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VERAPAMIL – A NEW ANTI-DIABETIC DRUG?

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Relevance. The number of diabetics has quadrupled since 1980. Today, more than 460 million adults worldwide have the disease. The main clinical problem associated with diabetes is cardiovascular complications leading to a reduction in the life expectancy of diabetics by up to 10 years. A key role in the pathogenesis of diabetes and its complications is played by protein glycation and oxidation. One of the drugs used to treat cardiovascular conditions is verapamil. Verapamil is a calcium channel blocker; however, other mechanisms of its action have been postulated.

Aim: the purpose of this experiment was to determine the antidiabetic potential of verapamil by comprehensively evaluating its antiglycoxidant capacity *in vitro*.

Materials and methods. The study was conducted in an *in vitro* experimental model of glycated bovine serum albumin (BSA). Fructose was used as the glycation agent. The used standard substances were aminoguanidine (protein glycation inhibitor) and Trolox (free radical scavenger). The intensity of protein oxidation products – concentration of total thiol (TT), glycation – N-formylkynurenine (NFK) fluorescence as well as glycoxidation – the level of Amadori products (AP) were evaluated.

Results and their discussion. Fru caused a significant intensification of oxidative/carbonyl stress compared to BSA: decreased TT level, increased NFK content and enhanced AP concentration. The model substances effectively counteracted these changes. Aminoguanidine markedly elevated TT concentration compared to Fru, as well as decreased NFK fluorescences and AP level to BSA level. Trolox reduced meaningfully the content of NFK versus the glycation factor, while the concentration of AP decreased effectively to baseline. Verapamil substantially diminished the growth of Fru-induced NFK fluorescence, while TT and AP levels were restored to the values of BSA.

Conclusion: the experiment confirmed the antiglycoxidative properties of verapamil. Since carbonyl/oxidative stress is a key etiopathogenetic component of diabetes and its cardiovascular complications, prevention of glycoxidation by the tested substance may be one of its previously undescribed mechanisms of action. Further *in vivo* studies are needed that may contribute to the registration of verapamil as an antidiabetic drug.