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MORPHOLOGIC CHANGES OF THE RAT'S THYMUS IN CASE OF INTRAPERITONEAL DEVELOPMENT OF EXPERIMENTAL TUMOR SARCOMA 45

It is known that the thymus is an organ regulating immunomorphologic processes in the organism. Reactive changes in the thymus occur in case of oncological diseases. Information that we discovered in the available literature concerns mainly structural changes in thymus in case of spontaneous and chemically induced tumors. We tried to determine structural changes in the rat's thymus in case of intrapperitoneal development of the experimental solid tumor sarcoma 45.
Keywords: *tumor, rat, cell.*

Actuality. It is known that the thymus is an organ regulating immunomorphologic processes in the organism. Reactive changes in the thymus occur in case of oncological diseases. Information that we discovered in the available literature concerns mainly structural changes in thymus in case of spontaneous and chemically induced tumors [1, 2, 3, 4, 5]. We tried to determine structural changes in the rat's thymus in case of intrapperitoneal development of the experimental solid tumor sarcoma 45.

Methods. For our investigation we used two groups (number one and number two) of laboratory rat's males at the age of three months. Each of the groups included five animals. Rats of the group number one (control) were intact. Rats of the group number two were subjected to the intraperitoneal transplantation of tumor cells.

On the twentieth day of the experiment all the animals were killed. The thymus and pieces of the tumor were extracted and fixed in solution of formalin. Paraffin sections were stained with haematoxylin-eosin. Histologic specimens were observed under light microscope.

Discussion. Microscopically it was estimated that on the outside the thymus of the control rats (animals of the group number one) is surrounded by connective tissue capsule that consists of numerous cells, and thin wavy fibres lying parallel to the sirface of the organ. The connective tissue cells contain rounded and oval nuclei that are pooly stained, and are characterized by presence of distinct karyolemma and masses of chromatin. Within some zones of the capsule its structural elements are loosely arranged, and among them there are lymphoid cells. Thickness of the capsule is 19,03±0,62 micrometers.

Trabeculae arising from the capsule extend deeply into the substance of the thymus and partially separate lobules from each other. The trabeculae are penetrated by thin-walled vessels filled with formed elements of blood. Inner surfaces of the blood vessels are lined by thin endotheliocytes containing elongated poorly stained nuclei.

Each thymic lobule has an outer cortex and an inner medulla that differ from one another by density of the lymphoid cell arrangement. The medulla of the adjoining lobules is continuous.

Thickness of the cortex is 213,33±10,04 micrometers. The lymphoid cells in it are very densely arranged, their boundaries are not prominent. Rounded and oval nuclei of the cells are densely stained and are 3,86±0,14 micrometers in diameter.

The epithelial reticular cells are sometimes found between the cortical thymocytes. The epithelial reticular cells contain rounded and oval poorly stained nuclei that have distinct karyolemma and masses of chromatin. The nuclei are 5,62±0,21 micrometer in diameter. The thymic cortex is penetrated by thin-walled vessels filled with formed elements of blood.

Thymic medulla is 260,0±7,6 micrometers in thickness. It is penetrated by numerous small blood vessels. Thymocytes of the medulla are arranged looser, and their nuclei are bigger in size than those of the cortex, the diameter of the nuclei is 4,45±0,14 micrometers.

Epithelial reticular cells of the medulla are found more often, and some of them are arranged in groups including two to twelve cells. Nuclei of the cells are 6,9±0,3 micrometers in diameter. Among the medullary epithelial reticular cells there are degenerative ones, this fact obviously is the result of the beginning of formation of Hassall's corpuscles.

Completely formed Hassall's corpuscles are found in the cortex of the lobules. The corpuscles are rounded or irregular in shape, they are composed of concentrically arranged epithelial cells. Some of them contain centrally located cavities. Average diameter of the Hassall's corpuscles is 10,3±0,4 micrometers.

In different parts of the thymus of the control rats there are singly present large oval cells (11,4±0,2 micrometers in diameter). Their cytoplasm is eosiniphilic, and their nuclei are centrally situated and densely stained. Those cells resemble plasma cells.

In the rats of the group number two the thymus is surrounded by connective tissue capsule infiltrated by lymphoid cells. Capsular vessels are dilated and filled with formed elements of blood.

Within the lobules of the thymic parenchyma the structural difference between cortex and medulla isn't conspicuous: in all zones the lymphoid cells are arranged very densely. Boundaries of the thymocytes are not prominent.

In some zones of the lobules the nuclei of the lymphoid cells are densely stained; the diameter of the nuclei is 3,67±0,16 micrometers. In other zones the thymocytes contain poorly stained nuclei that are 4,56±0,1 micrometers in diameter; within those zones there are small cavities that remain in places of the entirely destroyed lymphoid cells. Some zones are made up of homogeneous eosinophilic substance containing fragments of thymocytes.

In the rats of the group number two the thymus is enlarged. Microscopically it is estimated that on the outside the gland is covered by thin connective tissue capsule infiltrated by lymphoid cells. Within the capsula one can also find large singly arranged oval cells that have distinct boundaries, granular cytoplasm, and centrally situated nucleus. Those cells resemble plasmocytes.

Septa arising from the capsule are small in numbers hence the lobular structure of parenchyma isn't prominent. Parenchymal cortex and medulla are not differentiated. Within all zones of the thymic parenchyma the lymphoid cells are densely arranged, and the epithelial reticular cells between them are not visible. There are zones made up of degenerative lymphoid cells. There are also small cavities filled by vacuolated colloidal substance.

Blood vessels and thymic corpuscles are found very seldom.
We also investigated the tumor tissue. Microscopically it was determined that the tumor is surrounded by connective tissue capsule which consists of numerous cells and thin fibres. The thickness of the capsule is varies in different regions. In the regions where the capsule is thinnest (its thickness is less than thirteen micrometers) its structural elements are arranged densely and are directed along the surface of the tumor. The nuclei of the cells are small, elongated, hyperchromatic. Average diameter of the nuclei is 3,94±0,16 micrometers. As the thickness of the capsule increases its structural elements gradually become wavy and then they become directed in different directions. In regions where the capsule is thickest (its thickness achieves one hundred and eighty micrometers) its connective tissue cells contain both small hyperchromatic nuclei and bigger nuclei containing distinct masses of chromatin. Those nuclei are rouded, oval, and elongated in shape, their diameter is 6,98±0,3 micrometers.
The capsule is well vascularized. In those zones where the capsula is thinnest the vessels in it are discovered very seldom. As the capsule becomes thicker, the number and size of its vessels increases. From the capsule the vessels penetrate deeply into the tumor where they form dense network.
In the peripheral parts of the tumor the cells are densely packed, their boundaries are indistinct. Cytoplasm of many of the cells is vacuolated. Nuclei are hyperchromatic, their diameter is 8,35±0,2 micrometers. Shapes of the nuclei are rounded, oval, polygonal.
Within the internal parts of the tumor the cells are arranged more loosely. Cytoplasm in many of the cells is vacuolated. Nuclei of the cells are 10,18±0,4 micrometers in diameter, they are rounded, oval, or bean-shaped. They are characterized by distinct karyolemma and masses of chromatin. Each nucleus contains one to six nucleoli which are different in size. There is tendency to decrease of the size of the nucleoli within a nucleus while increasing their number. Though there are some nuclei that contain nucleoli which considerably differ from each other in size.
Towards the centre of the tumor the number of destroyed cells increases. Nuclei of such cells are wrinkled, and their cytoplasm is brightly eosinophilic. There are also small cavities that were formed in the places of the entirely destroyed tumor cells.
Central parts of the tumor are necrotic.
Conclusions. Intrapulmonic development of the experimental tumor sarcoma 45 causes structural changes in thymus.

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ТӘЖІРИБЕЛІК ЕГІЛГЕН САРКОМА 45 ІСІГІНІҢ ҚҰРСАҚІШІЛІК ТҮРІНІҢ ДАМУЫНДА ЕГЕУҚҰЙРЫҚТАРДЫҢ ТИМУСЫНЫҢ МОРФОЛОГИЯЛЫҚ ЕРЕКШЕЛІКТЕРІ

Түйін: Тәжірибелік егілген саркома 45 ісігінің құрсақішілік солидті түрінің дамуында егеуқұйрықтардың тимусын түзетін тіндердің морфологиялық ерекшеліктері сипатталды.
Зерттеу нәтижесінде аталмыш ісіктің даму барысында мынандай өзгерістердің болатыны анықталды: тимус паренхимасының қыртысты және боз заттарға бөлінгені анықталмайды. Дегенеративті лимфойдты жасушалар көрінеді. Және де ұсақ қуыстар анықталып, онда вакуольденген коллойдты субстанция анықталады.

Түйінді сөздер: егеуқұйрық, ісік, жасуша.

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МОРФОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ В ТИМУСЕ КРЫС ПРИ ВНУТРИБРЮШИННОМ РАЗВИТИИ ЭКСПЕРИМЕНТАЛЬНОЙ ПЕРЕВИВНОЙ ОПУХОЛИ САРКОМА 45

Резюме: Описаны морфологические изменения ткани тимуса при внутрибрюшинном развитии солидной перевивной опухоли саркома 45. Было установлено, что при развитии данной опухоли в тимусе крыс наблюдается

отсутствие дифференциации паренхимы на корковое и мозговое вещество, наличие дегенеративных лимфоидных клеток, а также образование мелких полостей, заполненных вакуолизированной коллоидной субстанцией.
Ключевые слова: опухоль, крыса, клетка.