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Immune mechanism as the mechanism maintenance stability of both internal energy an organism as well as internal energy of cells of an organism

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Regulative mechanism of an organism was divided into three levels: highest level regulation, high level regulation and low level regulation which realize mechanism regulation of maintenance stability Internal Energy (stable temperature 36.6°C-36.9°C by which all enzymes operate etc.) and Internal Medium (stable concentration of substances in blood and neurolymph) as an organism as well as cells of an organism. Biochemical and biophysical Equilibrium Constants in three levels regulation support balance catabolic exoergonic processes and anabolic endoergonic processes, which determine intracellular and extracellular chemical potentials. The influences of cellular potentials on cellular walls form different cellular capacitors. Also the interactions between nuclear processes, due to nuclear capacitors, and mitochondrial processes, due to mitochondrion capacitors, determine stabile basophilic chemical potential in cytoplasm, i.e. stability cellular internal energy. Relative interactions between cellular capacitors of cells maintain common stability of internal energy both in cells and in an organism. The mechanism of mutual interactions between cellular capacitors of all cells and an organism promote remote defensive reactions across distance for immune responses on strange objects. Biophysical mechanism of immune cells remote reactions transit into contact biochemical immune reactions for decomposition of the strange object for maintenance stability internal energy and internal medium of an organism and as well as cells of an organism.

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Influence of bFGF, VEGF, PlGF, TGFβ on endothelial cells tube formation in presence of THP-1 cells

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During angiogenesis, interaction of endothelial cells (EC) with cells of microenvironment, including monocytes/macrophages, and the extracellular matrix are controlled by cytokines. The aim of the research was investigation of cytokine influence on capillary-like tube formation of endothelial cells EA.Hy926 in presence of THP-1 cells. For cell activation the following recombinant cytokines were used: bFGF - (BD, CIIIA) (1 ng/ml, 10 ng/ml, 20 ng/ml); VEGF - (BD, CIIIA) (1 ng/ml, 10 ng/ml, 100 ng/ml); PlGF - (BD, CIIIA) (1 ng/ml, 5 ng/ml, 20 ng/ml); TGFβ - (BD, CIIIA) (1 ng/ml, 5 ng/ml, 10 ng/ml). Endothelial cells were seeded on Matrigel-coated 24-well plates (BD, USA) at a density of 150000 cells/well, also were added cytokines and 2,5% fetal bovine serum. To part of wells THP-1 cells were added (250000 cells/well), to part of wells - the cultural medium without THP-1 cells. Capillary tube formation was assessed 24 hours later using microscope AxioObserver Z1.
Stimulating effect of bFGF and VEGF on capillary-like tube formation in monoculture and co-culture system was shown, while the effects of cytokines were more pronounced in co-culture system. PlGF had no effect on EC tube formation in monoculture, but at high concentrations proangiogenic activity of PlGF in co-culture system was shown. TGFβ inhibited EC tube formation, while its anti-angiogenic potential was more pronounced in the co-culture system. Thus, cytokines of microenvironment could make a definite contribution to the interaction of EC and monocytes/macrophages during angiogenesis.

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