

THEORETICAL AND EXPERIMENTAL MEDICINE

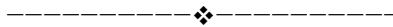
*Nikolaieva O.V., Smirnov A.S.**

STATUS OF EUCHROMATIN IN NUCLEI OF PYLORIC MUCOUS CELLS AFTER INHALATION OF EPICHLOROHYDRIN AND CORRECTION OF EMERGING CHANGES

Kharkiv National Medical University, Ukraine
*State Establishment "Lugansk State Medical University", Ukraine

Abstract: The study which involved examination by electronic microscopy determined that the area of euchromatin in one nuclei of gastric pyloric mucous cells of Albino outbred sexually mature adult male rats after inhalation of epichlorohydrin diminished as compared to the same index in rats of control group on 13.3% ($p < 0.05$) and 7.4% ($p < 0.05$) on the 1st and 30th day of supervision, respectively. Administration of both *Echinacea purpurea* extract and Thiotriazoline did not result in a change of euchromatin area. Employment of *Echinacea purpurea* extract in rats exposed to epichlorohydrin did not exert an impact on the duration and severity of the induced euchromatin area reduction. Application of Thiotriazoline secondary to epichlorohydrin exposure decreased the duration of the induced euchromatin area reduction.

KeyWords: pyloric glands, mucous cells, euchromatin in one nucleus, epichlorohydrin, *Echinacea purpurea* extract, thiotriazoline.



INTRODUCTION

The current state of population health depends on the degree of environmental pollution [2, 3]. There is pressure on ecological systems, among other factors determined by chemical pollutants, which come as a result of human activity in these systems [7, 8, 11]. One of the pollutants is epichlorohydrin [10]. The effect of epichlorohydrin results in the development of impairments in the organs of the immune, reproductive, respiratory systems, skin, eyes [1, 4, 5, 6, 9]. However, in the literature there are no data on the nature of epichlorohydrin action on the mucous membrane of the stomach and its action on the euchromatin in the nuclei of pyloric mucous cells.

2 PURPOSES, SUBJECTS AND METHODS:

2.1 Purpose

The objective of the research was to study the status of euchromatin in nuclei of pyloric mucous cells in rats after inhalation of epichlorohydrin and to provide evidence of the possibility of using an extract of *Echinacea purpurea* and Thiotriazoline for correcting the changes.

2.2 Subjects & Methods

The trial involved Albino outbred sexually mature adult male rats. The rats were divided into six experimental groups, each including thirty rats. Group I rats constituted Control Group. Group II rats were administered epichlorohydrin in a dose of 10 MPC (10 mg / kg) by inhalation for two months, five days a week for five hours a day. Group III rats were given *Echinacea purpurea* extract in a dose of 200 mg per kg of body weight through gastric tube for two months, five days per week. Group IV rats were administered Thiotriazoline in a dose of 117.4 mg per kg of body weight as an injection of 2.5% solution intraperitoneally for two months, five days a week. Group V rats were

Corresponding Author:

Anton Smirnov, postgraduate student, State Establishment "Lugansk State Medical University", Ukraine, e-mail: sns60@rambler.ru

exposed to epichlorohydrin and extract of *Echinacea purpurea*, and Group VI rats were exposed to epichlorohydrin and thiotriazoline according to the above described procedure. After two-month administration of epichlorohydrin, the extract of *Echinacea purpurea* and Thiotriazoline, six rats from each experimental group were taken out of the experiment on the first, seventh, fifteenth, thirtieth and sixtieth day. Examination with electronic microscope implied assessment of gastric fragments, which were placed in glutaraldehyde for 24 hours, and then to 1% osmium hydroxide for 1 hour. After dehydration the samples in increasing concentrations of ethanol and in absolute acetone material were filled with a mixture of epoxy resin (Epon-Araldite). The polymerization was carried out for 36 hours at a temperature of 60° C. Ultrathin slices were made on ultramicrotome UMT-4 ("Electron" Sumy, Ukraine). The slices were contrasted in uranyl acetate solution and lead citrate according to Reynolds. Microscopy was performed using an electronic microscope EM-125 of the same manufacturer. The square of euchromatin in the nuclei of pyloric mucous cells was determined using "Microvisible" software company Micros (Austria). Excel software was used for statistical analysis of the results. Significance of differences was assessed using Mann-Whitney U test. The difference was considered significant at $p < 0.05$.

Conflict of interests

There is no conflict of interests.

3 RESULTS AND DISCUSSION

Epichlorohydrin introduction decreased the square of euchromatin in one nucleus of mucous cell in the pyloric glands in comparison with the corresponding index in the rats of Control Group by 13.3% ($p < 0.05$) on the first day, by 7.4% ($p < 0.05$) on the thirtieth day after the inhalation cessation. It should be noted that the square of

euchromatin in one nucleus of mucous cells in the pyloric glands in the rats undergoing the inhalation of epichlorohydrin increased by 13.1% ($p < 0.01$) for the period from the first to the sixtieth day of observation (Table 1).

Table 1.
The square of euchromatin in one nucleus of pyloric mucous cell ($M \pm MSD, \mu m$)

Day of observation	Number of rats per group	Gp1	Gp2	Gp3	Gp4	Gp5	Gp6
1	n = 6	8.83 ± 0.60	7.66* ± 0.66	8.91 ± 0.68	9.06 ± 0.71	8.01* ± 0.55	8.22* ± 0.54
30	n = 6	8.82 ± 0.55	8.17* ± 0.63	8.80 ± 0.61	8.98 ± 0.66	8.27* ± 0.44	8.68 ± 0.57
60	n = 6	9.05 ± 0.40	8.66 ^x ± 0.42	9.37 ± 0.54	9.17 ± 0.69	8.72 ^x ± 0.53	8.98 ^x ± 0.52

Note:

- 1) * - $p < 0.05$ in comparison with the indices in Control Group rats;
- 2) # - $p < 0.05$ in comparison with the indices in rats that underwent epichlorohydrin inhalation;
- 3) x - $p < 0.05$ in comparison with the indices in the rats of the same experimental group at different periods of observation.

Introduction of both the extract of *Echinacea purpurea* and Thiotriazoline did not lead to a change in square of euchromatin in comparison with the corresponding index in the rats of Control Group ($p > 0.05$). The square of euchromatin in one nucleus of mucous cell in the pyloric glands in the rats of Group III and in the rats of Group IV did not change for the period from the first to the sixtieth day of observation ($p > 0.05$).

Introduction of Epichlorohydrin and the extract of *Echinacea purpurea* decreased the square of euchromatin in one nucleus of pyloric mucous cell in comparison with the corresponding index in Control Group rats by 9.3% ($p < 0.05$) on the first day, by 6.2% ($p < 0.05$) on the thirtieth day after the introduction cessation. Statistically significant differences between the values of the square of euchromatin in Group II rats and Group V rats were absent at all stages of the research ($p > 0.05$). The square of euchromatin in one nucleus of mucous cell in Group V rats became more by 8.9% ($p < 0.05$) for the period from the first to the sixtieth day of observation ($p < 0.05$).

The square of euchromatin in one nucleus of pyloric mucous cell decreased after introduction of Epichlorohydrin and Thiotriazoline in comparison with the corresponding index in Control Group rats by 6.9% ($p < 0.05$) on the first day of observation. There were no differences between the values of the square of euchromatin in Group II rats and Group VI rats ($p > 0.05$). The square of euchromatin in Group VI rats increased by 9.2% ($p < 0.05$) during the time from the first to the sixtieth day of the research.

4 CONCLUSIONS

The experimental results indicate the presence of changes in the square of euchromatin in one nucleus of pyloric mucous cell in rats following inhalation of epichlorohydrin, allowing to draw the following conclusions:

1. Prolonged inhalation of epichlorohydrin is accompanied by a decrease in the square of euchromatin in one nucleus of pyloric mucous cell in rats, which remains after the completion of epichlorohydrin administration.
2. The introduction of both the extract of *Echinacea purpurea* and Thiotriazoline did not lead to a change in the square of euchromatin.
3. Administration of *Echinacea purpurea* extract in rats treated with epichlorohydrin had no effect on the duration and severity of the induced reduction of euchromatin square.
4. Administration of Thiotriazoline secondary to epichlorohydrin decreased the duration of euchromatin square reduction. Thiotriazoline softens the effect of reducing the square of euchromatin in the nuclei of mucous cells in the pyloric glands.

Prospects for further research. Continued investigation of the character of epichlorohydrin influence on the stomach will make it possible to find out the mechanisms of changes in the body in response to xenobiotics creating an

experimental basis for the elaboration of promising ways to prevent the development of changes and their correction.

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