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DYNAMICS OF MATRIX METALLOPROTEINASES ACTIVITY AND EXTRACELLULAR MATRIX PROTEINS CONTENT OF HUMAN MESENCHYMAL STEM CELL LINES DURING REPLICATIVE AGING

I. V. Voronkina^{a, b, *}, L. V. Smagina^a, N. B. Bilyug^a, A. S. Musorina^a, and G. G. Poljanskaya^a

^aInstitute of Cytology, Russian Academy of Sciences, St. Petersburg, 194064 Russia

^bInstitute of Experimental Medicine, St. Petersburg, 197376 Russia

*e-mail: voronirina@list.ru

A comparative analysis of characteristics of mesenchymal stem cells (MSCs) of different origin is important in connection with the peculiarities of their interaction with a unique microenvironment (niche) characteristic of a particular tissue. Regulation of cellular processes is realized in particular through the interaction of extracellular matrix (ECM) proteins with matrix metalloproteinases (MMP). In this work we made the comparative study of dynamics of MMP activity and levels of ECM proteins during replicative aging of 3 lines of human MSCs obtained from War-ton's jelly of human umbilical cord (MSCWJ-1), eyelids skin (DF-2), and epicardial human adipose tissue (ADH-MSC) isolated during coronary artery bypass grafting. The comparative analysis of proportion of cells exhibiting the β -galactosidase enzyme activity characterizing the replicative aging process, the analysis of ECM proteins fibronectin and type I collagen content, as well as MMP-1, -2, -9 activities during long-term cultivation, was done. In general, in tested 3 lines replicative aging process differences were observed in changes of fibronectin and type 1 collagen content and MMP activities. ADH-MSC line cells differed most significantly from the other two lines in terms of aging rate, ECM protein content, and MMP activity. Perhaps the reason for this discrepancy was the origin of the cells from the unhealthy microenvironment in which they were located before transferring to *in vitro*.

Keywords: mesenchymal stem cells, aging, extracellular matrix, matrix metalloproteinases