COMPARATIVE MORPHOLOGY OF THE NERVOUS SYSTEM OF THE LIVER OF MAMMALS WITH DIFFERENT TYPES OF FOOD.

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ABSTRACT

This article analyzes the scientific literature on the study of the nervous system of the liver of mammals with different types of food and describes the unexplored aspects of this problem. 10 rabbit livers representing herbivore mammals and 10 dog livers representing carnivore mammals were taken for study. The results of the research revealed that the nervous system of the liver of mammals has specific morphofunctional properties depending on the type of food.

Key words: *type of feed, liver of mammals, nervous system of liver.*

INTRODUCTION

It is considered one of the most important organs within the digestive organs. Because in it many very complex biochemical processes (innate and reverse biochemical reactions) go and do not interfere with each other [1,3,4].

The importance of the management system in the simultaneous course of such complex biochemical processes is great. The control system, on the other hand, was formed and specialized in the process of long evolution in the body in relation to the habitat and the type of feed [2,5,6,14]. There are a lot of scientific literature that attribute such a control system of the organism [7,9,13,15]. However, there is not enough scientific literature that studies the specific formation and structural aspects of this system in connection with the type of food. This is one of the most urgent problems of Medicine. Therefore, we set ourselves the goal of studying these aspects of the problem [8,10,11,12].

PURPOSE OF THE STUDY.

Study of specific morpho functional types of liver nerve of lactating animals with different types of food.

MATERIAL AND METHODS OF STUDY.

In order to fulfill the goals and tasks of our research, livers of 10 adult rabbits and 10 dogs were taken. Livers of animals were frozen (fixed) in 12% formalin. Sections with a thickness of 7 μm were taken from the paraffin blocks prepared from the obtained materials using a microtome. In order to study the nervous system, the

obtained sections were stained by Bilshovsky-Gross and Karnovsky-Ruts methods and viewed under a microscope. To study the adrenergic nervous system V. N. Shvalev and N. I. It was determined by the method of Juchkova (1970) by processing unhardened sections in a 2% solution of glyoxylic acid. The received morphometric data were statistically processed, analyzed and compared. Based on the obtained data, a table was drawn up and conclusions were made.

RESULTS OF OWN RESEARCHES.

1. Morphology of the nervous system of the liver of wild mammals (rabbits).

Cryostat sections of rabbit liver treated with a 2% solution of glyoxylic acid, all elements of the adrenergic nerve structure can be seen under a fluorescent microscope. We find adrenergic nerve fibers in all parts of the liver of rabbits. However, in Glisson's capsule of the liver, adrenergic nerve fibers are very dense compared to its blood vessels, bile ducts and parenchyma. In the capsule of the liver of rabbits, adrenergic nerve fibers are located in the form of large, medium, small bundles or in the form of individual fibers. These bundles are located along the wall of blood vessels and form different tangles of different sizes. During the division of the Glisson capsule and the blood vessels entering into smaller blood vessels, the adrenergic nerve fibers are also divided into smaller bundles along the direction of the divided blood vessels and form a thick mesh along the wall of these blood vessels. Because adrenergic nerve fibers contain fluorogenic amines (catecholamines), they emit a bright blue-green light. Sometimes these colors remind of the northern rain. Sometimes, when the fibers in large bundles are very close to each other or overlap each other, these rays merge and appear as long radiating corridors. Separate fibers of the adrenergic nervous system coming out of the large bundles penetrate into the surrounding tissue or inside the wall of blood vessels and form a smaller mesh in its middle, i.e. muscle layer. Smaller bundles of adrenergic nerve fibers branch off from larger bundles of interstitial connective tissue and form a dense network along the walls of interstitial arteries and veins and bile ducts. The individual fibers coming out of this mesh go inside the lobes and go towards the central vein between the liver plates and sinusoidal capillaries. In some cases, these fibers end by forming different-shaped expansions near the cells of the liver plate or the wall of sinusoidal capillaries. This is certainly the connections (synapses) formed by adrenergic nerve fibers with terminals, that is, capillaries or liver cells.

The location density of adrenergic nerve fibers in the rabbit liver capsule is 15.6±2.40 (relative to the field of view of the microscope). The density of adrenergic nerve fibers in the parenchyma of the liver is 3.15±0.41. Like adrenergic nerve fibers, cholinergic nerve fibers are found in all parts of the rabbit liver. Most of them are located in the liver capsule and the wall of blood vessels. There are relatively fewer cholinergic nerve fibers in the wall of bile ducts and parenchyma of the liver. In the

capsule of the liver and in the wall of large blood vessels, cholinergic nerve fibers are located in the form of large bundles and thick net tangles formed by these bundles. Such large tufts and tangles penetrate the liver capsule to form smaller tufts along the walls of blood vessels and a tangle of webs around these vessels. Within the interstitial connective tissue, the interstitial and interstitial blood vessels and the wall of the bile ducts form small meshes. Separate fibers coming out of these entanglements enter the lobes and go to the central vein around the liver plates and sinusoidal capillaries. In some cases, the individual fibers penetrating the liver parenchyma split into two near the capillary wall or around the liver cells and end up forming various expansions. Such expansions can also be found in individual fibers coming out of large bundles, near the wall of the liver capsule, or around the wall of blood vessels. These extensions are the synapses formed by the terminals of cholinergic nerve fibers, i.e. nerve endings or working organs.

The average density of cholinergic nerve fibers in the liver capsule of rabbits is 19.64±2.12. This index is equal to 6.45±0.71 in the liver parenchyma of rabbits (inside).

Thus, all these data, obtained as a result of the research, constitute the unique morphological and morphometric characteristics of the nervous system of the liver of rabbits.

2. Morphology of nervous system of Carnivore mammalian (dog) liver.

Like other mammals, adrenergic nerve fibers are uniquely located in the liver of dogs. The capsule of the liver of dogs is much richer in adrenergic nerve fibers than other parts. They are mainly located along the wall of blood vessels in the liver capsule. In the wall of large blood vessels, large bundles of adrenergic nerve fibers form thick nets and tangles around the blood vessel. When large blood vessels divide into smaller blood vessels, large bundles of adrenergic nerve fibers also divide into smaller bundles, forming a thick mesh tangle around the small blood vessels. . Separate fibers from large and medium bundles penetrate the wall of blood vessels and form intravascular tangles in its muscular layer. In some cases, such individual fibers end up forming expansions next to the muscle fibers. Such adrenergic nerve fibers emit a bright blue-green light. Because they contain catecholamines, that is, fluorogenic amines. The level of light transmission may not be uniform across fibers or individual parts. This is due to the fact that mediators are not uniformly distributed in adrenergic nerve fibers, or in other words, the functional state of neurons. In large fibers, sometimes the rays radiating from adjacent or overlapping fibers combine to form bright light-emitting corridors. Smaller bundles separated from large bundles located in the wall of large blood vessels form a small mesh in the interlobular connective tissue, interlobular, in the wall of blood vessels and bile ducts. Separate fibers coming out of the network of these small bundles enter the liver lobe, form a very sparse network between the liver plate and

sinusoid capillaries, and are directed towards the central vein. Some individual fibers end by forming expansions near the capillary wall or near the liver cells. These extensions have a higher level of light transmission. Because these expansions are nerve endings and mediators accumulate in such nerve endings. Especially if these terminals are synapses formed with working organs, i.e. terminals of efferent nerve fibers, they emit a brighter light.

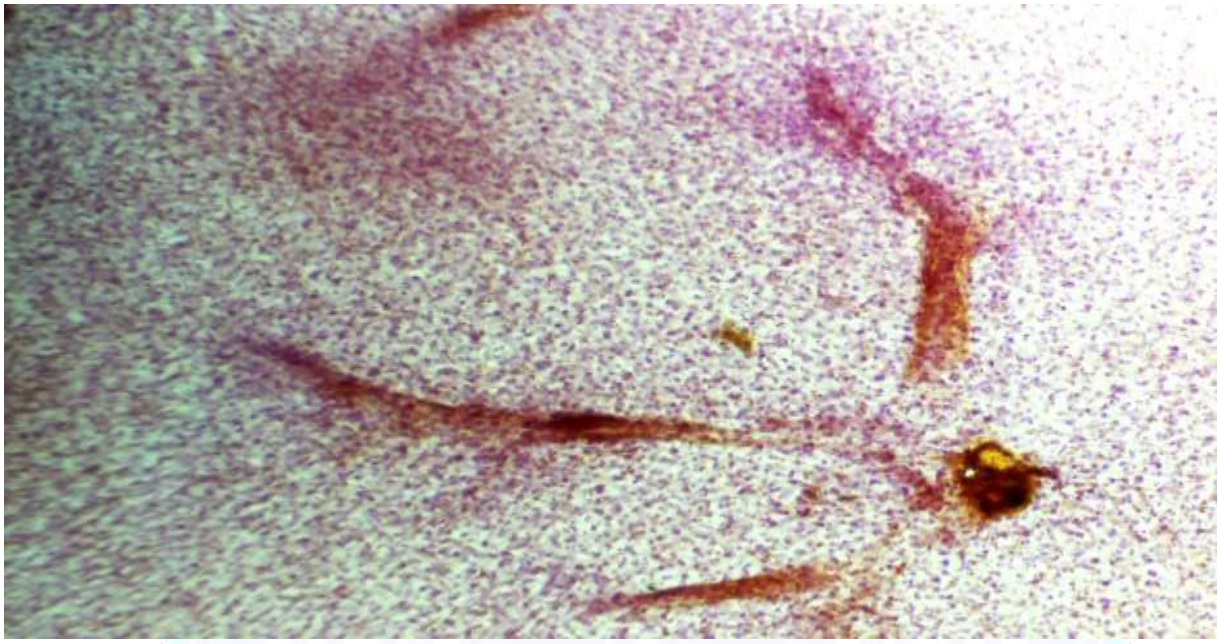
The average density of adrenergic nerve fibers in the liver capsule of dogs is 13.38±1.12, and this indicator is 1.56±0.18 in the liver parenchyma. Along with adrenergic nerve fibers, cholinergic nerve fibers can be seen in the liver of dogs. For this purpose, cholinergic nerve fibers are clearly identified when preparations prepared from the liver of dogs are stained by the Karnovsky-Rutz method. Looking at such preparations, it can be noted that the main part of cholinergic nerve fibers and nerve endings is located in the capsule of the liver of dogs. These fibers are located along the wall of the large blood vessels of the liver capsule and sometimes away from the blood vessels, forming individual large bundles. In the wall of large blood vessels, cholinergic nerve fibers form thick reticular tangles around large bundles and vessels. Separate fibers from these tangles go out into the surrounding tissues or the walls of blood vessels and form small meshes in the middle layer of the muscle. Large bundles and small bundles separated from tangles form a loose mesh in interlobular connective tissue, in the walls of veins and arteries around the lobes, as well as in the wall of bile ducts. Individual fibers coming out of this network enter the lobe and go along the wall of the sinusoidal capillaries towards the central vein.

The average density of cholinergic nerve fibers in the liver capsule of dogs is 15.10±0.34, and this indicator is 2.85±0.14 in the liver parenchyma.

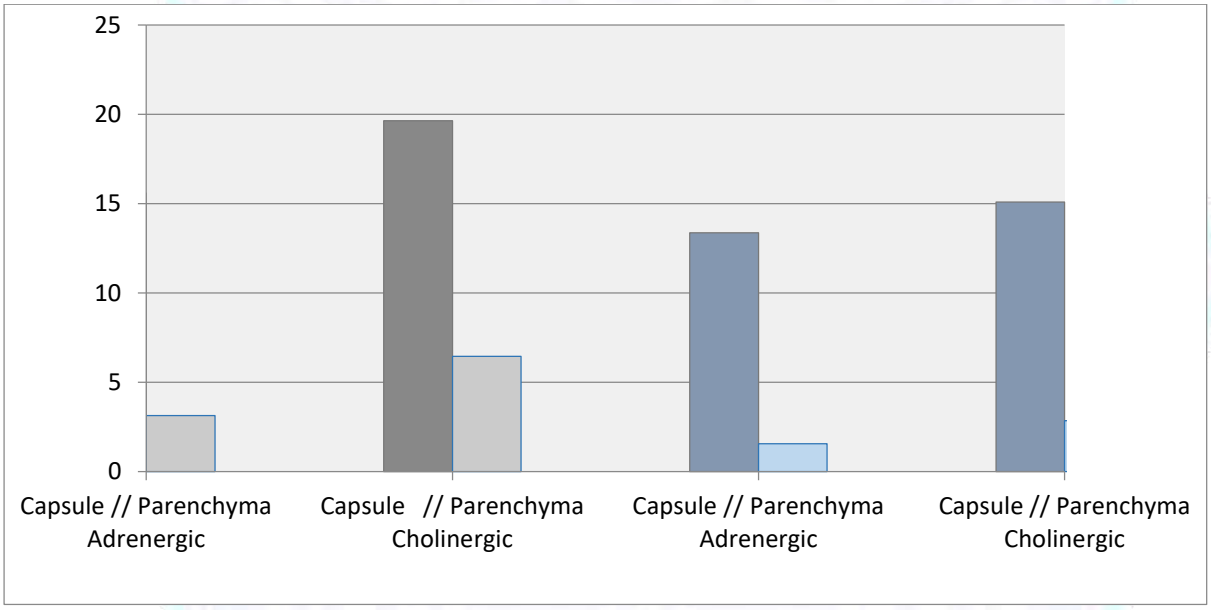
The information about adrenergic and cholinergic nerve fibers described above is a summary of the morphological and morphometric characteristics of the nervous system of the canine liver.

The results of our research show that the main part of the nerve structure (nerve fibers and nerve endings) of the liver of rabbits and dogs is located in its capsule. In the liver parenchyma, the nervous system is much less. Therefore, in many liver diseases, pain in the liver occurs when it is enlarged, that is, when it is stuck in its capsule. In cases where the liver has shrunk and shriveled (cirrhosis), pain is not felt in the liver. The mechanism of the pain syndrome is explained by the stimulation of sensory nerve endings in the liver capsule. This is certainly important information for doctors.

Drawings №1.



Histogram №1.



Explanation: Rabbits – Green, Dogs – Blue

CONCLUSION

In conclusion, it can be said that the nervous system of the liver of mammals has been found to have specific morphofunctional characteristics depending on the type of food in the course of evolution.

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