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STUDY OF INFLUENCE OF TOXIC SUBSTANCES ON ORGANISM

In the article the questions of complex action of crude oil are shown on the whole on the organism of rats. Morphological, haematological processes are studied for mammals, developing under influence of action of crude oil, getting them with food and water in the conditions of laboratory experiment. It is set that enterosorbent possesses the expressed universal absorbent property. In the road clearance of gastrointestinal tract it can link and destroy from an organism acting from outside and appearing inwardly toxic substances of different nature, including oil products.

Keywords: toxic substances, rats, morphological processes, haematological processes, enterosorbent, histological research, haematological index of blood, speed hemopexis, automatic haematological analyzer.

Introduction. Presently considerable part of illnesses of man and animals is related to worsening of ecological situation. Oil, getting in the organism of animals, can cause the gastroenteric bleeding, intoxication of liver, kidney insufficiency and violations of pesis.

Presently from influence of environment there is influence of enormous amount of toxic substances on the organism of man and animals. Toxic substances affect organism of people through respirable air, consumable food, water and through a skin. Under influence of toxic substances there are the pathological processes in organs, attended with the morphological changes of tissue their formative.

Violation of structure of one of them affects functional and structural properties of other tissue systems, that results in certain violations of intertissuecooperations. Finding out of biological mechanisms of action of toxic substances at intercellular and intertissue level matters very much for understanding of pathogeny of different diseases. For renewal and defence of organism of man enterosorbents, able to take in, render harmless and destroy toxic connections from an organism, are widely used [1-10].

From literary data evidently, that small works on the study of morphological changes on a background the use of complex action of enterosorbent on the whole on the organism of man and animals. For normalization of the broken exchange processes in the organism of man and animals, caused by eco-toxicants of anthropogenic character, very much different facilities and methods offer, heavy metals, adsorbents, and forage additions. Effective means reducing the negative consequences of action of eco-toxicants on the organism of animals are enterosorbents. Enterosorbent practically does not have contra-indications, does not require the special equipment, applicable in any terms [11-15].

Taking into account, importance of enterosorbents by us was high-efficiency carbon enterosorbents on the basis of digister, possessing a correction, universal sorbition abilities, goes out an organism by a standard method. In this connection, we undertook a study on determination of effective influence of enterosorbents on the histological and haematological indexes of white outbred rats getting it with food and water in the conditions of laboratory experiment.

Methods of realization of the experiment. Research object is 60 outbred rats-males of three months age with initial mass 200-220 gramms. Rats were neat on sex, age, mass. The choice of males for a study was conditioned by that for females in the different terms of ex-trawl cycle a sensitiveness can change to the different factors, and also a hit is possible in experience of pregnant females. The animals selected for experience answered all requirements produced to raising of experiment (Good Laboratory nursery).

1 group is an intact group;

2 group is an experience group - poisoning of Tengiz deposits;

3 group is an experience group is poisoning by oil of Tengiz deposit + enterosorbent.

Research is plugged in itself by influence of crude oil on shallow mammals in laboratory terms. Control group of animals got the same forage, in the same amounts and proportions, but without addition of oil. During an experiment in the food ration of experimental groups of animals got the same forage, in the same amounts and proportions, but without addition of oil. During an experiment in the food ration of experimental groups of animals systematic - added crude oil of Tengiz deposit.

On the first stage of experiment a feed was mixed by oil in gravimetric correlation 1: 0,01 is a concentration of oil about 1%, the concentration of oil of 0,001% was created in a drinking-water. Thus, taking into account day's ration of rat 2, 3 groups got crude oil in a dose- 6 g/kg/day. On the second stage of experiment animals 3 groups after poisoning by oil enterosorbent every day in the dosage of 1g/kg/day. Animals were contained in terms vivariums, by free availability to food, water and were one age. An experiment was conducted on standard to the generally accepted methodology. Viewing and photographing of the got histological preparations carried out through the light microscope of LeicaDMLS with the digital chamber of LeicaDFS 280.

For determination of haematological indexes of blood (amount of haemoglobin, red cells, thrombocytes and leucocytes, and similarly speed and haemopexis) of used automatic haematological analyzer of Abacus Junior Vet, productions of DIATRON (Austria). Fence of blood for laboratory animals came true by the method of counteretch for rats, approximately 0,5-0,6 mls of blood. Animals before a counteretch were put to sleep by a chloroform.

Haematological researches. Haematological indexes of blood at petroleum contamination and after a correction in a winter-spring period it was shown by its enterosorbent, that during the repeated realization of experiment practically all haematological indexes of blood of animals of the second group fell down at petroleum contamination. For some animals of the second group leucopeny, relatively absolute lymphopenia and monocytosis were marked. Sharply fell down level of red corpuscles and haemoglobin, and also thrombocytes. Experimental data showed that the stay of rats on a petroleum diet had

resulted in the considerable changes of leukocytes picture of peripheral blood. After the stay of rats on a petroleum diet there was statistically the reliable ($P < 0,001$) lowering of general amount of leucocytes to $1,6 \pm 0,02$ $10^9/l$. as compared to a control group are $4,9 \pm 0,03$ $10^9/l$. It is impossible to eliminate the origins of leucocytosis in our experiments and due to mobilization of cages from a wall pool in circulator. After disintoxication the amount of leucocytes increased to $5,1 \pm 0,01$, leukoformulenotedly got well. Experimental data showed that the stay of rats on a petroleum diet had resulted in the considerable changes of index of red corpuscles of peripheral blood.

After the stay of rats there was statistically the reliable ($P < 0,001$) lowering of all indexes of index of red corpuscles on a petroleum diet, the amount of red corpuscles and haemoglobin is special to - $8,29 \pm 0,08$ and $89 \pm 3,5$ accordingly. After disintoxication the amount of red corpuscles and haemoglobin increased to - $8,97 \pm 0,07$ and $113 \pm 6,4$ accordingly, erythrocytes formulenotedly got well. These changes in the thrombocyte index of peripheral blood at petroleum contamination and after a correction it was shown by its enterosorbent, that the stay of rats on a petroleum diet had resulted in the considerable changes of index of red corpuscles of peripheral blood. After the stay of rats there was statistically the reliable ($P < 0,001$) lowering of some indexes of thrombocyte index on a petroleum diet, the amount of thrombocytes and thrombocyte is special to - $577 \pm 13,5$ and $0,351 \pm 0,002$ accordingly. After disintoxication the amount of thrombocytes and haemoglobin increased to - $680 \pm 8,2$ and $0,461 \pm 0,001$ accordingly, thrombocyte formula notably got into norm. Experimental influence caused in the organism of shallow mammals of the second group noticeable deviations from a norm, and indexes of blood the animals of the third group had very near with the indexes of blood of control group of animals. It talks that enterosorbent as a purifier of organism from toxicants positively influences on the indexes of blood at chronic to intoxication. Consequently application of enterosorbent effectively reduces negative influence of oil on the homeostasis of organism.

Morphological researches. Results of histological research of lungs, heart, buds, bowels and stomach for the control rats of the first group on semithin cuts showed that all organs are in a norm. The results of histological research of lungs for the experimental rats of the second group after influence of crude oil were found out the expressed morphological changes. The phenomena of atelectasis of pulmonary fabric are placed visible, alternating with the areas of swelling of pulmonary tissue. Microscopic research of myocardium of experimental rats of the second group showed an edema and destruction of separate endothelial cages. Of the circulatory system capillaries were sanguineous. Morphological researches of mucous membrane of thin department of bowels covered by a monolayer with a border epithelium with the unclearly expressed arctic differentiation of relatively basale membrane.

There was a plethora of capillaries of hair and vessels of own shell in a thin bowel. The hypersecretion of bowel cells was also marked, that can be considered as a protective reaction. Histological research of bowels of rats at influence crude oil showed the expressed changes of destructive character in thin bowels and insignificant morphological changes of compensatory-adaptive character in the thick department of bowels. Histological researches of action of crude oil on the stomach of rats educed pathomorphological changes in a structure, there was an edema of mucous membrane of stomach and violation of integrity of epithelium in the separate areas of stomach. As a result of histological study of organs of experimental rats of the third group after poisoning by nanoenterosorbent was visible oil of Tengiz deposit +, that morphological researches of action of enterosorbent on the stomach of rats did not educe strong changes in the structure of this organ. On expiration of experiment after the reception of enterosorbent the stomach of rat looked fully renovated. Morphological research of kidneys of experimental rats of the third group showed that feeding by enterosorbent assisted the increase of compensatory-adaptive reactions. The histological study of microslides of myocardium of experimental rats of the third group showed on semithincuts, that in the muscular shell of heart of strong damages was not observed. As a result of histological research of bowels there is strengthening in the mucous membrane of shell of thin bowel by the bowel cells of hair secretion of mucus and selection of it in the road clearance of bowels, that executes a protective reaction on entering it road clearance of oil, the secretion of mucus increased bowel cages, its accumulation was marked in space between hair, also there are insignificant morphological changes in the thick department of bowels.

Conclusion. Haematological indexes of blood the animals of the third group had very near with the indexes of blood of control group of animals. For the animals of control group and third group the signs of anaemia were not marked, it talks about that, enterosorbent as a purifier of organism from toxicants positively influencing on the indexes of blood during chronic intoxication. In the road clearance of gastrointestinal tract enterosorbent can link and destroy from an organism acting from outside and appearing inwardly toxic substances of different nature, including oil products, and also can sorb surplus of bilirubin, cholesterol and lipid complexes, metabolites of nitrous exchange, substances of "middle molecular mass", accountable for development of metabolic toxicosis.

The results of histological research of internal organs specify on that after influence of crude oil the expressed morphological changes come to light in lungs, heart, kidneys, bowels, stomach of animals. The obtained experimental data of the third group testify that at petroleum contamination and after a correction its enterosorbent during two months accompanied rats by reduction of damage of organs. Undertaken studies for the rats of the second group allowed to educe, that over feeding with of rats crude oil brings to strong destructive violations of organs of lungs, heart, kidneys, bowels, stomach, and application in the experiment of crude oil and after a correction assisted reduction of dystrophic processes and increase of compensatory-adaptive reactions.

Conclusions:

1. Experimental influence crude oil caused in the organism of rats of the second group noticeable deviations from a norm. Adding of crude oil to the food ration resulted in the destructive changes of organs of animals of this group. Application of enterosorbent notably brought down negative influence of oil on morphological changes.
2. Enterosorbent can have antioxidant, blocks the action of aggressive free radicals and adaptogenic properties, promotes the resistibility of organism to the infections, unfavorable ecological factors, plays an important correction role.
3. The use of enterosorbent in experiment of the third group does not cause in the investigational organs of rats of the special changes of destructive character. Insignificant changes in histostructure fully reversable and carry compensatory-adaptive character.
4. It is set that enterosorbent possesses the expressed universal sorbtion property, renovates homeostasis of organism and possesses compensatory-adaptive characteristics.

REFERENCES

- 1 Barushnikov I.I., Kolesnikov S.I. Toxicologic estimation of new chemicals // Publ. of Irkutsk. - 1992. - №1. - P. 154-161.
- 2 Berezovskaya I.V. Classification of chemicals on the parameters of sharp toxicness at the parenterally methods of introduction // Chemical and pharmaceutical magazine. - 2003. - №3. - P. 32-34.
- 3 Gribova I.A. About the value of morphological analysis of blood at the different levels of influence of lead // Occupational and Health. diseases. - 1983. - №2. - P. 22-25.
- 4 Zdolnik T.D. Toxic aspects of influence of metals on the function of digestion // Monograph. - Ryazan: 2007. - P. 166-174.
- 5 Isaev V.A. Physiological aspects of digestion and feed. - M.: 2010. - 374 p.
- 6 Kucenko S.A. Bases of toxicology. - M.: Folio, 2004. - 252 p.
- 7 Shaposhnikov V.M., Kirushkina M.N., Simonova G.P., Blinov S.P., Rodents as possible indicators of crude oil contamination of environment // Rodents. - 2008. - P. 222-228.
- 8 Ugolev A.M. Physiology and pathology of wall digestion. - Leningrad: 1967. - 404 p.
- 9 Gref Joule. B. Poisoning by the heavy metals / of Joule. B. Gre, F.G. Levuzha // Internal illnesses. - M.: 1994. - P. 447-460.
- 10 Krasovski G.N., Rahmanin U.A., Egorov N.A. Extrapolation of toxicological data from animals to the man. - M.: 2009. - 344 p.
- 11 Rasputin V.G. Oil and oil products. Affecting biocenosis. - M.: 1989. - 312 p.
- 12 Gildenskioid P.S. Heavy metals in an environment and their influence on an organism: (review) // Hygiene and sanitation. - 1992. - №5. - 89 p.
- 13 Krivosheykin D.A., Muravev L.A., Roeva N.N., Shorina O.S., Eriashvilli N.D., Yurovicki U.G., Iakovlev of B.A. Ecology and safety of vital functions. - M.: 2000. - 396 p.
- 14 Glotova S. V. Study of sharp and chronic toxicness of preparation RANK 3607// the Pressing questions of veterinary biology. - 2009. - № 2 (2). - P. 15-18.
- 15 Stacevich L.H. Speaker of morphological changes of mucous membrane of bowels at posterity of rats after application of preparation of "Vestin" in the different terms of pregnancy // Sib, vest of c-x science. - 2007. - №6. - P. 164-168.

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УЫТТЫ ЗАТТАРДЫҢ АҒЗАҒА ӘСЕРІН АНЫҚТАУ

Түйін: Мақалада, егеуқұйрық ағзасына мұнай шикізатының кешенді әсерінің жалпы сұрақтары қарастырылғандығы көрсетіледі. Зертханалық тәжірибелер барысында, сүтқоректілерді қоректендіру негізінде тағаммен және сумен келетін мұнай шикізатының әрекетінің әсерінен болатын морфологиялық, гематологиялық процестер анықталынды. Энтеросорбент әмбебап сорбциялық қасиеттерге ие екендігі анықталынып құрылды. Ағздан және сырттан келіп түскен сондай - ақ іште пайда болған түрлі табиғатты уытты заттарды және мұнай өнімдерін саңылауда асқазан-ішек трактының байланыстыруы мүмкін.

Түйінді сөздер: уытты заттар, егеуқұйрықтар, морфологиялық процестер, гематологиялық процестер, энтеросорбент, гистологиялық зерттеу, қанның гематологиялық көрсеткіші, қанның ағу жылдамдығы, автоматтандырылған гематологиялық анализатор.

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ИЗУЧЕНИЕ ВЛИЯНИЯ ТОКСИЧЕСКИХ ВЕЩЕСТВ НА ОРГАНИЗМ

Резюме: В статье показаны вопросы комплексного действия сырой нефти в целом на организм крыс. Изучены морфологические, гематологические процессы у млекопитающих, развивающихся под влиянием действия сырой нефти, получавших ее с пищей и водой в условиях лабораторного эксперимента. Установлено, что энтеросорбент обладает выраженным универсальным сорбционным свойством. В просвете желудочно-кишечного тракта он может связывать и выводить из организма поступающие извне и образующиеся внутри токсические вещества различной природы, в том числе нефтепродуктов.

Ключевые слова: токсические вещества, крысы, морфологические процессы, гематологические процессы, энтеросорбент, гистологическое исследование, гематологический показатель крови, скорость свертывание крови, автоматический гематологический анализатор.