LECTURE COMPLEX

Discipline: "Normal genitourinary system"

Discipline code: NGS 2209

Name and code of the EP: 6B10115-"Medicine"

Volume of training hours/credits: 15/0,5

Course and semester of study: 2/3

Length of lectures:1 hour

Shymkent, 2024

The lecture complex was developed in accordance with the working curriculum of the discipline (syllabus) "Normal genitourinary system" and discussed at a meeting of the Department of "Topographic anatomy and histology".

Protocol No. 1 from "03" 09 2024

Head of the department,c.m.s., acting professor _____ Murzanova D.A.

Lecture No. 1.

1. Topic: Histology of the genitourinary system.

2. Purpose:

- To give an idea of the development and fine structure of the organs of the urinary system.
- To give an idea of the development and structure of the organs of the male reproductive system
- To give an idea of the development and structure of the organs of the female reproductive system.
- Give an idea of the ovarian-menstrual cycle.

3. Lecturea bstracts.

The urinary system includes the kidneys and urinary tract: cups, pelvis, ureters, bladder and urethra.

The kidney has a bean-shaped shape and is covered with a connective tissue capsule, under which the cortical substance is located. The brain matter lies deeper. Nephrons make up the parenchyma of the kidney. The nephron is a structural and functional unit of the kidney. The nephron consists of: a renal body consisting of a capsule and a vascular glomerulus, a proximal convoluted and straight tubule; a thin tubule consisting of descending and ascending sections, distal straight and convoluted tubules. The distal convoluted tubule flows into the collecting tube. Process

Urination consists of two phases: filtration phase and reabsorption phase

The endocrine system of the kidneys consists of 3 devices: juxtaglomerular, prostaglandin, and kallikrein-kinin.

The wall of the urinary tract has a general plan of structure and consists of 4 membranes: the mucous membrane, which includes the transitional epithelium and its own plate, the submucosal base, the muscular and adventitious membranes.

In the kidneys of newborns, the basement membrane of the glomeruli is poorly developed, the cortical layer of the kidney is thin, the pyramids and rays are indistinctly formed, the tubules are short, compactly arranged, the forming nephron capsules are arranged in groups. After birth, the number of vascular glomeruli increases.

The male reproductive system includes the testes, vas deferens, and accessory glands. The composition of the vas deferens includes the straight tubules, the testicular network, the excretory tubules, the duct of the appendage, the vas deferens and the ejaculatory duct.

The testis is externally covered with a serous membrane, under which there is a protein membrane. Connective tissue partitions extend from the mediastinal region of the testis and divide it into lobules. There are 1-4 convoluted seminal tubules in each lobule. Layers of loose connective tissue containing interstitial cells are located between the tubules. The wall of the convoluted tubules consists of 3 layers: basal myoid and fibrous. From the inside, the tubules are lined with an epitheliospermatogenic layer consisting of 2 cell differons: 1) sustentocytes, 2) developing spermatogenic cells, which include: spermatogonia, spermatocytes of the 1st and 2nd orders, spermatids and spermatozoa.

All the vas deferens are built according to a single plan. Their wall consists of 3 membranes: mucous muscular and adventitious. In different departments, the vas deferens are

lined with different epithelium. The accessory glands of the male reproductive system include seminal vesicles, prostate gland and bulbourethral glands.

After birth, there are no dividing spermatogonies in the seminal tubules of the testes. At the age of 7-8, layers of spermatogenic cells appear in the epithelium of the seminal tubules. At the age of 12-13, spermatids appear in the seminal tubules. Since 1516, all cells of the spermatogenic epithelium have been detected.

The female reproductive system includes the ovaries, oviducts, uterus, vagina, external genitalia and mammary glands.

The ovary is covered from the outside with a protein shell, under which there is a cortical substance. In the center of the ovary there is a medulla containing large arteries and veins. The cortical substance of the ovaries contains follicles of varying degrees of maturity, with developing ovocytes, atretic follicles and bodies, yellow and former bodies. Follicles, depending on the stage of development, are divided into: 1) primordial, 2) primary, 3) secondary, 4) tertiary (mature). In place of a burst follicle, a yellow body develops after ovulation, which goes through 4 stages: vascularization and proliferation, glandular metamorphosis, flowering and reverse development. Some of the follicles that have entered a period of great growth are subject to atresia

The wall of the oviducts includes 3 membranes: mucous, muscular and serous. The mucous membrane forms deep longitudinal folds consisting of its own mucosal plate covered with a prismatic ciliated epithelium.

The uterus has a pear-shaped shape. The uterine wall consists of 3 membranes: endometrium, myometrium and perimetrium. The endometrium is lined with a single-layer prismatic epithelium, which forms simple tubular glands - crypts. The myometrium consists of 3 layers of smooth muscle tissue: submucosal, vascular and supravascular. The change in the endometrium of the uterus during the sexual cycle is called the menstrual cycle, in which there are 3 phases: mental, post-menstrual, premenstrual. The mammary glands have a lobular structure, in each lobule there is a complex alveolar-tubular gland, the excretory duct of which opens on the surface of the nipple.

During puberty, the relationship between the ovaries and the hypothalamic-pituitary system is finally formed. At the same time, all the formative processes of the reproductive system are activated.

With the normal development of the female body, the cyclicity of gonadotropin secretion is established and sexual cycles occur. The concept of the sexual cycle combines the ovarian and ovarian cycles, that is, the processes occurring in the ovaries under the influence of hormones and the menstrual cycle, that is, cyclic changes in the uterus. Both processes are interrelated and hormonal. The duration of the ovarian menstrual cycle is on average 28 days + - 7 days. The duration of the ovarian menstrual cycle is considered from the first day of the onset to the first day of the next menstruation.

If fertilization does not occur, then the current cycle ends with menstruation and the period of a new cycle begins.

Phases of the ovarian-menstrual cycle: 1. Menstrual (desquamation phase).
2. Postmenstrual (estrogenic, proliferative, reparative or follicular). 3. Premenstrual (progestin, luteal, secretory, or pregramidal – the phase preceding pregnancy).

Menstrual phase – the duration of this phase is on average 4 days. From day 1 to day 4 of the ovarian-menstrual cycle. In this phase, the functional layer of the endometrium is rejected. It is characterized by the absence of hormones, because progesterone is no longer there, and estrogen is not yet there.

The postmenstrual phase begins on the 5th day of the ovarian–menstrual cycle, ends 1-2 days after ovulation, since ovulation occurs in the middle of the cycle, the estrogenic phase occurs before the 15th-16th day of the cycle. During this phase of the ovaries, follicle growth and development occurs under the influence of the follicle-stimulating hormone. During the development of follicles, a large amount of estrogens is produced. This inhibits the further production of follicle-stimulating hormone, but stimulates the production of luteinizing hormone. These hormonal shifts cause ovulation. Changes in the ovary correspond to changes in the uterus. During the period of increased secretion of follicle-stimulating hormone and estrogens, endometrial cell proliferation and restoration of the functional layer due to the basal layer of the endometrium. During this period, the endometrium thickens to 2-3 mm. And mitoses are observed in the cells of the glands and in the cells of the stroma. The glands straighten, but do not secrete. Blood vessels are being restored.

Premenstrual phase – the yellow body functions, the duration of its functioning is 10-12 days, and the entire phase lasts 12-13 days. The high level of progesterone secreted by the corpus luteum creates favorable conditions for embryo implantation. Prolactin produced during this phase enhances the effect of progesterone. In this case, the epithelial cells of the uterine mucosa stop dividing, hypertrophy, the uterine glands expand and branch, glandular cells begin to secrete glycogen, glycoproteins, lipids and mucin. Stroma cells increase, glycogen and fat droplets appear in their cytoplasm and a decidual reaction occurs.

4. Illustrative material Presentation, including:

• color micrographs of histopreparations

• * electronograms, diagrams, drawings

5. Literature:

Main literature

1. Inderbir Singh. Textbook of HumanHistology.With Color Atlas and Practical Guide/8 thEdition.Jaypee Brothers Medical Publishers .2016.-302 p.ПереводГистологиячеловека

2. Dudek Ronald W. Embryology / Ronald W. Dudek. - 5th ed. - [s. l.] : Wolters Kluwer, 2014. - 158 p. Перевод заглавия: Эмбриология

3. Gartner Leslie P. Cell Biology and Histology / Leslie P. Gartner. - 8th ed. - [s. l.] :Wolters Kluwer, 2019. - 436 p. - (BRS. Board Review Series)Переводзаглавия: Клеточнаябиологияигистология

Additional literature

Textbook of Human Histology.Inderbir Singh /Sixth Edition/Inderbir Singh 2010.-386 p. Перевод Учебник по гистологии человека

Electronic publications

1. ATLAS OF HISTOLOGY with Functional Correlations. Thirteenth Edition, Wolters Kluwer.2017.- 1102 p.

2. Theory and practice of Histological techniques.Eighth edition.Elsevier Limited.2019.-554 p.

3. Textbook of HumanHistology.With Color Atlas and Practical Guide/8 thEdition.Jaypee Brothers Medical Publishers .2011.-386 p.
4. USMLE Step 1.Lecture Notes 2018.by Kaplan.2018.-425 p/
5. Zhumabayeva, S.E., Boken, T.S.
Cytology and histology : Educational-methodical complex. . - Kokshetau: KGU, 2017. - 101 p.http://rmebrk.kz/
6. Бородулина, О.В. Цитология и гистология – Cytology and histology : Практикум. / Костанайский гос. педагогический университет им. У. Султангазина. - Костанай: КГПУ им.У.Султангазина, 2020. - 100 с. - http://rmebrk.kz/

6. Control questions (feedback):

• General morphofunctional characteristics of the urinary system
• Kidneys, the structure of cortical and cerebral matter
• The structure of the nephron
• Histophysiology of the nephron
• * Endocrine system of the kidney
• Urinary tract
• Age-related features