

THE PREVENTIVE EFFECTS OF VITAMIN E IN AGED DIABETIC RATS BLADDER AGAINST OXIDATIVE DAMAGE

Hypothesis / aims of study

Diabetes Mellitus (DM) is a chronic disease which cannot be cured completely. In uncontrolled hyperglycemia reactive oxygen species (ROS) are synthesized as a result of the glucose otooxidation. This results with the enhanced cellular lipid peroxidation in diabetic patients. The enhanced production of ROS cause the non-specific modification of proteins, phospholipids and nucleic acids leading to cell destruction.

Free radical theory is discussed in aging, also. It is well accepted that the rate of aging process depends on oxidative stress and the balance between antioxidants and prooxidants. It was proposed that the balance between oxidant and antioxidant species is important in regarding the aging process and prevention of the diabetic complications.

Our aim is to examine the effects of aging and/or DM on oxidative stress and the protective effect of vitamin E in bladder tissue.

Study design, materials and methods

Young (n= 18; 4 months; 244±27,4 gr) and aged (n= 18; 18 months; 307±26,8 gr) male Wistar albino rats were randomly allotted into six experimental groups. Group 1: Aged control; group 2: aged diabetic; group 3: aged diabetic and vitamin E treated; group 4: young control; group 5: young diabetic; group 6: young diabetic and vitamin E treated. Each group consisted of 6 animals. Diabetes was induced by streptozotocin in group 2, 3, 5 and 6. Vitamin E was administered in group 3 and 6. At the end of 6 weeks MDA and GSH levels in bladder tissues were measured. Histological changes of bladder tissues were examined by electron microscopy.

Results

We found that increased MDA and decreased GSH levels in young and aged diabetic groups compared to related control groups. Elevated MDA and reduced GSH levels were determined in aged control group according to young control group. There weren't significant difference of MDA and GSH levels between young and aged diabetic vitamin E treated groups compared to related control groups. In our study, highest degeneration was detected in aged diabetic group by electron microscopy. The protective effects of vitamin E were seen in young and aged diabetic groups, especially in young diabetics.

Interpretation of results

Though the effects of free radicals on diabetic complications were investigated (1), results of the effects on bladder tissue was not well established. In a study it was stated that oxidatif stress is effective in the progression of diabetic cystopathy and was supported immunohistochemically (2). In our study we demonstrated that in young and aged diabetic rats bladder tissue, MDA level the end product of lipid peroxidation was increased and GSH an indicator of antioxidant system was decreased. In electronmicroscopical examination, mitochondrial degeneration depending on the free radicals was obvious in both diabetic groups.

Vitamin E is a chain braking antioxidant. In diabetic rats elevated MDA levels and decreased GSH levels were normalized by vitamin E administration (3). We demonstrated that in aged and young diabetic rats vitamin E administration favoured to antioxidant system and epithelial destruction was diminished and connective tissue in lamina propria was protected, and in young diabetic vitamin E treated group the cells were quite normal. Compared to young diabetics vitamin E was more effective.

Concluding message

Our results suggested that the regular vitamin E supplementation prevents free radical damage in bladder tissue of young and aged diabetic rats.

References

1. Arch Gerontol Geriatr (2004) 39; 269-275.
2. Urology (2004) 64(5); 1062-7.
3. Cell Biochem Funct (2002) 20(1);67-71.

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Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	Yes
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