FUNCTIONAL STATE OF PARADONT IN RATS INTOXICATED WITH PHENOXYHERBICIDE

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Introduction

Chlorinated aromatic compounds, highly active herbicide 2,4-D being one of them, present a large group of chemicals polluting the environment. The investigations carried out in recent years show that the derivatives of 2,4-D produce definite toxic effect on warm-blooded animals and man (Kaioumova A. F., 1996; Imelbayeva E.A., 1998; Kaioumova A. et al., 1998; Gilmanov A. et al., 1998). The effect of herbicides on victims' body is caused by the total effect of these herbicides as well as their admixtures present in technical preparations (Izbavitelev P.V., 1962). At present it was demonstrated that one of the admixtures of herbicide 2,4-D group was dioxin (A. Schecter et al., 1998). At the same time literature lacks data concerning the effect of herbicide 2,4-D group of paradont. In this connection the purpose of the present paper is to study the effect of herbicide 2,4-DA (amino salt of 2,4-dichlorphenoxyacetic acid) on the functional state of paradont tissues in experimental animals.

Materials and Methods.

The experiments were performed on 60 male rats weighting 180-200 gr. Toxic effect was caused by the intragastric injection of 2,4-DA for 28 days in the total dose of 1200 mg\kg (LD50), 60 mg\kg (1\20 LD50) and 6 mg\kg (1\200LD 50). The intact rats having the same weight served as controls. The rats were killed under ether anesthesia. Parodont tissues were obtained for investigation. The material was obtained on the 14 and 28 days following the beginning of intoxication as well as on 7, 14, 21, 28, 42 days after ceasing 2,4-DA injection.

450 cryostat sections 7 mkm thick at t=-25°C were obtained for histochemical reactions. The activity of succinatedehydrogenase was determined using Nakhlas method, that of alkaline phosphotase by azocombination, acidic phosphotase was determined after Gomorhi method, the number of acidic glucosaminoglycans was calculated by Kheyl method. The activity of histochemical reactions was assessed according to four-mark grading system as inactive, weak, moderate and high.

Results and Discussion.

The activity of succinatedehydrogenase (SDG) in the tissue structures of marginal paradont with LD50 dose was lower than in the control. SDG activity of multilayer flat partly keratosic epithelium was also reduced in comparison with the control. The enzyme activity was weak in the proper layer of the mucous membrane both in the experimental and control groups. The activity of succinatedehydrogenase remains weak when 1\20 and 1\200 LD50 2,4-DA doses were used. (Diagrams 1,2,3).

The study of hydrolysis enzyme activity, that is alkaline phosphotase, revealed its moderate activity both in the epithelial layer and in the connective tissue of gingiva mucous membrane

irrespective of 2,4-DA dose. However, the blood capillaries in the proper plate of the mucous membrane show high activity in comparison to the control group when LD50 is injected. (Diagram 4).

We failed to reveal significant difference in acidic phosphatase activity as well as in the number of acidic glycosaminoglycane in gingiva tissue structures both in the experimental and control groups.

Acknowledgements.

Thus, significant changes in paradont enzymatic system in experimental animals have been revealed. First of all, succinatedehydrogenase (SDG) and alkaline phosphatase activity change was observed. SDG activity change demonstrates pronounced shifts of oxidation-reduction processes in gingiva epithelial layer.

Toxic factors have been found to cause increased enzymatic activity in the youngest cells capable of dividing. In the course of their differentiation the enzyme activity gradually subsides which contributes to accelerated epithelium cornification process. Reduced alkaline phosphatase activity of gingiva epithelial layer demonstrates decreased metabolic processes. Consequently, 2,4-D causes metabolic changes in gingiva tissue structures in experimental animals which undoubtedly effects the functional state of paradont.

References

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Diagram 1

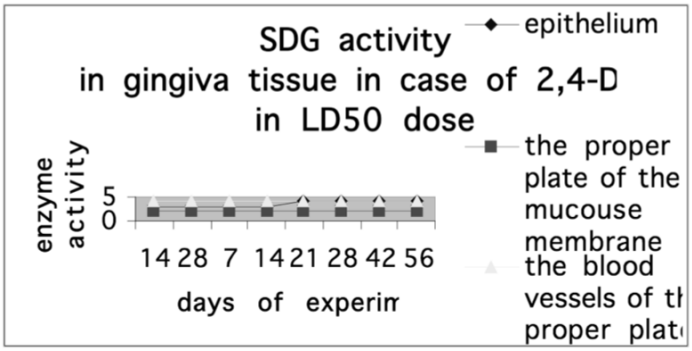

Diagram 2

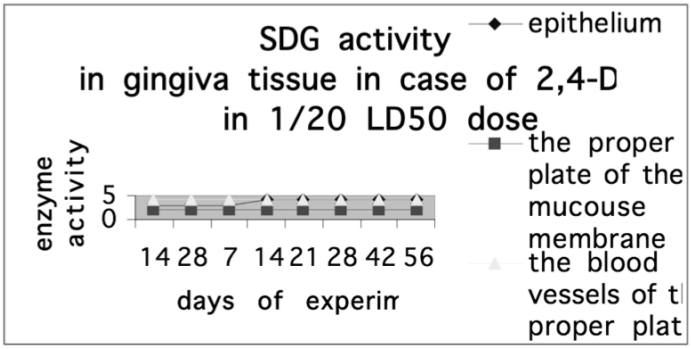

Diagram 3

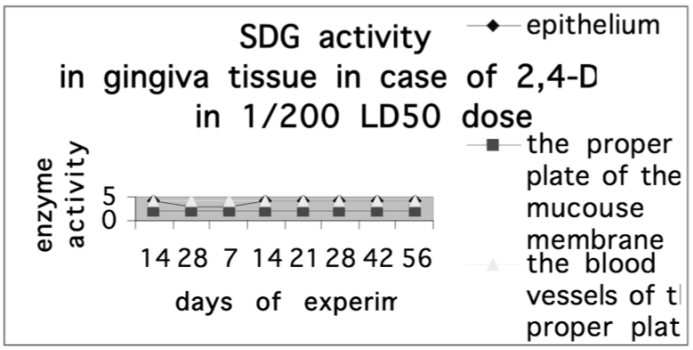

Diagram 4