

Zaporizhzhya State Medical University
Department of Histology, Cytology and Embryology

**Methodical recommendations for the organization of
independent and individual extracurricular work of students
"HISTOLOGY
OF INTERNAL ORGANS"**

Zaporizhzhya

2016

ББК 28.05+28.83+28.866]я 73

М 54

УДК 576.3+611-013+611-018](075.6)

Methodical recommendations for the organization of independent individual and extracurricular work of students of 2nd year of medical faculties "Histology of internal organs" / Sirtcov V.K., Sulaeva O.N., Aliyeva E.G., Zavgorodnyaya M.I., Makeyeva L.V., Zidrashko G.A., Pototskaya E.I.-Zaporizhzhya. - 2016 - 80с.

It is recommended by the Cyclic methodical commission of medical and biological departments (report № 3 from 20.10.16)

This manual is intended for the organization of independent and individual extracurricular work of medical students studying in English. The structure of the training manual is adapted to the requirements of the program-oriented training and is based on the principles of multi-level and continuity of the learning process, using feedback mechanisms. The developed tasks for independent and individual work provide opportunities for self-control of knowledge and accumulated morphological diagnostic skills. The "Histology of regulatory systems" is made according to the program of histology, cytology and embryology for students of medical high schools of III-IV levels of accreditation.

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ISBN 966-565-085-8

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2016

**Topic: THE DIGESTIVE SYSTEM. ANTERIOR PART. ORAL CAVITY.
THE TONGUE. THE TEETH. THE SALIVARY GLANDS**

Motivation. Pathology of the digestive system takes one of the leading places in the structure of human morbidity and mortality. At the core of the digestive system diseases are violations of embryonal development, diet and structural and functional maintenance of the digestive process violations. Process of food digestion begins in the mouth. Knowledge of the structural basis of mouth structures functioning plays an important role in the understanding and diagnosis of the oral cavity diseases.

Learning objective (general): to be able to interpret the structural bases of functioning of the oral cavity.

Expected outcome:

1. To interpret the sources of development and overall organization structures of oral cavity.
2. To determine in histological specimens various departments of oral cavity.
3. To interpret the stages of development and structure of the teeth.
4. To interpret the structural basis of the salivary glands functioning.
5. To differentiate the different salivary glands and their structural components in histological specimens

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Sources of development and structure of the oral mucosa

Mucosa layers	Source of development	Tissue composition	Functional significance

Table 2.

The comparative characteristic of the mucosa structure in the different parts of the oral cavity

The structures of the oral cavity	Epithelium	Lamina propria	Underlying tissue
Cheek			
Gum			
Lip (mucous part)			

5

Hard palate			
Soft palate			
Ventral surface of the tongue			
Dorsal surface of the tongue			

Table 3.

Structural and functional characteristic of the tooth tissues

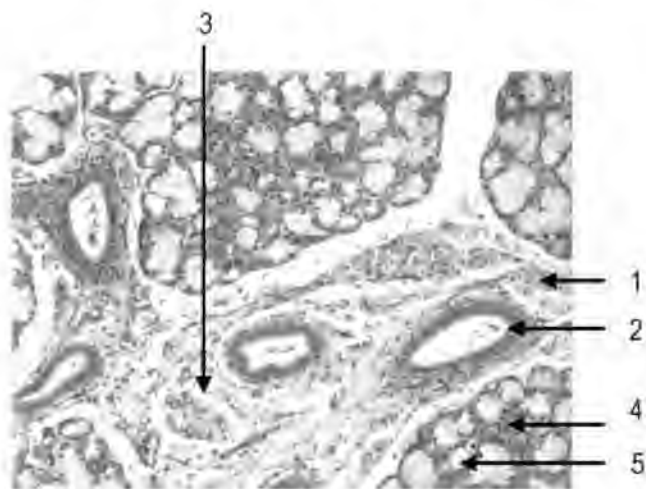
Tooth tissue	Source of development	Features of the structure	Regeneration
Enamel			
Dentin			
Cementum			
Pulp of the tooth			
Periodontium			

Table 4.

Characteristic of the major salivary glands

Gland	Secretory portions	Ducts	The chemical composition of secret
Parotid salivary gland			
Submandibular salivary gland			
Sublingual salivary glands			

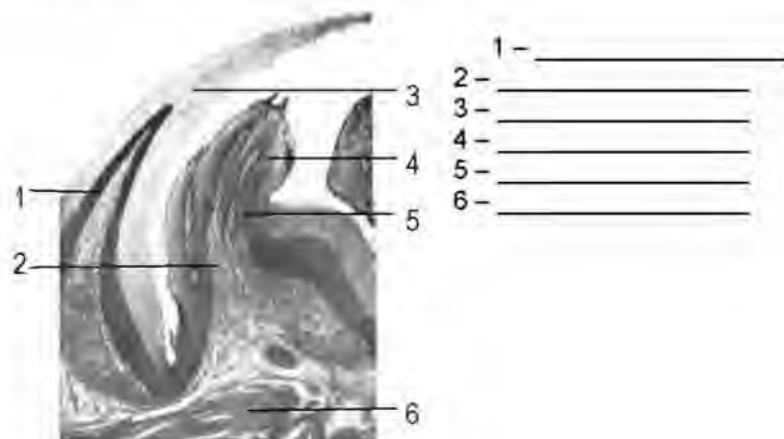
2. For developing skills in diagnostic identify the structures marked below.

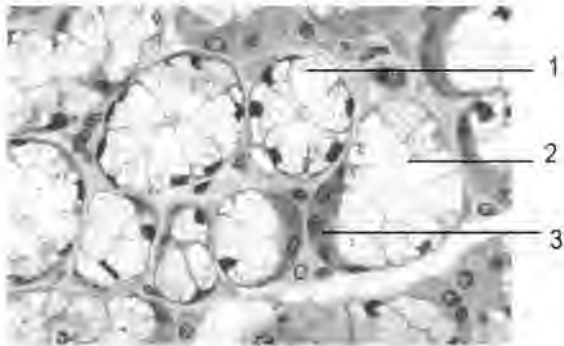


Recognize the organ and the structures shown in the picture

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____

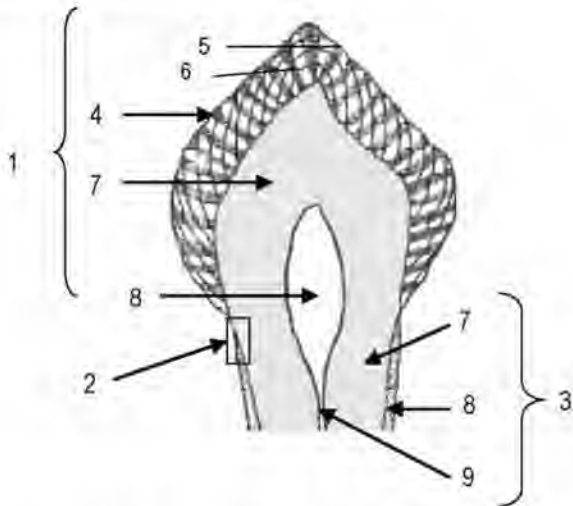
Recognize the structures shown in the picture





Recognize the organ and the structures shown in the picture:

- 1- _____
- 2- _____
- 3- _____



Recognize the structures shown in the picture:

- | | |
|----------|----------|
| 1- _____ | 6- _____ |
| 2- _____ | 7- _____ |
| 3- _____ | 8- _____ |
| 4- _____ | 9- _____ |
| 5- _____ | |

TOPIC: THE PHARYNX. THE ESOPHAGUS. THE STOMACH.

Motivation. Pathology of the esophagus and stomach, take considerable place in the structure of the human disease. Knowledge of the structural basis for the realization of the process of digestion and the protection and regeneration mechanisms of these organs is the basis of understanding of the mechanisms of diseases development such as gastroesophageal reflux disease, Barrett's esophagus, gastritis, gastric ulcer, gastric cancer, which will be explored in subsequent stages of learning.

Learning objective (general): to be able to interpret the structural basis of the pharynx, esophagus, and stomach functioning.

Expected outcome:

1. To interpret the sources of development and regeneration of the esophagus and stomach.
2. To determine in histological specimens esophagus and stomach, as well as their departments.
3. To interpret the structural bases of realization of the digestion process in the stomach.
4. To interpret the composition and functioning of the barriers that protect the mucous membranes from the effects of peptic factors
5. To interpret the role of the local innervation apparatus and endocrine system in maintaining the structural and functional state of the digestive system.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Parts of the digestive tract

Parts of the digestive tract	Source of epithelium development	Type of epithelium	Organs of this digestive part
Upper			
Middle			
Lower			

Table 2.

Parts of the pharynx and its characteristic

Parts of the pharynx	Features of the structure	Tonsils located in this part
Nasopharynx		
Oropharynx		
Laryngopharynx		

Table 3.

Cells of the gastric glands

Type of cell	Key morphological features	Function	Key regulators
Chief cells			
Parietal cells			
Mucus neck cells			
Endocrine cells			
Undifferentiated cells			

2 Recognize the organ (part of digestive tube) and the structures shown in the picture:



Organ _____

1 - _____

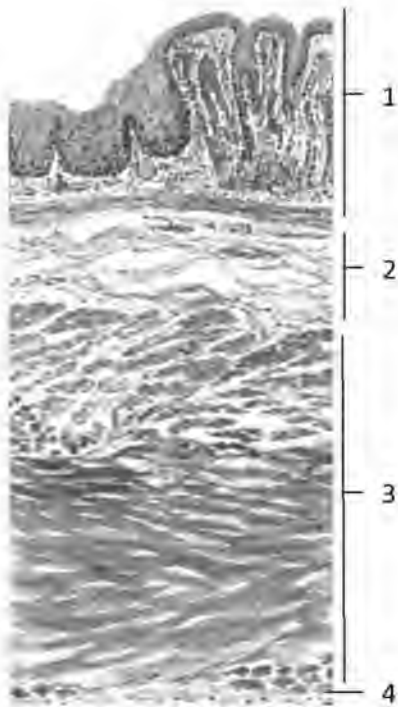
2 - _____

3 - _____

4 - _____

5 - _____

6 - _____

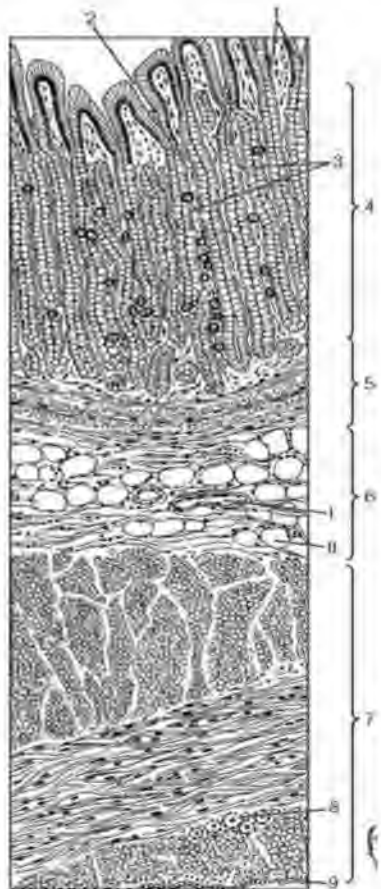


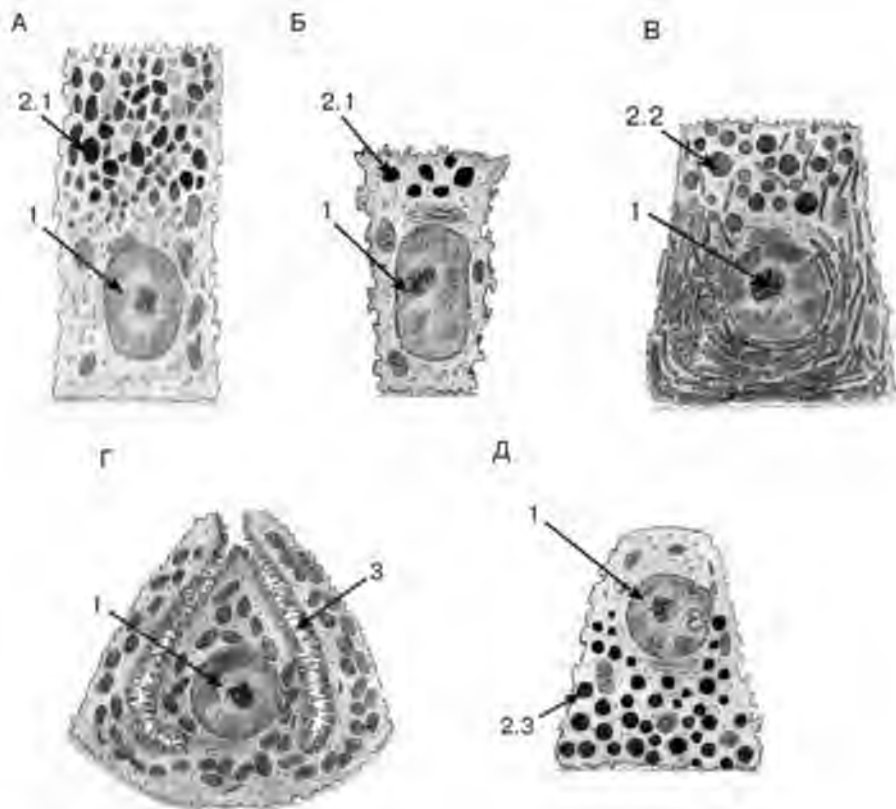
Part of the digestive tube

- 1 - _____
 2 - _____
 3 - _____
 4 - _____

Organ _____

- 1 - _____
 2 - _____
 3 - _____
 4 - _____
 5 - _____
 6 - _____
 7 - _____
 8 - _____
 9 - _____
 1 - _____





Cells of _____
(organ)

Recognize the structures shown in the picture:

- A - _____
- Б - _____
- B - _____
- Г - _____
- Д - _____
- 1 - _____
- 2.1 - _____
- 2.2 - _____
- 2.3 - _____

TOPIC: THE SMALL AND LARGE INTESTINE

Motivation. Small and large intestine play an important role not only in the process of digestion, but in the maintenance of immunologic homeostasis in humans. Knowledge of the structural bases of functioning and regeneration of small and large intestine is the basis of understanding of the mechanisms of intestinal diseases that will be studied in the subsequent stages of training.

Learning objective (general): to be able to interpret the structural bases of functioning of small and large intestine.

Expected outcome:

1. To interpret the sources and the development and regenerative possibilities of small and large intestine.
2. To determine in histological specimens small and large intestine, and their departments.
3. To interpret the structural bases of realization of the process of digestion in the small and large intestine.
4. To interpret the composition and functioning of the barriers that protect the mucous membranes from the effects of peptic factors
5. To interpret the role of the local innervation apparatus and the endocrine system and the gut-associated lymphoid tissue in maintaining the structural and functional state of the digestive system.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Parts of the small intestine

Parts of the small intestine	Relief features	Features of the structure	Functions

Table 2.

Cell composition of the small intestine epithelium

Type of cells	Localization in the crypt-villus-system	Features of the structure	Functions

Table 3.

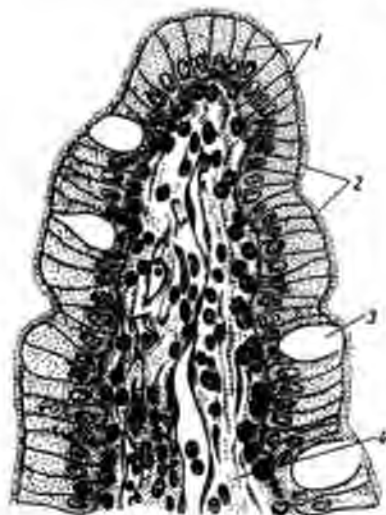
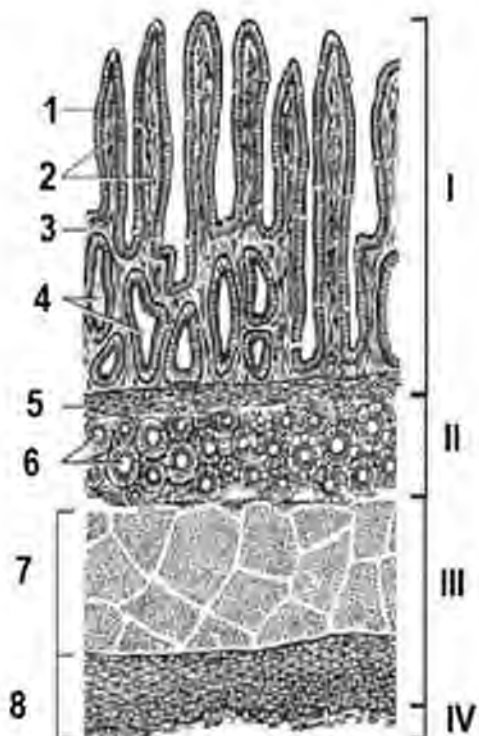
**Comparative characteristics of the structure
of small and large intestine**

Characteristic	Small intestine	Large intestine

2. Recognize the organ (part of the digestive tube) and the structures shown in the picture:

Part of the digestive tube

- _____
- I - _____
- II - _____
- III - _____
- IV - _____
- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____



Structure _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____



1



2



3



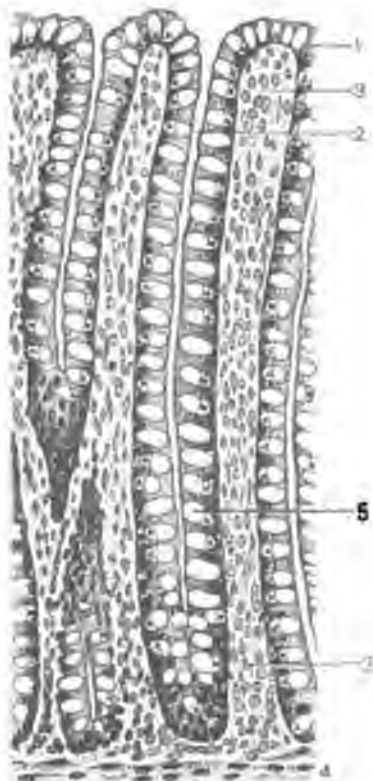
4

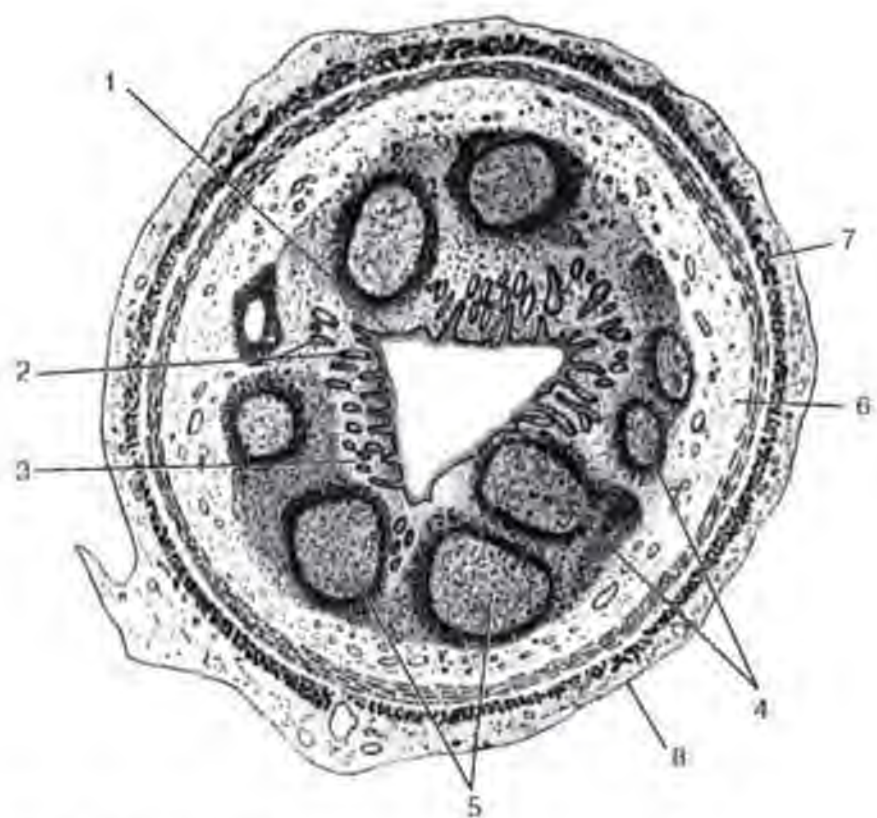
Recognize the cells of the intestinal epithelium:

- 1 - _____
 2 - _____
 3 - _____
 4 - _____

Part of the digestive tube

- _____
 1 - _____
 2 - _____
 3 - _____
 4 - _____
 5 - _____
 6 - _____





Part of the digestive tube

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____

TOPIC: THE LIVER. THE PANCREAS

Motivation. The digestion process is largely dependent on the work of the digestive glands - liver and pancreas, which not only produce peptic factors (enzymes, bile), but also play an important role in the regulation of metabolic processes in the human body. Knowing of digestive glands' histophysiology underlies in the understanding of cause-and-effect relationships in the development of diseases such as hepatitis, cirrhosis, acute and chronic pancreatitis, neoplasia and metastatic lesions of organ, biliary tract disease, and so on.

Learning objective (general). To be able to determine features of structure and regeneration of the liver and the pancreas for the interpretation of the functional state, and the nature of the possible pathological processes in organs during the subsequent stages of studying.

Expected outcome:

1. To define embryonic sources, stages and possible malformations of the digestive glands.
2. To identify the general structure, tissue composition, features of blood supply and innervation of the digestive glands.
3. To interpret the structural basis for the functioning of the digestive glands, principles of tier work regulation.
4. To interpret the relationship between the work of digestive glands and other gastrointestinal parts.
5. To identify possibilities of the digestive glands regeneration.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 3.

Characteristic of the digestive glands

Gland	Source of development	Key morphological features	Functions
Liver			
Pancreas			

Table 2.

Characteristic of specialized liver cells

Cell	Source of development	Key morphological features	Functions
Hepatocytes			
Kupffer cells			
Lipocytes (Ito-cells)			
Pit-cells			

Table 3.

Structural and functional characteristic of the pancreas

Part of the gland	Structural elements	Cells	Secretion products	Functions
Exocrine				
Endocrine				

2. Recognize the organ and the structures shown in the picture:

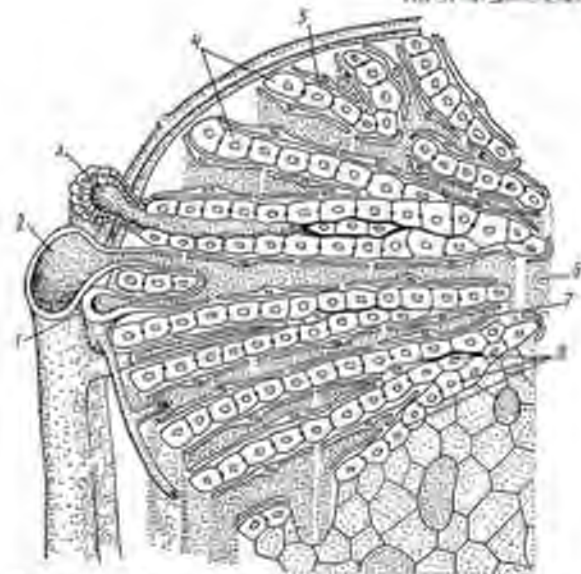
Organ _____

1 - _____

2 - _____

3 - _____

4 - _____



Recognize the organ and the structures shown in the picture.

Organ _____

1 - _____

2 - _____

3 - _____

4 - _____

5 - _____

6 - _____

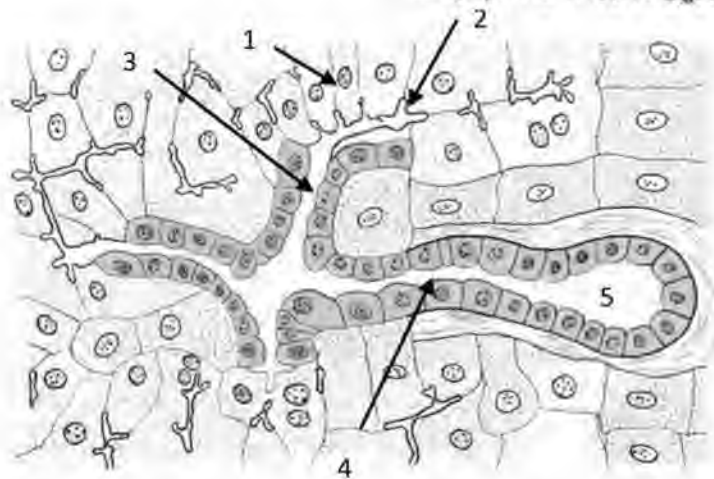
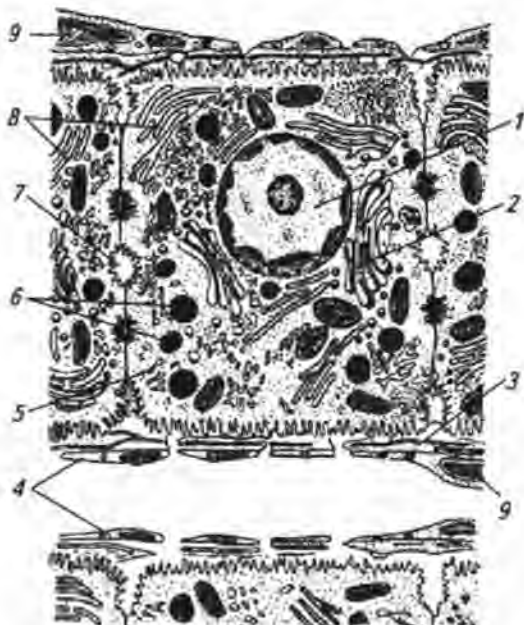
7 - _____

8 - _____

Recognize the cells:

Identify the structures shown in the picture:

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____
- 9 - _____



Identify the intrahepatic bile ducts structures shown in the picture:

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____

TOPIC. THE RESPIRATORY SYSTEM. AIRWAYS. LUNGS.

Motivation: Respiratory organs provide not only air transport, its moisturizing, cleansing, warming and gas exchange, but also perform a number of other functions, including participation in the metabolism of biologically active substances (endothelin-1, angiotensin II, nitrogen oxide, and so on.). The respiratory system has a powerful specific defense system, disruption of which can lead to the development of asthma, chronic obstructive pulmonary disease and others. Knowledge of morphological structures that determine the efficiency of air conditioning and gas exchange is a prerequisite for understanding the physiology and pathology of the respiratory system, is the basis for the differential diagnosis and choice of tactics of treatment of patients with disorders of the respiratory system.

Learning objective (general): To be able to differentiate between the structural elements of the respiratory system, to interpret their functional features in order to determine the presence, location and nature of pathological changes in patients with respiratory disorders.

Expected outcome:

1. To identify sources and main stages of development of the respiratory system, the possible options for the development of anomalies.
2. To interpret the general regularities of the structure and the functional significance of the airways and respiratory department.
3. To interpret cellular air conditioning fundamentals, factors affecting the efficiency of the process.
4. To identify the structural foundations of the gas exchange, the components of aero-hematic barrier and the factors affecting its permeability.
5. To interpret morphological substrate of non-respiratory functions of the lungs, age-related changes and the possibility of regeneration of the respiratory system.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables for test the level of knowledge:

Table 1.

Characteristic of the airway wall

Tunica	Tissues	Functions
Mucosa		
Submucosa		
Fibro-cartilaginea		
Adventitia		

Table 2.

Comparative characteristic of the airway structure

Respiratory ways	Mucosa epithelium	Muscularis mucosa	Submucosa	Tunica fibro-cartilaginea
Nasal cavity				
Larynx				
Trachea				
Large bronchus				
Middle bronchus				
Small bronchus				
Terminal bronchiole				

Table 3.

Structural and functional characteristic of the lung

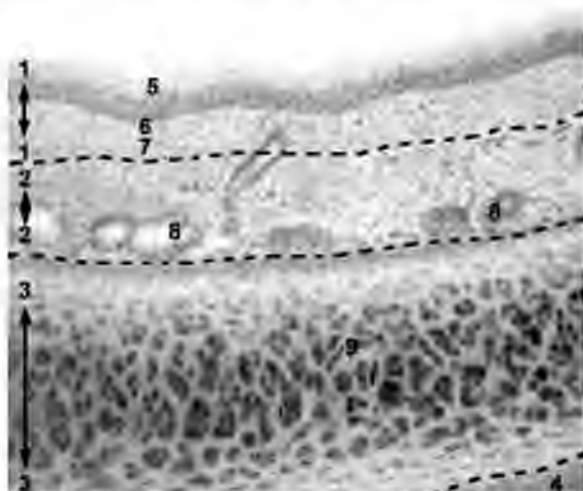
Parts	Tissues	Structural components	Functions
Parenchyma			
Stroma			

Table 4.

Histophysiology of the pulmonary alveoli

Alveolar cells	Morphological features	Functions

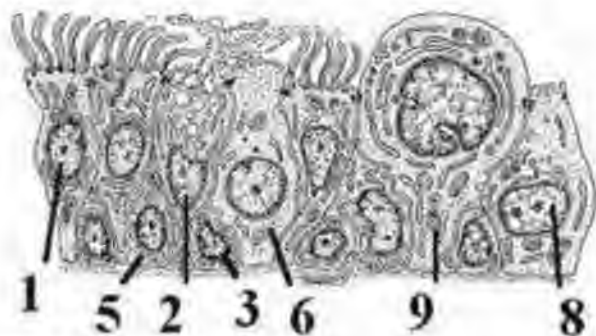
2. Recognize the organ and the structures shown in the picture:



Part of the respiratory ways _____

- 1 - _____
 2 - _____
 3 - _____
 4 - _____
 5 - _____

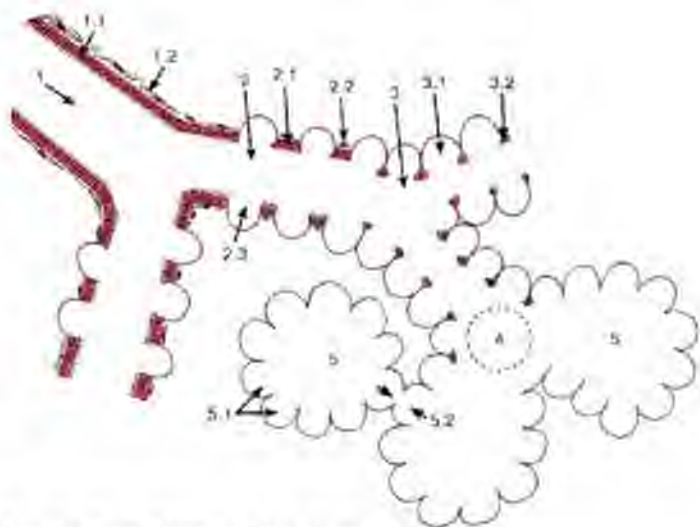
- 6 - _____
 7 - _____
 8 - _____
 9 - _____



Identify the cells shown in the picture:

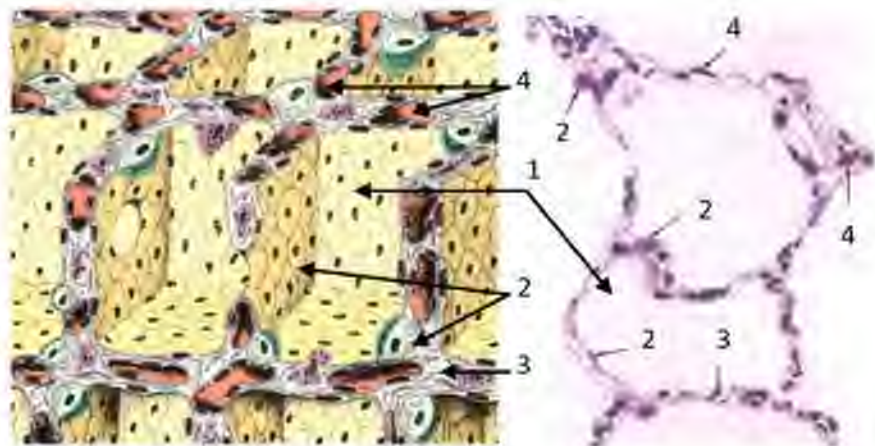
- 1 - _____
 2 - _____
 3 - _____
 4 - _____
 5 - _____

- 6 - _____
 7 - _____
 8 - _____
 9 - _____



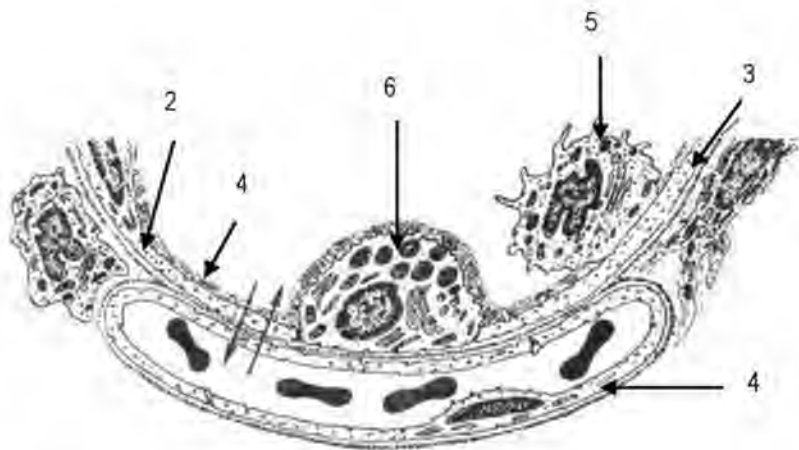
Recognize the structure shown in the picture: _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____



Recognize the structures shown in the picture: _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____



Recognize the structures shown in the picture:

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____

TOPIC: THE INTERGUMENTS. THE SKIN AND ITS DERIVATIVES

Motivation. The skin and its derivatives form the outer cover of the body. Also participating in protection and thermoregulation, skin plays an important role in maintaining the water and salt balance, catabolic excretion products. Here occurs the synthesis of vitamin D3, as well as the metabolism of several hormones. Due to the presence of numerous sensory nerve endings skin performs receptor function. The skin condition is evaluated to diagnose biological age, hormonal status of the organism, vitamin saturation, determine the presence and stage of development of a number of diseases. The study of the relief of the skin epidermis - dermatoglyphics - one of the individual methods of identification in forensic practice.

Learning objective (general). To be able to determine the structural foundations interpret functioning of the skin to detect and treatment of pathological changes in the subsequent stages of studying.

Expected outcome:

1. To identify sources of development and general structure of the skin.
2. To define particular structural organization of the skin in various areas of the body.
3. To interpret the structural bases of realization of the protective function of the skin.
4. To interpret the structural foundations of the receptor function of the skin.
5. To identify the structural manifestation of age-related skin changes, the possibility of physiological and reparative regeneration.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Structural and functional characteristic of the skin layers

Skin layer	Source of development	Tissues	Functions
Epidermis			
Dermis			
Hypodermis			

Table 2.

Characteristic of epidermal cells

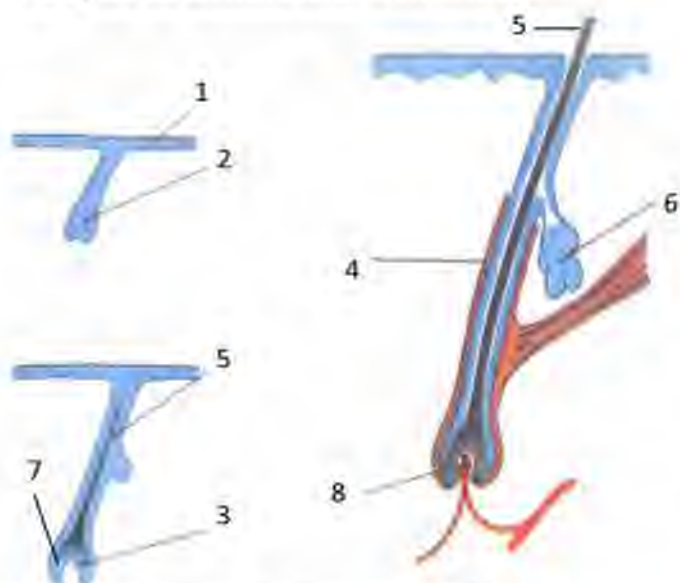
Cell	Source of development	Structure	Functions
Keratinocytes			
Langerhans cells			
Melanocytes			
Merkel cells			

Table 3.

Comparative characteristics of the skin glands

Features	Sebaceous glands	Sweat glands
Gland type		
Contact with the hair root		
Localization of the secretory portion		
Cell types		
Type of secretion		
Excretory duct		

2. Recognize the structures shown in the picture.



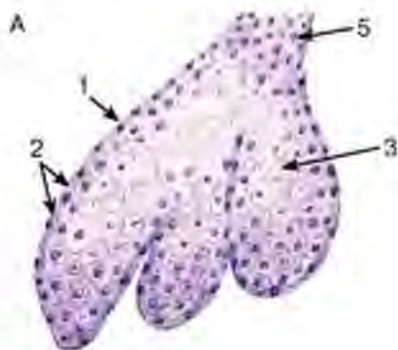
The development of what skin structure is presented?

- _____
- 1- _____
- 2- _____
- 3- _____
- 4- _____
- 5- _____
- 6- _____
- 7- _____
- 8- _____

Identify the gland _____

Recognize the structures

- 1- _____
- 2- _____
- 3- _____



Type of the skin _____

I - _____

II - _____

III - _____

1 - _____

2 - _____

3 - _____

4 - _____

5 - _____

6 - _____

7 - _____

8 - _____

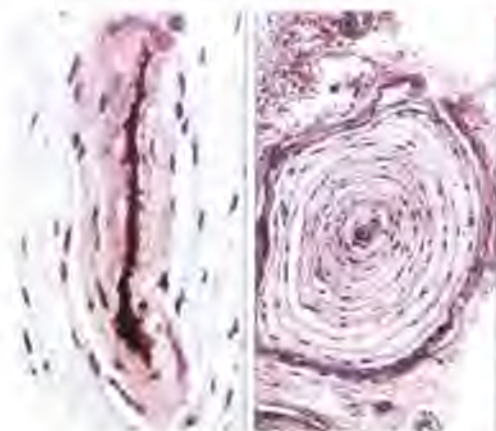
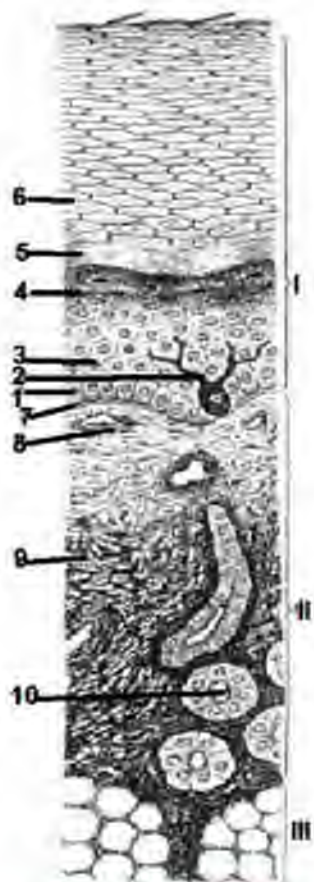
9 - _____

Identify the nerve endings types:

1 - _____

2 - _____

3 - _____

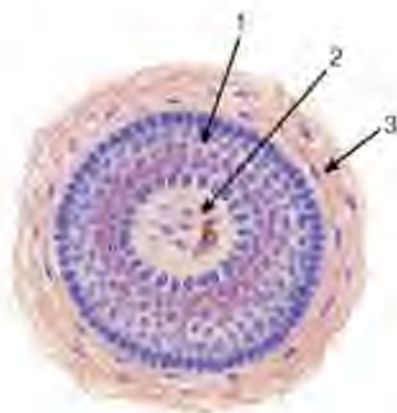


1

2



3



Identify the depth of the cut of the hair follicle

Recognize the structures

1 - _____

2 - _____

3 - _____

Identify the depth of the cut of the hair follicle

Recognize the structures

1 - _____

1.1 - _____

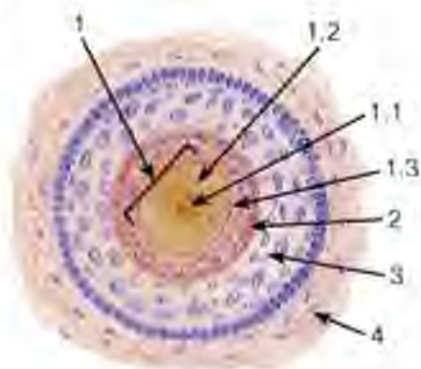
1.2 - _____

1.3 - _____

2 - _____

3 - _____

4 - _____



TOPIC: THE URINARY SYSTEM. THE KIDNEY. THE URINARY TRACT

Motivation. Urinary system plays an important role in maintaining homeostasis in the body. This is largely due to the excretory function of the urinary system, which consists of the urinary excretion of end products of metabolism. In addition, kidneys are involved in the regulation of blood pressure; exchanging ions (sodium, potassium, calcium, chloride, phosphorus); maintaining acid-base balance; stimulation of erythropoiesis. Malformations and diseases of the urinary system can lead to the development of chronic renal failure. Knowledge of the structural bases of kidney functioning is necessary for the understanding of normal and pathological physiology of organ in the subsequent stages of training.

Learning objective (general). To be able to interpret the structural basis of the urinary system functioning, features of their regulation for the interpretation of pathological changes in the subsequent stages of training.

Expected outcome:

1. To interpret sources and stages of development of the urinary system, possible malformations.
2. To determine the overall organization, key morphological characteristics and functional significance of the urinary system.
3. To interpret the structural bases of the excretory function of the kidney, the factors affecting the volume and composition of the ultrafiltrate.
4. To interpret the structural and functional organization of renal tubular system, mechanisms of reabsorption and regulation factors.
5. To characterize the morphological organization of endocrine apparatus of kidney, role in the regulation of water-salt and acid-base metabolism.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Characteristic of the kidney nephrons structures

Part of nephron	Localization	Structure	Functions
Renal corpuscle			
Proximal tubule			
Loop of Henle. The thin descending part			
loop of Henle Thin ascending part			
Loop of Henle. Thick ascending part			
Distal convoluted tubule			

Table 2.

Juxtaglomerular apparatus structural organization

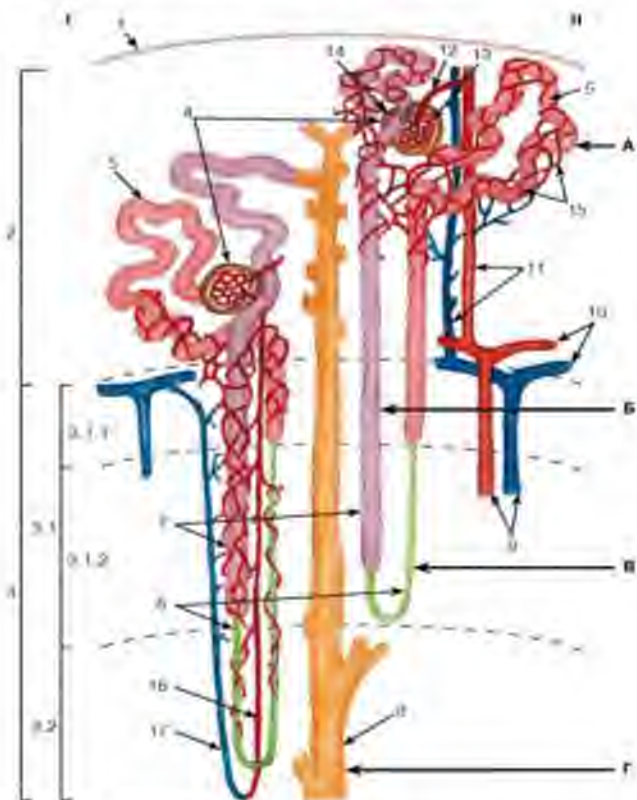
Component of JGA	Localization	Structure	Function
Juxtaglomerular cells			
Macula densa			
Juxtavascular cells			

Table 3.

Structural and functional characteristic of the urinary tract

Tunica	Tissues	Functions

2. Recognize the structures shown in the picture:



Types of the nephrons

- I - _____
 II - _____

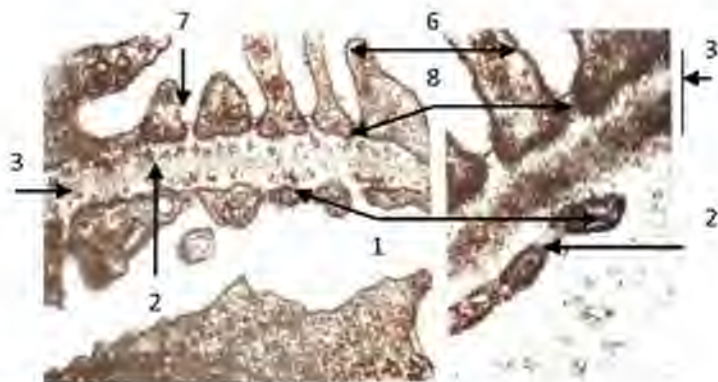
Types of the tubules

- A - _____
 Б - _____
 В - _____
 Г - _____

Recognize the structures:

- 1 - _____
 2 - _____
 3 - _____
 4 - _____
 5 - _____
 6 - _____
 7 - _____

- 8 - _____
 9 - _____
 10 - _____
 11 - _____
 12 - _____
 13 - _____
 14 - _____



Structure _____

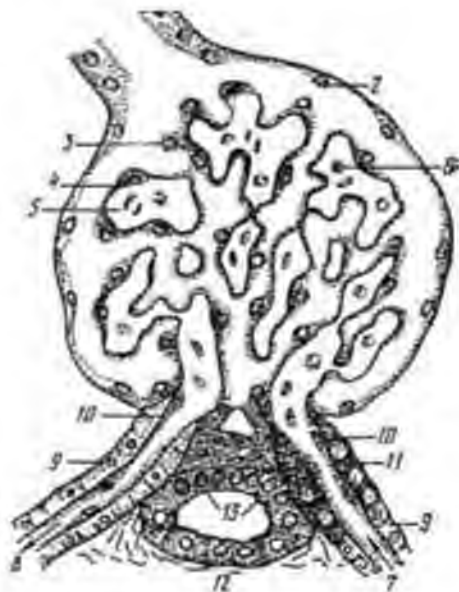
Its localization _____

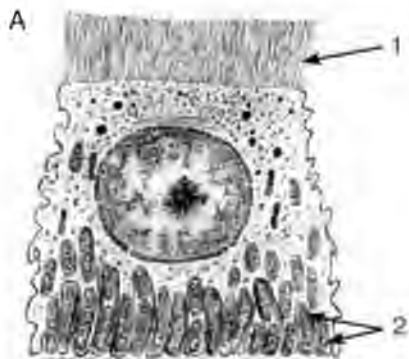
Recognize the structures:

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____

Structure _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____
- 9 - _____
- 10 - _____
- 11 - _____
- 12 - _____
- 13 - _____





Identify tubules:

A - _____

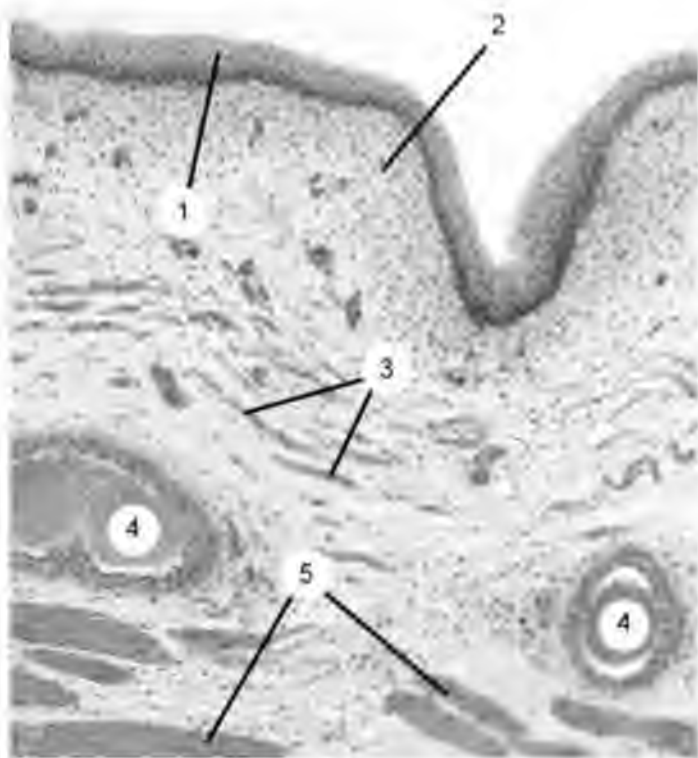
B - _____

C - _____

1 _____

2 _____





Organ _____

Recognize the structures:

1 - _____

2 - _____

3 - _____

4 - _____

5 - _____

TOPIC: THE MALE REPRODUCTIVE SYSTEM.

Motivation. Diseases of the male reproductive system are the subject of an independent science - andrology, which quickly develops nowadays. Male reproductive system has two related functions - the formation of male gametes (sperm) and secretion of male sex hormones, which ensures the preservation of the species, the formation of secondary sexual characteristics, sexual behaviors of the individual. Dysregulation and structural-functional changes of the testes can cause male infertility, pathology of accessory glands (prostate). Knowledge of the development and structure of the testes helps to understand the features of the male reproductive system in ontogenesis, understanding the causes of the possible defects of the reproductive system, disorders of spermatogenesis, interpretation of the pathogenesis of inflammatory, degenerative, neoplastic diseases of the male reproductive system, as well as features of homeostasis violations in these conditions.

Learning objective (general). To be able to interpret the features of the development and structural-functional state of organs of male reproductive system for the interpretation of organ and systemic disorders in diseases in later stages of education.

Expected outcome:

1. To identify sources and stages of development of the male reproductive system.
2. To interpret the structural organization and key morphological features of organs of the male reproductive system.
3. To interpret stages and morphological manifestations of spermatogenesis, its regulation, the role of blood-testis barrier and Leydig cells.
4. To interpret the structural basis for the functioning of the seminiferous tract and accessory glands and their role in the formation of sperm.
5. To interpret age changes of the male reproductive system.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Characteristic of the testis structural organization

Testis parts	Tissues	Cells	Functions
Stroma			
Tunica albuginea			
Mediastinum			
Septae			
Intralobular connective tissue			
Parenchima			
Seminiferous tubules			

Table 2.

Structural features of spermatogenesis

Period of spermatogenesis	Process in this period	Cells formed as a result	Its chromosome composition
Proliferation			
Growth			
Maturation			
Formation			

Table 3.

Characteristic of the male reproductive tract

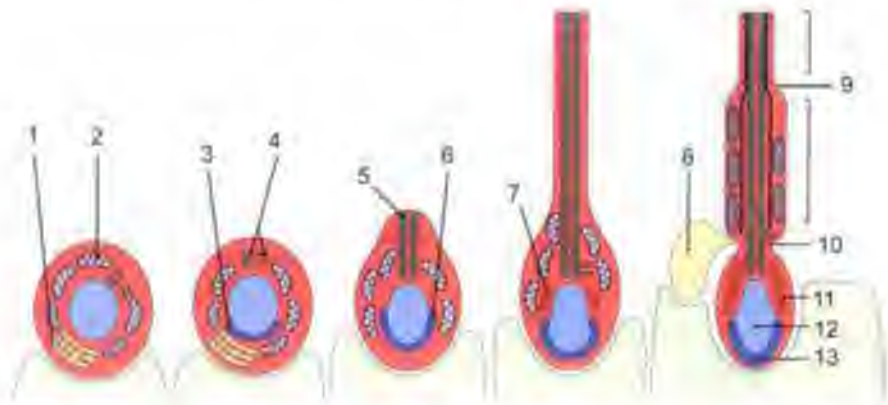
Part of the male reproductive tract	Localization	Mucosa epithelium	Structure of the tunica muscularis
Tubuli recti			
Rete testis			
Ductus efferentes			
Ductus epididymidis			
Vas (ductus) deferens			
Ejaculatory duct			
Urethra			

Table 4.

Structural and functional characteristic of the male accessory glands

Gland	Features of the structure	Secret composition	Functions
Seminal vesicles			
Prostate			
Bulbourethral gland			

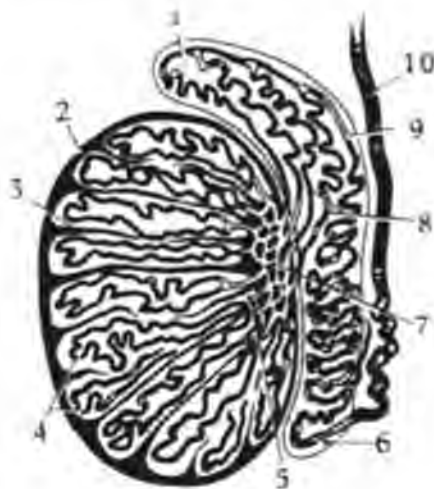
2. Recognize the organ and the structures shown in the picture:



Process _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____

- 8 - _____
- 9 - _____
- 10 - _____
- 11 - _____
- 12 - _____
- 13 - _____



Organ _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____
- 9 - _____
- 10 - _____

Organ _____

1 - _____

2 - _____

2.1 - _____

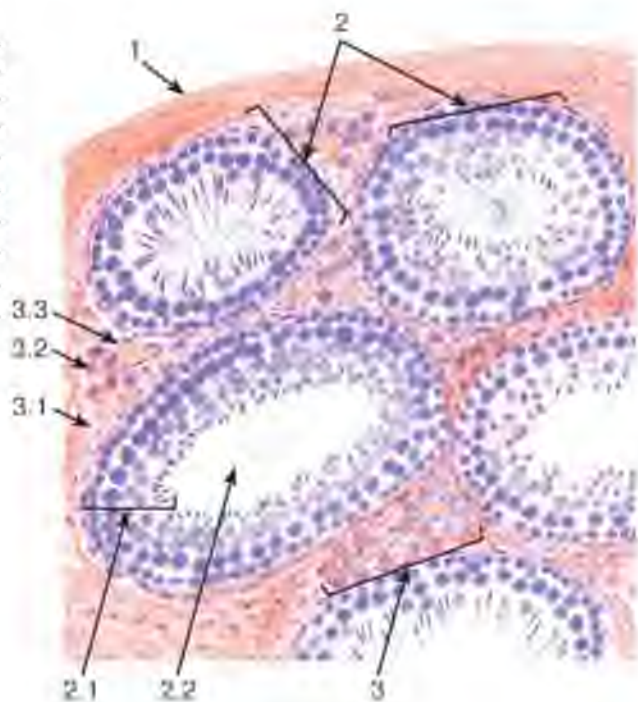
2.2 - _____

3 - _____

3.1 - _____

3.2 - _____

3.3 - _____



Organ _____

1 - _____

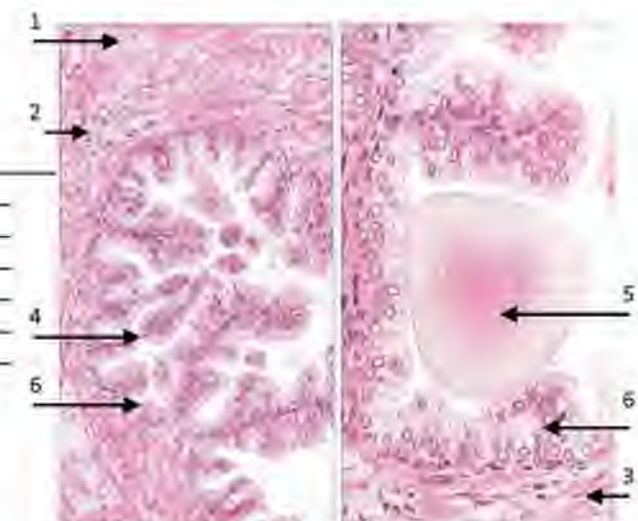
2 - _____

3 - _____

4 - _____

5 - _____

6 - _____



TOPIC: THE FEMALE REPRODUCTIVE SYSTEM. THE OVARY. OVOGENESIS. REPRODUCTIVE WAY. THE MAMMARY GLANDS. OVARIAN-MENSTRUAL CYCLE.

Motivation. Organs of the female reproductive system play an important role in the vital activity of the female body, endocrine control and implementation of the reproductive function. Knowledge of the development, structure and cyclical adjustment of the female reproductive system is the basis of understanding of the causes and the possibilities of correction of female infertility, bleeding and tumor pathology.

Learning objective (general): To be able to interpret the structural basis of the female reproductive system functioning.

Expected outcome:

1. To identify sources and stages of development of the female reproductive system.
2. To interpret the structural organization and key morphological features of the female reproductive system.
3. To interpret stages and morphological manifestations of ovogenesis, its regulation, the role of systemic and local factors.
4. To interpret the structural bases of the functioning of the female reproductive tract, their restructuring in the process of ovarian-menstrual cycle.
5. To interpret age-related changes of the female reproductive system.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Ovogenesis phases

Ovogenesis phases	Period of the ontogenesis	Process	The resulting cells and its chromosome composition
Proliferation			
Growth Phase of little growth			
Phase of big growth			
Maturation			

Table 2.

Ovarian follicles characteristic

Follicle type	Characteristic of ovocyte	Follicular epithelium	Theca
Primordial follicle			
Primary follicle			
Secondary (antral) follicle			
Tertiary (Graafian, mature) follicle			

Table 3.

Comparative characteristics of the female reproductive tract structure

Organ	Tunics structure			Functions
	Mucosa	Muscularis	Serosa	
Oviducts (Fallopian Tubes)				
Uterus				
Vagina				

Table 4.

Ovarian-menstrual cycle

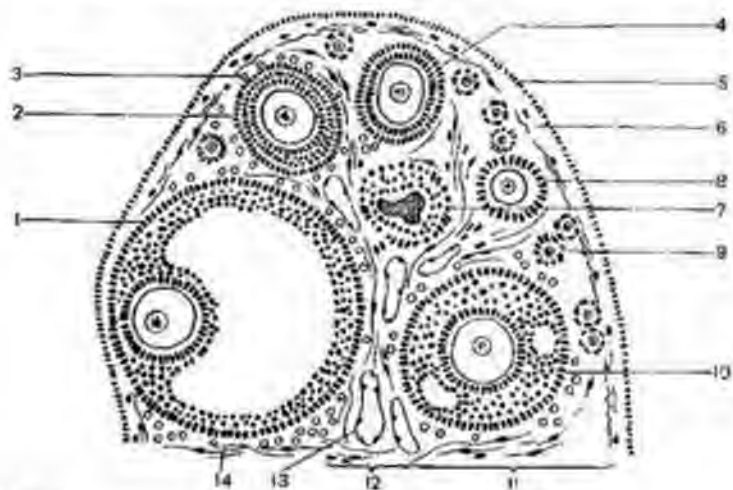
Phase of cycle	Days	Hormonal regulation	Changes in the endometrium
Menstrual phase (menses)			
Proliferative (follicular) phase			
Secretory (luteal) phase			

Table 5.

The structure of the mammary gland in different periods of ontogeny

Period of ontogenesis	Stroma	Excretory ducts	Secretory portions
Childhood			
Puberty			
Pregnancy			
Lactation			
Postmenopause			

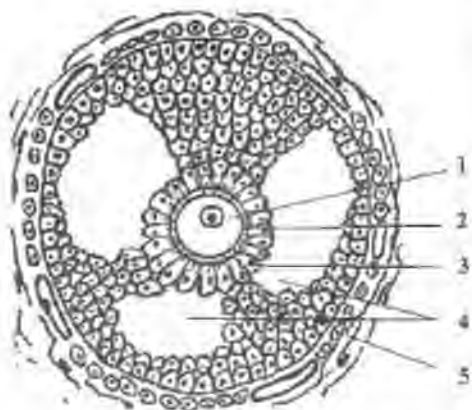
2. Recognize the organ and the structures shown in the picture:



Organ _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____

- 8 - _____
- 9 - _____
- 10 - _____
- 11 - _____
- 12 - _____
- 13 - _____
- 14 - _____



Type of the follicle _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____

Organ

Phase of the menstrual cycle



Organ

Structures

1 - _____

1.1 - _____

1.2 - _____

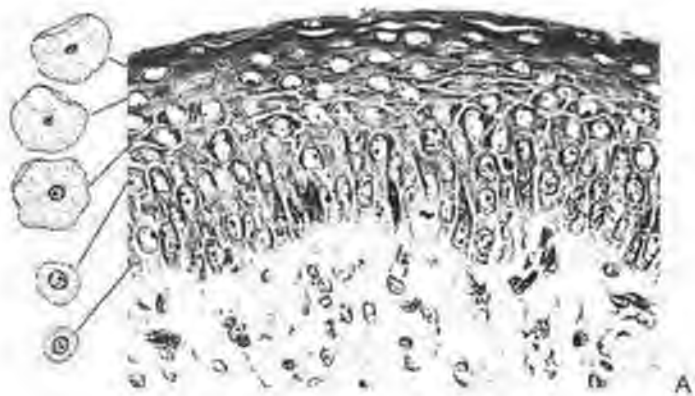
2 - _____

2.1 - _____

2.2 - _____

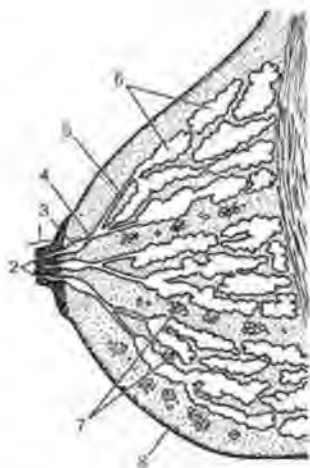
3 - _____





Organ _____

Features of the epithelium

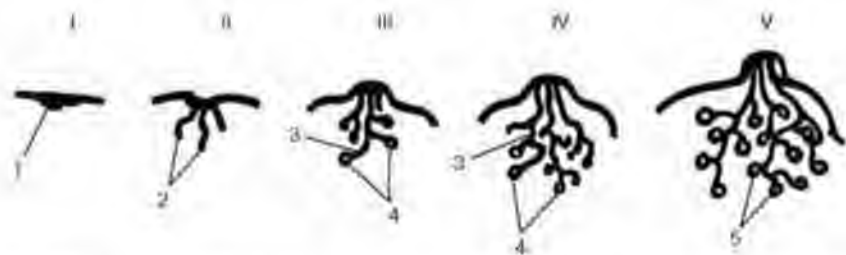
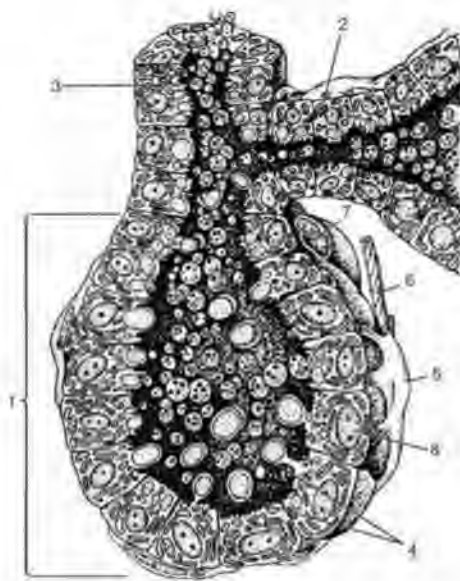


Organ _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____

Organ

- _____
- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____



Identify periods of ontogenesis, which correspond to the stages of mammary gland development

- I - _____
- II - _____
- III - _____
- IV - _____
- V - _____

Recognize the structures

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____

TOPIC: EMBRYOLOGY. THE MOTHER-FETUS SYSTEM.

Motivation. One of the causes of female infertility and abortion is a violation of the formation of the mother-fetus system. The link between the mother and the fetus is the placenta. Knowledge of the structure of its development and functioning plays an important role in the understanding of possible mechanisms of placentogenesis pathology and disorders of pregnancy and childbirth.

Learning objective (general): To be able to interpret the structural basis for the functioning of the reproductive system during pregnancy and lactation.

Expected outcome:

1. To treat periods of embryogenesis, the basic process and the results of their implementation.
2. To identify the extraembryonic organs of human, sources for their development and significance.
3. To interpret sources and stages of development of the placenta
4. To interpret the essence of critical periods in human development, the causes of congenital malformations, the role of the mechanisms of the system "mother-fetus" in the development of the fetus
5. To characterize the restructuring of the mammary glands in different periods of ontogenesis and during lactation.

TASKS FOR INDEPENDENT WORK

1. Fill in following tables to test the level of knowledge:

Table 1.

Periods of embryogenesis			
Periods of embryogenesis	Terms	Main processes	What is results from the implementation of this period
Fertilization			
Cleavage			
Gastrulation Early			

Late			
Histo- and or- ganogenesis Neurulation			
Somites formation			
Postsomite period			

Table 2.

Characteristic of human extraembryonic organs

Organ	Germ layers, that form it	Functions
Amnion		
Yolk sac		
Chorion		
Allantois		

Table 3.

Structural organization of the placenta

Characteristics	Fetal part	Maternal part
Components		
Key morphological features		
Functions		

2. Recognize the structures shown in the picture:



Period of embryogenesis

- _____
- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____



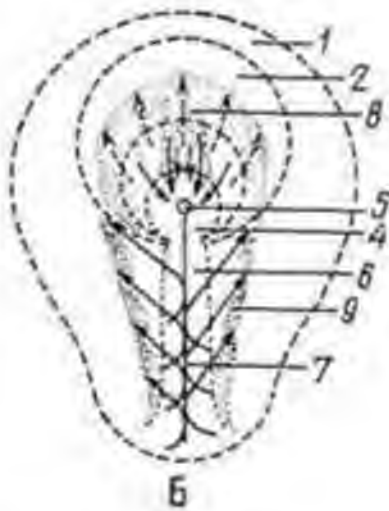
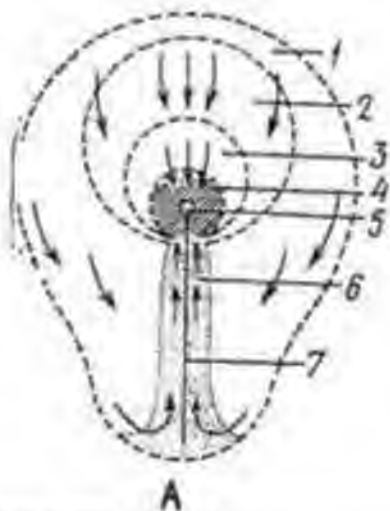
Period of embryogenesis _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____

Period of embryogenesis

Phase _____

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____

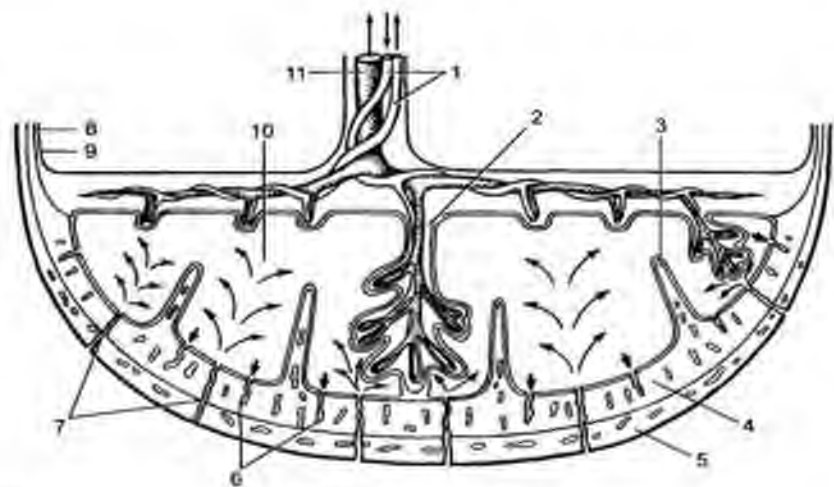


Period of embryogenesis _____

Phase _____

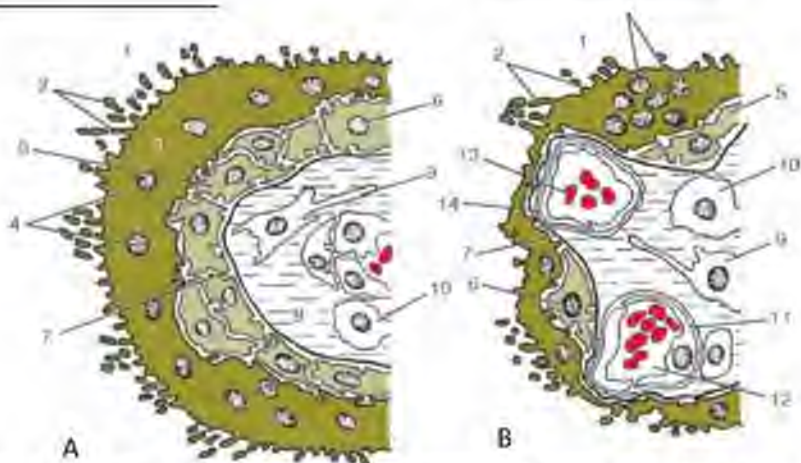
- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____

- 5 - _____
- 6 - _____
- 7 - _____
- 8 - _____
- 9 - _____



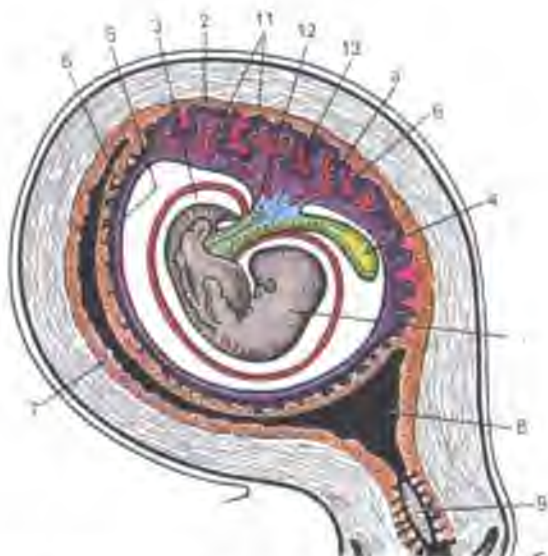
Organ

- | | |
|-----------|------------|
| 1 - _____ | 7 - _____ |
| 2 - _____ | 8 - _____ |
| 3 - _____ | 9 - _____ |
| 4 - _____ | 10 - _____ |
| 5 - _____ | 11 - _____ |
| 6 - _____ | |



Identify the structures of the blood-chorial barrier in the immature (A) and mature (B) placenta.

- | | |
|-----------|------------|
| 1 - _____ | 7 - _____ |
| 2 - _____ | 8 - _____ |
| 3 - _____ | 9 - _____ |
| 4 - _____ | 10 - _____ |
| 5 - _____ | 11 - _____ |
| 6 - _____ | 12 - _____ |



Identify human extraembryonic organs:

- 1 - _____
- 2 - _____
- 3 - _____
- 4 - _____
- 5 - _____
- 6 - _____

- 7 - _____
- 8 - _____
- 9 - _____
- 10 - _____
- 11 - _____
- 12 - _____

TOPICS FOR STUDENT INDEPENDENT WORK

« SPECIAL HISTOLOGY OF VISCERAL ORGANS. HUMAN EMBRYOLOGY»

1. Development of the oral cavity and digestive system.
2. Structural basis of digestion.
3. Neurohumoral regulation of digestion.
4. Gut associated lymphoid tissue
5. Development of digestive glands
6. Regulation of secretory activity and regeneration of digestive glands
7. Development of the respiratory system.
8. Neurohumoral regulation of mucociliary apparatus and bronchial tonus.
9. Age characteristics of the skin.
10. Development of urinary system.
11. Structural basis of urine concentration.
12. Development of the male reproductive system
13. Structural and molecular diagnostic criteria of the male infertility.
14. Development of female reproductive system
15. Regulation of ovarian-menstrual cycle
16. Mechanisms of endometrial receptivity and implantation.
17. Mechanisms of placental development
18. Regularities of the human organogenesis.

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