

3. BIOCHEMICAL CHANGES OF THE VASCULAR ENDOTHELIUM IN DIABETIC PATHOLOGY



Author: Stici Vlada

Scientific advisor: Sardari Veronica, PhD, Department of Biochemistry and Clinical Biochemistry, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. Diabetes mellitus (DM) is a multifactorial pathology that has become a worldwide problem due to its rapid spread and progression. Persistent hyperglycemia in DM induces disruption of vascular homeostasis by interfering with metabolic, hormonal and genetic imbalances. As a result of these disturbances, the functionality of the vascular endothelial cells changes, thus the amplification of proinflammatory and procoagulant processes, characteristic of diabetic pathology, takes place.

Aim of study. Elucidation of biochemical aspects in the pathogenesis of vascular changes caused by diabetes mellitus, which disrupt the quality of life. Detailed analysis of the molecular processes and understanding of the underlying mechanisms that contribute to the vascular dysfunction associated with DM.

Methods and materials. Analysis of published literature from the information resources of the Medical Scientific Library at *Nicolae Testemitanu* State University of Medicine and Pharmacy and articles from specialized medical scientific journals included in databases such as PubMed, Cambridge Journals Online, Elsevier, Diabetes Care, Medline and MedScape.

Results. In DM the vascular endothelium regulates the passage of macromolecules and circulating cells in the blood. This is a major target of oxidative stress, which leads to the activation of the polyol pathway, the acceleration of the formation of protein kinase C (PKC) isoforms and the intensification of the hexosamine pathway, which is due to the overproduction of superoxide anion at the level of the mitochondrial respiratory chain and promotes the formation of advanced glycation end products (AGEs). Glycated biological compounds, as well as collagen in the vascular endothelium and respiratory chain proteins in the mitochondria, undergo irreversible changes, lose their ability to act, which contributes to the installation of fibrotic and atrophic processes in the organs affected by the complications of diabetes and lead to the amplification of oxidative stress, which is closely related to the glycation process. Activation of PKC in the cells of the vascular wall leads to an increased expression of vascular endothelial growth factor that increases the permeability of the endothelial barrier and inhibits nitric oxide synthase, due to the direct effect of free radicals, which react with nitric oxide by inactivating it. Free radicals determine the activation of the hexosamine pathway that induces the procoagulant state attributed to diabetic pathology.

Conclusion. The structural changes in the vessels in diabetic patients are due to the alterations occurring as a result of oxidative stress and inflammation. Scientific studies propose the implementation of regimes with antioxidants: polyphenols, vitamins C and E, beneficial against the consequences of diabetes.