



MORPHOLOGICAL ASPECTS OF THE STRUCTURE OF THE UTERUS IN WHITE OUTBRED RATS

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Abstract:

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Using light microscopy methods, the morphological structure of the uterus in white outbred rats was clarified. It was found that the walls of the uterine horns grow together, forming a double body and neck, which are separated from each other by a thin septum and have two separate openings in the vagina. The medial walls unite the perimeter and the supravascular layer of the myometrium at the confluence. These results can be used to write sections of evolutionary, functional, comparative species morphology and reproductive biology. The cervix of white outbred rats is more similar to humans, which should be taken into account when choosing an experimental model for scientific research.

Keywords: uterus, cervix, rat, myometrium, smooth myocyte, morphology

THE RELEVANCE OF THE RESEARCH

The study of the processes of individual development of animals and methods of controlling their reproduction is one of the most important tasks of modern morphology. For a deep and objective understanding of the mechanisms of differentiation, abnormal histo- and organogenesis, it is necessary to have fundamental knowledge of the structure of laboratory animals. Among them, rats stand out, which, due to the rapid onset of puberty, the short duration of embryogenesis and the short period of postnatal involution, are the most convenient objects for experimental research.

One of the most interesting questions is the structure of the uterus at the level of the confluence of its caudal sections with the formation of the body and cervix. Currently, there are many unexplored aspects, especially at the microscopic level. It is important to study the smooth muscle tissue of the myometrium in the caudal part of the uterus, which plays a key role in the implementation of its functions and depends on endocrine activity, especially during pregnancy and childbirth.

The uniqueness of the uterus, whether human or animal, is largely explained by the peculiarities of its morphology and the functions it performs. Anatomically, the uterus of a white mongrel rat consists of two horns and the body of the ischium. It should be noted that in the main textbooks on veterinary medicine, the uterus of the rat, according to the generally accepted classification, depending on the level of fusion of the caudal ends of the paramesonephric ducts, is described

as bifid. According to the literature, in white outbred rats the body of the uterus is an undivided area between the horns of the cervix of the uterus, the caudal ends grow together at the level of the apex of the bladder and form the unpaired body of the uterus and the ischium. In fact, despite the fact that the walls of the right uterine horn grow together to form the body of the isch, their cavities remain separated from each other by a thin septum and open into the vagina with two separate openings, therefore, the uterus of rats should be classified as double.

Histological examination revealed that the uterine wall consists of three membranes: mucous (endometrium), muscular (myometrium) and serous (perimetry). A large number of works have been devoted to the study of the structure of the endometrium. The perimetry is represented by dense fibrous connective tissue covered with mesothelium; in the area of the cervix there are accumulations of adipose tissue - parametrium.

The smooth muscle tissue of the uterine myometrium, which, as is known, is characterized by the specificity of its functions and endocrine dependence, remains poorly studied. There are a number of controversial issues to which the specialized literature does not have clear answers, for example, there is still no definite position regarding the number of layers of the myometrium, much less its structure in the lower segment of the uterus.

THE AIM OF THE STUDY

The main goal of the Uterine Uniqueness study is to study the morphology and function of the uterus in



various animal species, including humans and rats. Specifically in the case of the rat, the study aims to describe the structure of the uterus, including its constituent parts - the horns, body and cervix. It is noted that veterinary textbooks may consider different classifications of the uterus in albino rats depending on the degree of fusion of the caudal ends of the ducts. It is important to point out that, in fact, differences in the structure of the uterus between different species can exist even with external similarities. Thus, the study aims to study in detail the unique features of the uterus in different animal species and their relationship with the morphology and functions of this organ.

MATERIALS AND METHODS OF THE STUDY

Female rats weighing 220-300 g, 4-5 months of age were selected for the purpose of experimental research. All laboratory animals were obtained from the same vivarium and were performed on 4-5month old white rats. These adult (4-5 months old) white outbred rats were kept under standard vivarium conditions with

relative humidity (50-60%), temperature (19-22°C) and light regime (12 hours dark and 12 hours light).

In order to prevent infectious diseases in the vivarium and to ensure that they are free of infectious diseases, the laboratory animals were quarantined for 21 days and observed during these days, their temperature was measured and their weight was checked several times during these days. weight gain was monitored. During this period, no symptoms of illness were observed in them, their temperature was within normal limits (38.5-39.50C), appetite disorders and other external changes were not detected. These cases showed that it is possible to involve them in experiments.

Nuraliev N.A. in the preparation of standard vivarium food ration for laboratory animals. and all. (2016) based on the recommendations in the methodological manual. All biological safety rules and ethical principles of working with laboratory animals were strictly followed in keeping, killing and dissecting laboratory animals.



(Figure 1) A normal uterus of a white outbred female rat.

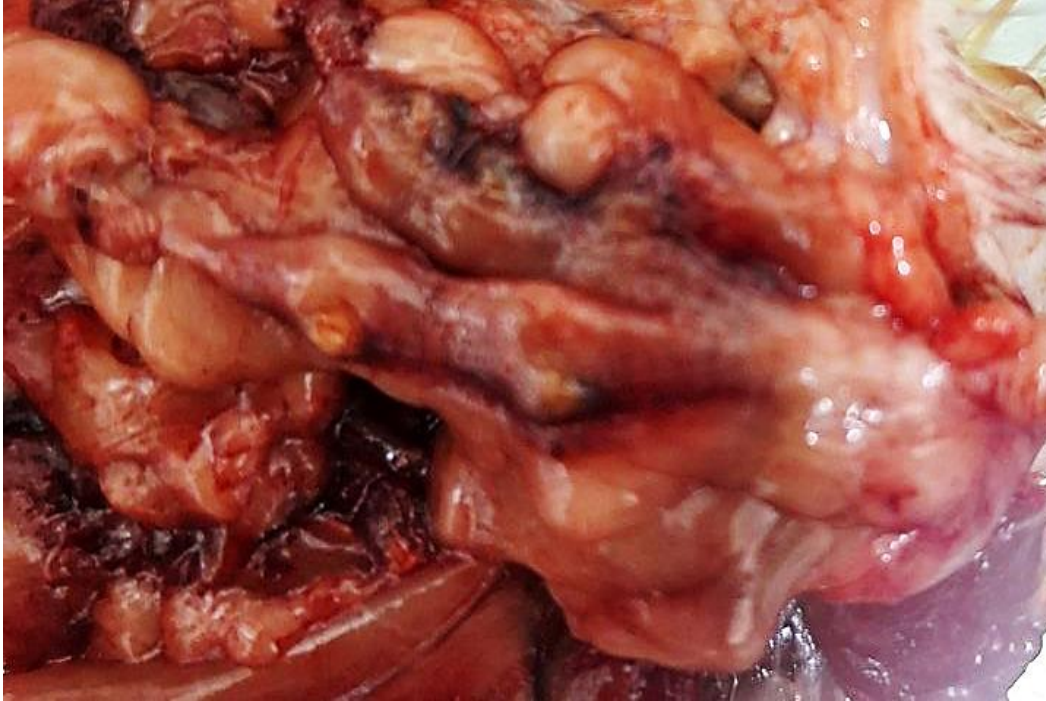


(Figure 2) Postpartum uterus of a white female rat.

Research methods widely used in experimental research were used to study the morphological parameters of the organs of laboratory animals (autopsy practice). All histological preparations were viewed using an HL-19 trinocular microscope (China) with software. The main objects of the study were histological paraffin blocks prepared from the uterine tissue of purebred rats and tissues cut on a rotary microtome. Preparation of histological sections

consisted of 4 stages and was carried out by traditional morphological methods. A YD-315 rotary microtome (China) was used to prepare the preparations, the prepared sections were stained with hematoxylin and eosin, van Gieson's histochemical method and viewed under a trinocular microscope, photographs of the changed areas were taken.

A control group was formed with 20 animals selected for the study



(Figure 3) Abdominal location of the uterus of an outbred rat.

The statistical processing of the obtained material was carried out using traditional variational statistics methods using the Excel program, using the software package for medical and biological research on a personal computer based on Pentium IV processors. The principles of evidence-based medicine were used in the organization and conduct of research.

RESULT AND DISCUSSION

The structure of the white rat uterus has double horns, double body and neck.

Uterine branches unite in the caudal direction to form the body and neck, but their cavities are separated from

each other by a barrier and open into the vagina with two independent openings. Histological examination showed that the wall of the uterine horns, the body and the wall of the cervix have a similar structure and consist of three layers: endometrium (mucous layer), myometrium (muscle) and perimetrium (serous) layers. It was found that the muscular layer of the uterus consists of sparse fibrous tissue, the endometrial glands are of the same size, without changes, and the cervix consists of flat coagulating epithelium. Macroscopically, it is possible to see a bicornuate uterus located in the abdominal cavity (pictures 1-4).

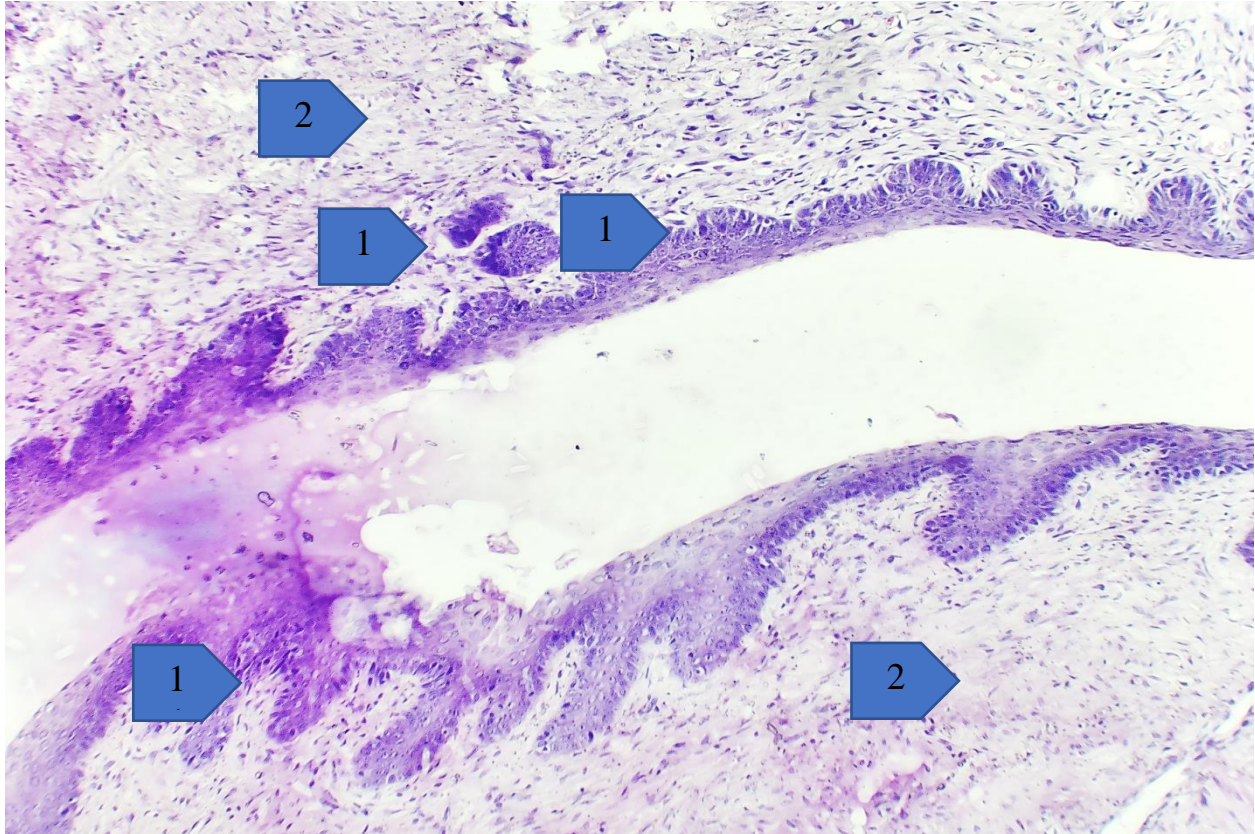


Figure 4. Microscopic appearance of the cervix. Multilayered flat epithelium (1), smooth muscle layer, myocytes (2). Hematoxylin-Eosin. 20x40.

In outbred rats, the vaginal part of the cervix is covered with a multi-layered flat epithelium, similar to that of humans (Fig. 5). A special plate of thin fibrous connective tissue holds the uterus and cervical glands. Collagen fibers (type III collagen fibers) dominate among the fibrous structures of connective tissue. The number of elastic fibers is small. In rats, the cervix is more similar to the human cervix, which is important information to consider when looking for an experimental model for research. The implementation of the main functions of the uterus, as it is known, is based on the activity of the myocytes in the myometrium and has been one of the organs that has not been sufficiently studied. At the same time, the smooth muscle tissue of the uterine myometrium of mammals, including humans, is known to be characterized by high structural specificity and endocrine dependence.

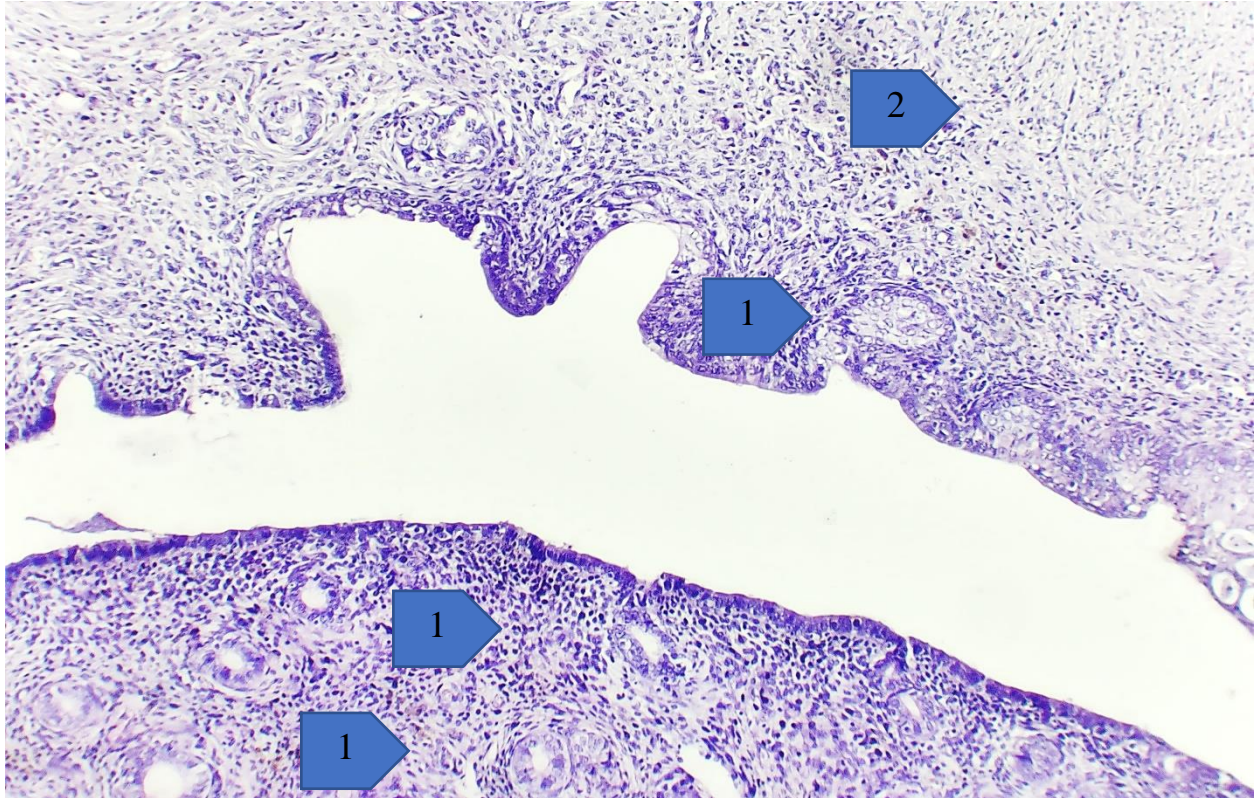


Figure 5. Microscopic view of the uterine horn of a white outbred rat. Endometrial glands (1) and smooth muscle layer, type of myocytes (2). Hematoxylin-eosin dye. Magnification 10x10

It is known that perinatal pathology, neonatal pathology, infertility and similar pathologies are increasing and getting younger. Reproductive health is a state of complete physical, mental and social well-being, which means the absence of diseases in all areas related not only to the reproductive system, its functions and processes. Integral components of reproductive health are caring for the health of the younger generation, safe sex, the use of effective and acceptable methods of birth control, safe pregnancy and the birth of a healthy child, prevention of sexually transmitted infections, and timely treatment. It should be noted that the number of cancer diseases of the reproductive system of women has become "younger", that is, the number of patients with tumors of the reproductive system has increased, most of them are of working age, which negatively affects the reproductive system. function of a woman. In women of reproductive age with recent somatic and gynecological pathologies

FINDINGS

The structure of the uterus of a white mongrel rat has double horns, a double body and a neck. The branches of the uterus join caudally to form the body and cervix, but their cavities are separated from each

other by a septum and open into the vagina by two independent openings. Histological examination showed that the wall of the uterine horns, the body and the wall of the cervix have a similar structure and consist of three layers: endometrium (mucosal), myometrium (muscular) and perimeter (serous). Macroscopically, you can see a bicornuate uterus located in the abdominal cavity. The vaginal part of the cervix is covered with stratified squamous epithelium, similar to that of humans. In rats, the cervix is more similar to the human cervix, which is important information for research. Reproductive health is an important aspect of overall well-being and requires taking care of the health of the younger generation, using safe methods of contraception, preventing infections and timely treatment. Oncological diseases of the reproductive system of women are becoming more common and younger, which negatively affects their reproductive function.

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