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[myrzahanova@mail.ru](mailto:myrzahanova@mail.ru)**FACTORS THAT PROVIDE MOVEMENT  
OF LYMPHATICS OF RATS ON LYMPHATIC VASCULARS**

**Abstract.** Movement of lymph in the reduction of the vascular wall due to the existence of valves in the lymph vessels occurs only in one direction. Authors use the rat for experimental work. For a reliable interpretation of the data obtained from animal experiments on the human body, it is necessary to know the specific features of their structure. In the body, the movement of lymph along the vessels is facilitated by a number of secondary factors, so passing through the thoracic cavity, the duct accumulates lymph from the organs located there. Under the aorta, the caudal thoracic duct passes in the form of a broad cistern of the thoracic duct, moreover, the intestinal lymphatic duct starts. However, the thoracic duct is very thin and gently structured by semi-transparent or almost invisible without special devices of rat lines.

**Keywords:** lymphomas, experience, rats, perforation, vessels, intestines, nodes.

**INTRODUCTION**

In the movement of lymph, a certain role is played by rhythmic contractions of the walls of some lymphatic vessels. These abbreviations occur 8-10 and even, according to the instructions of individual researchers, 22 times per minute. The movement of lymph in the reduction of the vascular wall due to the existence of valves in the lymphatic vessels occurs only in one direction. Lymphatic system - includes lymph, lymphatic organs (lymphatic nodule, lymph node, tonsils, spleen, thymus gland) and ways that conduct lymph (lymphatic capillaries, vessel, trunk, duct). The lymph node consists of a peripheral cortical substance (cortex) and a central medulla; Covered with a capsule containing elastic and smooth muscle fibers. The basis of the cortex is lymphatic nodules (lymphatic follicles), small accumulations of cell-rich lymphoid tissue in which lymphocytes develop; In addition to lymph nodes, lymphatic follicles are found in the tonsils, spleen, mucous membranes of the stomach, intestines, larynx. The tissue of the lymph node is divided by connective tissue strands - trabeculae into incompletely delimited lobules. Through the convex surface of the lymph node penetrating lymphatic vessels penetrate, and the outgoing lymph vessels divert the lymph from the lymph nodes through the gates to the deepening in the lymph node for the entry of arteries, nerves and exit of veins and vascular vessels. Under the capsule of the lymph node and in the brain substance there is a network of spaces called the lymphatic sinus.

**MAIN PART**

In the body, in addition to the main mechanism, a number of secondary factors contribute to the transport of lymph along the vessels. During the inhalation, the outflow of lymph from the thoracic duct to the venous system increases, and when it is inhaled, it decreases. The movements of the diaphragm affect the lymph flow - periodic compression and stretching with the diaphragm of the thoracic duct cistern strengthens the filling of its lymph and promotes the movement along the chest lymphatic duct. The increase in activity of periodically contracting muscular organs (heart, intestines, skeletal muscles) affects not only the strengthening of the lymph drainage, but also facilitates the passage of tissue fluid into the capillaries. The contractions of the muscles surrounding the lymphatic vessels increase the intra-lymphatic pressure and squeeze the lymph in the direction determined by the valves. When the limb is immobilized, the outflow of lymph is weakened, and with active and passive movements it increases. Rhythmic

stretching and massage of skeletal muscles contribute not only to the mechanical movement of the lymph, but also increase their own contractive activity of lymphangions in these muscles.

A large lymphatic vessel of a distinctive shape emerges from the plexus - the mesenteric CS. It lies between the cranial mesenteric (right and cranial) and ilio-colon (left and caudal) arteries, and then between the cranial mesenteric vein (right) and the artery (left and caudal). The vascular bundle lies on the flattened cranial surface of the root fat body of the mesentery of the small and large intestine, and in different ways:

- First (the ventral end of the root body) to the left of the middle, (oblique) sagittal segment of the ascending colon, then below it (caudal) and finally to the right;
- right along the entire segment, to the head of the pancreas.

The main lymphatic ducts include the thoracic duct with a cistern, cervical, subclavian, cranial and caudal mesenteric, mediastinal, renal and portal ducts. The thoracic duct is unpaired, located 2 cm below the diaphragm approximately at the level of the left adrenal vein. It lies near and slightly below the ventral aorta on the left side and passes cranially through the diaphragm into the thoracic region and the neck area to the right of the esophagus. It turns dorsally to the carotid arteries and trachea at the level of the clavicles and joins the left subclavian vein. According to Job (1915), the thoracic duct passes dorsolateral along the cranial hollow vein to the site of its connection with the venous system, flowing into the left external jugular vein at the junction of the latter with the subclavian vein. Passing through the chest cavity, the duct collects lymph from the organs located here. Caudally the thoracic duct passes under the aorta in the form of a broad cistern of the thoracic duct and gives rise to the intestinal lymphatic duct. The thoracic duct is very thin, delicate and often almost transparent, and in some rat lines it is almost invisible without special adaptations. Lymph nodes are widely scattered in the body of a rat, located along the lymphatic vessels surface or in deeper areas and are grouped into groups of lymph nodes - regional nodes. The caudal (of 4 knots) axillary node receives a large outflowing vessel from the inguinal nodes, which accompanies the superficial epigastric vein (going cranially along the milky line). In this node there is an outflow of lymph from the nipples and ventral areas of the chest and belly. Two medial axillary nodes drain the lateral surfaces of the abdomen and back through a large lymphatic vessel, which merges with them, passing along with the vein a large subcutaneous muscle. A small branch of this lymphatic vessel passes in the deep layers of the skin itself to the medial humeral node. The rostral axillary node receives the humeral lymphatic vessel from the medial surface of the thoracic extremity and axillary region. Large subclavian lymphatic duct goes from this node to the thorax along with the axillary vein and joins the axillary vein.

Dissection of CGBB on total preparations of 20 white rats 1-2 months, both sexes, fixed in a 10% formalin solution. Results of a biochemical blood test showed an increase in creatinine, bilirubin, urea, thymol level and ALTAST enzymes, alkaline phosphatase, total amylase in the experimental group of animals.

In the lymph, the total protein content was deeper 42% than in the blood. The content of urea, creatinine, residual nitrogen increased. From these data it can be seen that the most striking changes were observed from the total protein, urea in lymph and blood plasma.

The regional lymph nodes of the internal organs of the belly (Figure 9) are divided into three groups that are emptied separately into the thoracic duct cistern through the lymphatic ducts. Splenic, caudal gastric and portal nodes drain the cranial abdominal organs, the cranial mesenteric chain collects lymph from the intestine, and caudal mesenteric mesenteric from the descending colon; all of them are considered as certain functional entities. Small splenic node - *In. lienalis*, solitary, collects lymph from the spleen capsule and the fibrous trabeculae of the spleen by means of lymph vessels that go together with the four veins of the spleen's gates. Its efferent duct goes centrally together with the splenic vein to the caudal gastric node. Caudal gastric lymph node - *In. gastricuscaud.*, single or paired, is attached to the gastro-omental vein and drains the distal esophagus, stomach and pancreas through the lymph vessels that accompany the visceral veins. A short efferent duct enters two portal nodes, one located on either side of the portal vein. A group of portal lymph nodes pour out into the left part of the thoracic duct cistern through the portal lymphatic duct - a large lymphatic canal that runs obliquely through the abdominal aorta and caudal vena cava. A large accumulation of cranial mesenteric lymph nodes represents a chain of 6-10 nodes located at the root of the mesentery; drains the duodenum, thin, ascending and transverse colon. The lymphatic plexus, located under the entire mucous membrane of the small intestine, is emptied

into separate nodes of the chain through the lymph vessels that run along the segmental branches of the cranial mesenteric vein. The cranial mesenteric duct accompanies the ephemeral vein and collects the flowing lymph from each node of the chain. It passes dorsally and pours into the right side of the thoracic duct cistern, while the cranial mesenteric and splenic veins flow into the portal vein cranially. The paint introduced into the intestinal wall always passes through the nodes and never enters directly into the mesenteric duct. The caudal mesenteric lymph node is located in the mesentery of the descending colon at the intersection of the caudal mesenteric vein (going to merge with the cranial mesenteric vein) with the abdominal aorta and caudal vena cava. The node collects lymph from the rectum and sigmoid colon through the lymphatic canal, which is located next to the vein. The efferent caudal mesenteric duct opens into the thoracic duct cistern on the left side.

The lymphatic channel of the mesentery of the colon and small intestine of the white rat has a similar structure - a system of lymphatic vessels - radial (draining lymph from the organ) and arcade (transverse anastomosis of radial vessels). In the structure of mesenteric lymphatic vessels of the small and large intestine, differences were found that consist in the inverse correlation of the parameters of arcade and radial vessels.

## CONCLUSION

The rat's blind gut lies on the loops of the small intestine: the base is skew-Sagittal, more often along the middle line or near it, the apex is more often curved to the right. Near the base of the cecum, on the left and above the ileum (PC) mouth is 1 ileocecal LU (large, bean-shaped). The iliac-humeral LU are located to the right of the terminal segment of the PC. From the base of the caecum, an upward OK (FOC) emerges behind and to the right of the ileocecal angle. Its ventral loop is located almost transversely. In general, the root of the mesentery of the VOC and the small intestine is a dense body. To the left of it lies the middle sagittal segment of the BOC (Figure 1-5) or crosses its cranial surface obliquely. After fixation, I gradually removed the loops of the small intestine and segments of the colon, opening access to the pancreas and duodenum-jejuna flexure. Between them, I found pancreaticoduodenal CABG, and after dissecting the pancreas -

the initial segment of the CBA and adjacent near-aortic CIBL. The root body extends from the dorsal loop OK (on the ventral surface of the head of the pancreas, near the medial edge of the duodenum) to the ventral loop of the BOC, to the right and to a different extent under the (caudal) middle segment of the BOC. The root can be curved: its dorsal end lies to the right of the middle segment of the FOC, it can have a tire, the ventral end to the left. The granular relief of the root body is due to the fatty lobules. Its convex surface is directed caudally, and the flattened surface is cranial.

At the latter is a vascular bundle (cranial mesenteric veins and artery, and between them - the lymphatic trunk). Near the ventral end of the root body, but separately from it lie the terminal CABL in the fatty capsule: they are located near the place of transition of the transverse loop of the FOC to its middle segment, on either side of the site of the PAO from the trunk of the KBA to the left.

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**ФАКТОРЫ, ОБЕСПЕЧИВАЮЩИЕ ПЕРЕДВИЖЕНИЕ ЛИМФЫ КРЫС  
ПО ЛИМФАТИЧЕСКИМ СОСУДАМ КИШЕЧНИКА**

**Аннотация.** Передвижение лимфы при сокращении сосудистой стенки в связи с существованием клапанов в лимфатических сосудах происходит только в одном направлении. Авторами крыса используется для проведения экспериментальных работ. Для достоверной интерпретации на организм человека данных, полученных в результате опытов на животных, нужно знать видовые особенности их строения. В организме передвижение лимфы по сосудам способствует ряд второстепенных факторов, так проходя через грудную полость, проток аккумулирует лимфу от расположенных там органов. Под аортой каудально грудной проток проходит в виде широкой цистерны грудного протока, к тому же дает старт кишечному лимфатическому потоку. Однако, грудной проток очень тонко и нежно структурирован полупрозрачных или почти невидимой без специальных приспособлений линий крыс.

**Ключевые слова:** лимфы, опыт, крысы, передвижение, сосуды, кишечник, узлы.

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**ЛИМФАТИСТИКАЛЫҚ ЖӘРМЕТТЕРДЕГІ РАТТАМАЛАРДЫҢ  
ЛИМФАТИЦИЯСЫ ҚОЗҒАЛЫСЫНА ҚАТЫСТЫ ФАКТОРЛАР**

**Аннотация.** Лимфа тамырларындағы клапандардың бар болуына байланысты тамырлы қабырғадағы лимфаның қозғалысы тек бір бағытта жүреді. Авторлар тәжірибелік жұмыстарға егеуқұйрықты пайдаланады. Адам денесіндегі жануарлар эксперименттерінен алынған деректерді сенімді түрде түсіндіру үшін олардың құрылымының ерекшеліктерін білу қажет. Денеді лимфалардың ыдыстағы қозғалысы бірнеше қайталама факторлармен қамтамасыз етіледі, сондықтан кеуде қуысы арқылы өтетін бұлшықет жерде орналасқан органдардан лимфа жинайды. Аорта астында кеуде қуысының кеуде қуысы кеуде қуысының кең шырағы түрінде өтеді, сонымен қатар ішектің лимфа түтігі басталады. Алайда, кеуде қуысы өте жіңішке және жартылай мөлдір немесе егеуқұйрықтарды арнайы құрылғылары жоқ дерлік көрінбейтін түрде құрылымды.

**Түйін сөздер:** лимфомалар, тәжірибелер, егеуқұйрықтар, перфорация, тамырлар, ішектер, түйіндер

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