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STRUCTURAL CHANGES IN THE LABORATORY RATS' KIDNEYS IN CASE OF DEVELOPMENT OF DIFFERENT EXPERIMENTAL AND SPONTANEOUS TUMORS

At the modern stage of the medicine development of the biological modelling of diseases becomes the most important scientific method. That fact causes the necessity to create such experimental models on laboratory animals that would reflect mechanisms of the origin and development of human deseases and mechanisms of recovery. Organization of the experiments is impossible without profound knowledge of the laboratory animal's biology that remains poorly investigated today. Study of the condition of tumor-carrier's kidneys is a part of that problem.
Keywords: *Kidney, cell, epitheliocyte.*

Actuality. At the modern stage of the medicine development of the biological modelling of diseases becomes the most important scientific method. That fact causes the necessity to create such experimental models on laboratory animals that would reflect mechanisms of the origin and development of human deseases and mechanisms of recovery. Organization of the experiments is impossible without profound knowledge of the laboratory animal's biology that remains poorly investigated today. Study of the condition of tumor-carrier's kidneys is a part of that problem.
Information that is available in the scientific literature is obtained by means of clinical investigation, and it is concerned with functional changes in the kidneys in case of tumor development [1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20].
Taking into consideration the above mentioned facts we tried to determine the structural changes in the rat's kidneys in case of experimental and spontaneous tumors.
Methods. For our investigation we used adult males of laboratory rats. Five groups of animals were formed. Group №1 (control) included five intact rats. Group №2 included five rats that were subjected to the subcutaneous introduction of cell strain of experimental lymphosarcoma. Group №3 included five rats that were subjected to the intraperitoneal introduction of cell strain of experimental ovarian tumor. Group №4 included five rats that were subjected to intraperitoneal introduction of cell strain of experimental tumor sarcoma 45. Group №5 included three rats in which spontaneous mammary tumors were discovered. The rats to which the experimental tumors were transplanted were killed by the time of full development of the tumors. Animals of the groups №1 and №3 were put to sleep with the help of diethyl ether on the twelfth day after transplantation. Animal of the groups №2 and №4 were put to sleep on the twentieth day. Animals of the group №5 were put to sleep after the spontaneous mammary tumors in them were discovered. Then the abdominal cavity was opened, the kidneys were extracted and were fixed in the solution of formalin. Paraffin sections were stained with hematoxylin-eosin and were examined under light microscope.
Discussion. The kidney of the control group rats is covered by a thin capsule (4,52±0,2 micrometers in thickness) that consists of numerous cellular elements containing elongated hyperchromatic nuclei and of thin connective tissue fibres. All the structural elements of the renal capsule are very densely arranged and are oriented along the surface of the organ.
In the renal parenchyma the cortex and medulla are distinguishable. Within the cortex the scattered glomerules (76,2±2,9 micrometers in diameter), are made up of capillaries the lumens of which are well visible. Parietal layer of the glomerular capsule is lined by flattened epithelium containing elongated nuclei.
The bulk of cortex is occupied by convoluted tubules lined by unilayered epithelium that is 7,6±0,19 micrometers in height. Cytoplasm of the epithelial cells is granular, boundaries of the cells are not visible, basal membrane is not defined. Rounded and oval nuclei of the epithelial cells have prominent karyolemma and distinct masses of chromatin. Diameter of the nuclei is 4,95±0,16 micrometers. The convoluted tubules contain lumens the average width of which is 18,17±0,8 micrometers. Between the convoluted tubules one can discover thin-walled vessels containing formed elements of blood.
Renal medulla is made up of straight tubules that are lined by squamous epithelium. Height of the epithelial cells is 3,35±0,13 micrometers. Cytoplasm of the epithelial cells is granular, boundaries of the cells are indistinguishable. Oval nuclei of the epithelial cells have clearly defined karyolemma and well visible masses of chromatin. Diameter of the nuclei is 4,17±0,12 micrometers. The straight tubules contain lumens the average width of which is 13,34±0,5 micrometers.
In kidneys of the rats of group №2 one can discover wrinkled glomerules. Average diameter of the glomerules is 64,57±2,17 micrometers. Epithelium of the cortical tubules is destroyed in many zones. In those zones where the epithelial cells are preserved their average height is 8,38±0,37 micrometers, and the diameter of their nuclei is 4,87±0,16 micrometers. Many of the epithelial cells are devoid of nuclei. Sometimes one can discover layers of epithelial cells that have lost connection with basal membrane. In some of the epithelial cells the apical parts are destroyed. Vacuolated epithelial cells are often found. Many of the tubules situated close to the renal surface are often devoid of the epithelial lining. There are not numerous cavities that have formed in places of destroyed renal tubules. Cortical blood vessels are engorged with blood.
In the medulla the degenerative changes take place to a considerably smaller degree. But here one can discover tubules that are devoid of epithelial lining and canaliculi that are lined by anucleate or vacuolated epithelium. In some cases epithelium loses connection with basal membrane. Lumens of some tubules are filled with fragments of cytoplasm and with irregularly scattered nuclei. In the medulla there are some cavities containing vacuolated homogeneous colloid-like substance. Medullary blood vessels are engorged with blood.
In kidneys of the rats of group №3 the capsula is thickened (12,79±0,52 micrometers). It consists of numerous cellular elements containing oval nuclei and of thin connective tissue fibres running along the renal surface.
Some of the glomerules are characterized by present of dilated capillaries that are engorged with blood. The other glomerules are wrinkled, the parietal layer of their capsule is destroyed.
In the most zones of convoluted tubules the epithelium is degenerating. In some cases the epithelial cells are devoid of nuclei. In the other cases they represent shapeless mases within which preserved nuclei are scattered. In some zones the epithelium

is so increased that it entirely closes the lumen. Thin connective tissue septa between convoluted tubules are seen better than in those of intact rats.

In the medulla the degenerative changes take place to a considerably smaller degree. Lumens of straight tubules are increased in comparison with those of intact rats (16,61±0,78 micrometers). Hight of the epithelium is also increased (5,93±0,27 micrometers). Nuclei of the epithelial cells are rounded and oval in shape, their diameter is 5,46±0,15 micrometers. In some zones the epithelium of the straight tubules is cast-off.

Kidneys of the rats of group №4 are characterized by considerable destructive changes. Entirely preserved glomerules are not found. The most of the glomerules represent wrinkled shameless mass. There are empty and sclerotic glomerules.

Not numerous preserved renal tubules are lined by epithelial cells the boundaries of which are not distinct. Rounded and oval nuclei of the cells have clearly defined karyolemma and prominent nucleoli. Destruction of the renal tubules was accompanied by thickening of basal membrane. Collapsing epithelial cells gradually fill the tubular lumens.

There are numerous cases of local necrosis that represent shapeless masses within which nuclei are irregularly scattered.

In the rats of group №5 renal cortex contains wrinkled and destroyed glomerules.

In the medulla the epithelium of renal tubules is often cast-off. Here there are also zones of vacuolated homogeneous substance. Some zones are made up of destroyed tubules; those zones are infiltrated with formed elements of blood.

Conclusions. Development of neoplasms in the organism of laboratory rats causes structural changes in the kidneys: destruction of renal glomerules and tubules, formation of necrotic zones.

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ӘР ТҮРЛІ ТӘЖІРИБЕЛІК ЖӘНЕ СПОНТАНДЫ ТҮРДЕ ДАМЫҒАН ІСІКТЕР КЕЗІНДЕ ЗЕРТХАНАЛЫҚ ЕГЕУҚҰЙРЫҚТАРДЫҢ БҮЙРЕКТЕРІНДЕ БАЙҚАЛАТЫН ҚҰРЫЛЫМДЫҚ ӨЗГЕРІСТЕР

Түйін: Авторлар тәжірибелік ісіктер (Плисе лимфосаркомасы,аналық жыныс безінің аффенитивті ісігі,саркома 45) және сүт безінде спонтанды ісіктер дамығанда зертханалық егеуқұйрықтардың бүйректерінде байқалатын морфологиялық өзгерістерді зерттеген.Зерттеу барысында жалпы құрылымдық өзгерістермен қатар аталмыш ісіктердің әр қайсысына тән жеке ерекшеліктер анықталды.
Түйінді сөздер: бүйрек,жасуша,эпителиоцит

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СТРУКТУРНЫЕ ИЗМЕНЕНИЯ В ПОЧКАХ ЛАБОРАТОРНЫХ КРЫС ПРИ РАЗВИТИИ РАЗЛИЧНЫХ ЭКСПЕРИМЕНТАЛЬНЫХ И СПОНТАННЫХ ОПУХОЛЕЙ

Резюме: Авторами изучались морфологические изменения почек у лабораторных крыс при развитии экспериментальных опухолей (лимфосаркома Плисса, АфОЯ, саркома 45), а также при развитии спонтанных новообразований молочной железы. Были установлены как общие закономерности структурных изменений, так и специфические особенности, характерные для каждого вида опухолей.
Ключевые слова: почка, клетка, эпителиоцит.