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Adipose tissue-derived mesenchymal stromal cells: Paracrine activity and angiogenic properties in patients with ischemic heart disease and diabetes mellitus type 2

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Therapeutic effects of mesenchymal stromal cells (MSCs) in the treatment of ischemic heart disease (IHD) may be due to their paracrine actions. The regenerative potential of MSCs can be deteriorated in diseases. We investigate paracrine activity and angiogenic properties as well as proliferative and migratory characteristics of adipose – derived mesenchymal stromal cells (AD-MSCs) from patients with ischemic heart disease (IHD) and diabetes mellitus type 2 (DM2).

Methods: AD-MSCs were isolated from subcutaneous adipose tissue of 27 patients with IHD, 15 with IHD and DM2 and 18 healthy donors with age ranging from 44 to 80. The stimulation of endothelial cells (EA.Hy926 cell line) tube formation by AD-MSCs conditioned media (CM), the expression (RT-PCR) and secretion (ELISA) of growth factors were evaluated.

Results: Total tube length formed by EA.Hy926 cells was lower in both groups of IHD compared with healthy donors. However the content of angiogenic factors (VEGF and PIGF) was higher in IHD group and IHD+DM2 group (p<0.05). The level of PIGF mRNA was higher in IHD and IHD+DM2 groups. Angiogenesis inhibitors (endostatin and PAI-1) mRNA levels were elevated in IHD group and IHD+DM2 group compared to control group. The level of thrombospondin-1 mRNA was increased in MSCs of IHD group.

Conclusions: In spite of increase in secretion of pro-angiogenic factors the angiogenic potential of AD-MSCs from patients with IHD and DM type 2 was impared. This data may be due to disturbance of balance between pro-angioigenic and anti-angioigenic factors: excess expression of angiogenesis inhibitors by these cells

Biography

Nina Dzhoyashvili, M.D. graduated from Lomonosov Moscow State University School of Medicine in 2008. She finished a Cardiology Residency Program at Russian Cardiology Research Center in 2010. Since 2010 she is a PhD student at the Department of Biochemistry and Molecular Medicine of Moscow State University. Her main scientific interests include molecular and cellular mechanisms of angiogenesis, pathogenesis of atherosclerosis, potential of stem cell and gene therapy

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