucie Bacakova is an Associate Professor; she has graduated from the Faculty of General Medicine, Charles University; Prague, Czechoslovakia in 1984. She has completed her PhD from the Czechoslovak Academy of Sciences and became Associated Professor at the 2nd Medical Faculty, Charles University. She is the Head of the Department of Biomaterials and Tissue Engineering, Institute of Physiology, Academy of Sciences of the Czech Republic. She is a Specialist for studies on cell-material interaction and vascular, bone and skin tissue engineering. She has published more than 150 papers in reputed journals (h-index 26).

Lucie.Bacakova@fgu.cas.cz

Notes: