

## Morphological Characteristics of the Intestine of White Rats

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**Abstract:** In this article, the morphological structure of the wall of the duodenum is studied. The study of the morpho-functional indicators of the muscle fibers in the wall of the duodenum shows that they consist of a combined complex structure. The obtained results allow a deeper understanding of the mechanism of the occurrence of various changes in the muscular tissue of the duodenal wall. It was found that there is a layer of briquetting tissue with collagen fibers connecting the mucous and outer layers of the organ in the muscle fibers of the duodenal wall.

**Key words:** morphology, duodenum, muscular layer, outer muscular layer, inner muscular layer.

### Relevance of the study

Due to its anatomical and physiological characteristics, the duodenum is a unique junction where the digestive tracts of the stomach, liver and pancreas converge [Viorel Moraru, MD, et al., 2018].

Among the diseases and pathological conditions of the proximal part of the stomach-intestinal tract, a chronic disorder of the permeability of the duodenum occupies an important place [Ya.M. Vakhrushev., 2018].

Despite the decreasing trend of wound disease noted by local and foreign authors, there is no decrease in the frequency of complications [Sheptulin A.A. 2015, Sukovatykh B.S., 2017].

The presented literary data of the last decade show that there are no clear views on the morphology of the muscle fibers of the duodenal wall, both in morphology and pathology. The authors did not prove the components of muscle mass formation in the muscle layer and the morphological characteristics of the parts of the wall of the duodenum near it in the course of development.

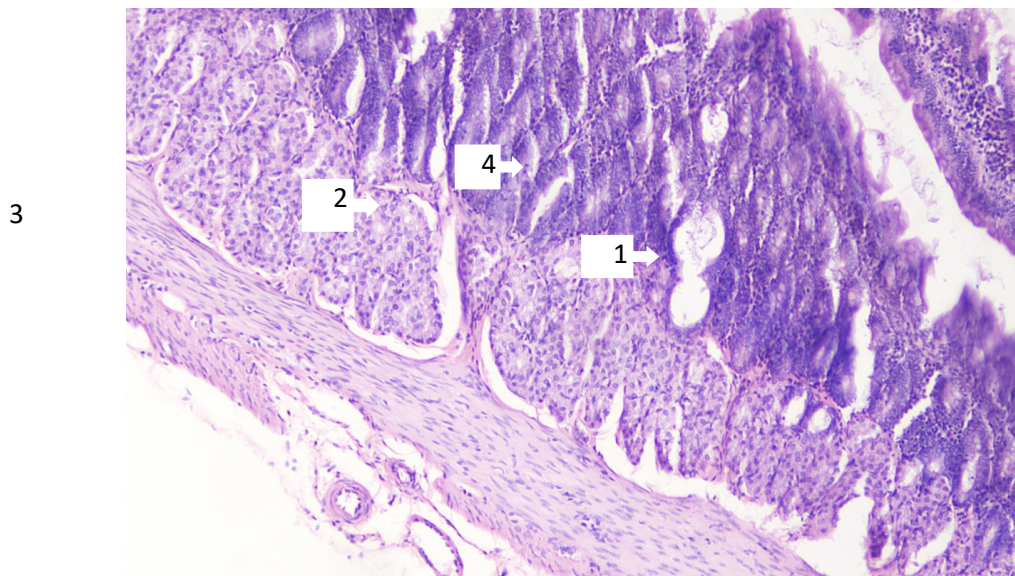
**Materials and methods:** In the experiment, 3-month-old and 12-month-old white rats under the same conditions were subjected to abdominal dissection under inhalation anesthesia and the duodenum was removed.

Using general histological methods, the morphological structure of the wall layer of the duodenal folds of the control groups was studied.

**Results and discussion.** In rats of different ages, the duodenum consists of three: upper, descending, ascending parts and four: subhepatic, upper, lower, duodenum - jejunum folds, which differ from each other in terms of morphology and morphometrics, these areas are young during postnatal ontogeny, improves with change.

We studied two periods of late postnatal ontogeny: the reproductive period - a three-month period of rats, and the pre-senile (senile) period - a twelve-month period.

During the reproductive period, the average thickness of the wall of the rat duodenum in the area of the subhepatic fold is  $847.8 \pm 10.44 \mu\text{m}$ , in the area of the upper fold it is  $893.0 \pm 9.4 \mu\text{m}$ , in the area of the lower fold it is  $925.0 \pm 8.57 \mu\text{m}$ , ten two fingers - average in the area of the jejunal fold - equal to  $849.7 \pm 11.44 \mu\text{m}$ . It is slightly thinner in the pre-bend and post-bend areas.



**1-picture. Three-month-old rat duodenal wall structure. 1. mucous membrane. 2. submucosa. 3. muscle layer. 4. muscle mass. Hematoxylin and eosin stain. Ok. 10 x ob.20.**

The muscular layer consists of inner circular and outer longitudinal smooth muscle layers. Contraction of the internal circular muscle ensures mixing of the mass in the intestinal cavity, while contraction of the outer longitudinal muscle layer ensures the downward movement of the mass in the intestinal cavity. In the area of the fold, the bundles of collagen fibers pierce through the submucosal layer into the muscle layer and form a somewhat strong muscular sheath (Fig. 1).

The thickness of the internal circular muscle is  $175.8 \pm 3.15 \mu\text{m}$  on average in the area of the subhepatic fold,  $184.6 \pm 1.15 \mu\text{m}$  on average in the area of the superior fold,  $192.2 \pm 0.97 \mu\text{m}$  in the area of the inferior fold, duodenum - average in the area of the jejunum fold  $174.1 \pm 3.15 \mu\text{m}$ .

The outer longitudinal muscle thickness is on average  $75.9 \pm 0.2 \mu\text{m}$  in the area of the subhepatic fold, on average  $77.7 \pm 1.9 \mu\text{m}$  in the area of the upper fold, on average  $81.5 \pm 0.84 \mu\text{m}$  in the area of the lower fold, duodenum - on average in the area of the jejunum fold It is  $75.0 \pm 0.92 \mu\text{m}$ .

In presenile (senile) period, the average thickness of the wall of the duodenum of rats in the area of the infrahepatic fold is  $894.0 \pm 8.8 \mu\text{m}$ , in the area of the superior fold -  $905.5 \pm 7.9 \mu\text{m}$ , in the area of the inferior fold -  $950.5 \pm 15.3 \mu\text{m}$ , duodenum - the average in the area of the jejunum fold is equal to  $864.6 \pm 9.8 \mu\text{m}$ .

The thickness of the inner ring muscle is  $185.2 \pm 2.7 \mu\text{m}$  on average in the area of the subhepatic fold,  $186.4 \pm 1.6 \mu\text{m}$  on average in the area of the upper fold,  $195.6 \pm 3.1 \mu\text{m}$  in the area of the lower fold, duodenum - in the area of the jejunum fold average is  $177.9 \pm 2.0 \mu\text{m}$ .

The thickness of external longitudinal muscles in the area of the subhepatic fold is  $78.9 \pm 0.7 \mu\text{m}$  on average, in the area of the upper fold it is  $79.9 \pm 0.7 \mu\text{m}$ , in the area of the lower fold it is average -  $83.8 \pm 1.3 \mu\text{m}$ , duodenum - in the area of the jejunum fold average is  $76.3 \pm 0.9 \mu\text{m}$ .

Thus, in the course of development, the muscle fibers of the duodenal wall are formed differently.

**Conclusion.** In the late postnatal period, during the reproductive age, the increase in the thickness of the muscle layer in the wall of the duodenum is more pronounced in the branches of the distal part of the muscle mass. By adulthood, the muscle layer is thicker in the proximal muscularis.

It was found that there is a layer of bridging tissue with collagen fibers connecting the mucosal and outer layers of the duodenal wall in the muscle fibers of the duodenal wall, and this forms a functional unit that separates one part of the duodenum from another.

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