

## **AGE-RELATED MORPHOLOGICAL CHARACTERISTICS OF THE SACRAL SEGMENT OF THE SYMPATHETIC TRUNK IN RABBITS.**

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**Abstract:** This article examines the age-related morphology of the lumbar border sympathetic trunk in rabbits. All specimens were fixed in 12% neutral formalin. A total of 20 specimens were examined: 10 from fetuses and 10 from adult rabbits. Macroscopic and microscopic examination methods were used. The sacral border sympathetic trunk in rabbits exhibits significant variations in shape, node size, and topography. Data were obtained on structural changes in the sympathetic nodes and trunk depending on the animal's age.

**Keywords:** rabbits, sympathetic trunk, lumbar region, node size, rabbit fetuses, adult rabbits, age-related morphology.

## **ВОЗРАСТНЫЕ ОСОБЕННОСТИ МОРФОЛОГИИ КРЕСТЦОВОГО ОТДЕЛА СИМПАТИЧЕСКОГО СТВОЛА У КРОЛИКОВ.**

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**Резюме:** В статье изучена возрастная морфология поясничного отдела пограничного симпатического ствола у кроликов. Весь материал фиксировался в 12% растворе нейтрального формалина. Всего нами изучено 20 препаратов. 10 - у плодов, 10 - у взрослых кроликов. Используются макроскопические и микроскопические методы исследования. Крестцовый отдел пограничного симпатического ствола у кроликов по форме, величине узлов и их топографии подвержен значительным вариациям. Получены

данные о структурных изменениях симпатических узлов и ствола в зависимости от возраста животных.

**Ключевые слова:** кролики, симпатический ствол, поясничный отдел, величине узлов, плодов кролика, взрослых кроликов, возрастная морфология.

**Introduction.** The morphology of the sympathetic trunk as a whole and its various divisions continues to attract the attention of not only morphologists and physiologists, but also clinicians [1,2]. The sacral division of the sympathetic trunk remains the least studied, with its description in the literature being rather contradictory even today. Only a small number of works [3,4] are devoted to the age-related features of the structure of the sacral division of the border sympathetic trunk. The cited literature mainly covers the morphology of the border sympathetic trunk in humans. Only isolated studies [5,6] are devoted to the rabbit, which is one of the most common objects for various experiments. We also found no data in the available literature on the age-related features of the sacral division of the sympathetic trunk in rabbits.

**Aim of the study.** We studied the age-related features of the sacral division of the sympathetic trunk in rabbits.

**Materials and methods.** As part of one of the sections of the departmental work on the age-related morphology of the nervous system, we examined the sacral division of the sympathetic trunk in rabbit fetuses and adult rabbits. All material was fixed in a 12% solution of neutral formalin. In total, we studied 20 preparations: 10 from fetuses and 10 from adult rabbits.

**Results.** Most often, we observed three sacral ganglia (74.4%); two ganglia were found in 13.3% of cases, and one ganglion was seen only once (1.1%). In five adult rabbits, the sacral sympathetic division was represented by a single ganglionic cord, in which separate ganglia could not be macroscopically distinguished. The ganglia appear cylindrical, rhomboid, conical, triangular, and stellate. The sizes of the ganglia also vary considerably. In rabbit fetuses of the first 10 days of life, the size of the ganglia ranges from  $0.2 \times 0.2$  mm to  $2.0 \times 0.5$  mm. In two-month-old rabbit fetuses, a significant increase in ganglion size was noted — from  $0.6 \times 0.4$

mm to  $3.9 \times 2.1$  mm. In adult rabbits, the ganglia reach  $19.0 \times 1.5$  mm. When individual ganglia fuse in adult rabbits, they form a ganglionic mass in the form of a trunk up to 36.0 mm in length and up to 2.0 mm in diameter. Of particular interest is the question of the shape of the sacral sympathetic chain as a whole, its topography, and the connections of individual ganglia. According to our data, the most frequent fusion occurs between the second and third sacral ganglia, or of all three ganglia into single larger formations located along the midline of the sacrum. Initially, these are metamericly arranged primary ganglia, which then concentrate in the second stage into a single cord. In the third stage of sympathetic development, definitive segmentation of the trunk into separate ganglia occurs. Large concentrated ganglia observed in all divisions of the sympathetic trunk should be considered as a result of the fact that the third stage of sympathetic development — segmentation of the trunk during the intrauterine period — does not occur. In our material, we also observed symmetrical positioning of the paired sympathetic chain near the midline of the sacrum. We noted certain features of the shape of the sacral sympathetic trunk related to sex. In males, sacral sympathetic trunks in the form of a truncated pyramid are more common. In females, according to our observations, this shape occurs twice as rarely. The question of the topography of the sacral ganglia is of practical interest. According to our data, the first sacral sympathetic ganglia are located 0.5–2.0 mm lateral to the median line of the sacrum: in 81.2% of cases at the level of the first sacral vertebra, in 13% of cases at the level of the upper third of the first sacral vertebra, and in 5.8% of cases at the level of the lower third of the first sacral vertebra. The second sacral ganglia are located 0.5–1.5 mm lateral to the median line of the sacrum: in 79.2% of cases at the level of the second sacral vertebra, in 19.0% of cases at the level of the lower third of the second sacral vertebra, and in 1.8% of cases at the level of the upper third of the second sacral vertebra. In one case, the left second sacral ganglion was located at the level of the third sacral vertebra. The third sacral ganglia are located 0.5–1.0 mm lateral to the median line of the sacrum: in 57.7% of cases at the level of the third sacral vertebra, in 34% of cases at the level of the lower third of the third sacral vertebra, and in 8.7% of cases the third sacral ganglia were located on

the cartilage between the third sacral and first caudal vertebrae. We found transverse connections between the sacral ganglia 12 times. Of these: between the first sacral ganglia — 7 times, between the second — 3 times, and between the third — 2 times. We did not encounter crossed transverse connections in our material. From the sacral ganglia of the sympathetic trunk, most often one, less often two communicating branches arise, which are directed laterally to the sacral spinal nerves. We observed the origin of one communicating branch in 85.6% of cases and two in 14.4% of cases. Two communicating branches more often arise from the first sacral ganglia. According to our studies, two communicating branches arise from the first sacral ganglia in 55.9% of cases, from the second sacral ganglia in 29.4% of cases, and from the third sacral ganglia in 14.7% of cases.

In the 15 animals we studied, we observed splitting of the interganglionic branches in five cases. In six cases, most often on the right, fusion of the first sacral sympathetic ganglion with the caudal lumbar ganglion was noted.

**Conclusion.** The sacral division of the border sympathetic trunk in rabbits shows significant variations in the shape, size of the ganglia, and their topography. In the sacral division of the sympathetic trunk in rabbits, three ganglia are most often observed (74.4%) and one ganglion is least often observed (1.1%). In the majority of cases, transverse connections are present between the sacral ganglia.

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