


ОҢТҮСТІК ҚАЗАҚСТАН MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		 SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
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METHODOLOGICAL GUIDELINES FOR PRACTICAL CLASSES

Discipline: "Normal digestive and endocrine systems"


Discipline code : NDES 2208

Name and code of the EP: 6B10115 – “Medicine”

Amount of study hours/credits: 30/1

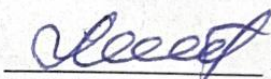
Course and semester of study: 2/3

The amount of practical training: 8 hours

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The guidelines for practical training were developed in accordance with the working curriculum of syllabus of the discipline "Normal digestive and endocrine systems" 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.

Lesson No. 1

1. Topic: Organs of the oral cavity. The esophagus.

2. Purpose:

- Know the microscopic and ultramicroscopic structure of the oral cavity and esophagus

3. Learning objectives:

- Have an idea of the general structure of the wall of the digestive system
- Learn to identify the organs of the oral cavity at the microscopic level
- Be able to identify the shells, layers and tissue composition of the organs of the oral cavity
- To understand the relationship between the structural and histochemical features of the organs of the oral cavity with their function
- To understand the features of the structure of the esophagus

4. The main issues of the topic:

Complete the tasks.

1. Fill in the table of the structure of the mucous membrane of the digestive system, noting its layers and their tissue composition.

Plates (layers) of the mucous membrane	Tissue composition

2. Make a table indicating the components of the tooth, their structure and chemical composition.

.Tooth parts	Structure	Chemical composition
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3. Compare the large salivary glands of the oral cavity according to the structure and nature of the secretions they secrete. Specify the number of different types of secretory cells (few, average, many) in these glands.

The name of the glands	Types of secretory cells	Number of secretory cells	The nature of the secret

4. Mark in the table the constituent components of the membranes of the organs of the anterior part of the digestive system. Put a "+" sign in the appropriate column if these structures are present, or a "-" sign if they are absent from the body.

Органы	Слизистая оболочка				Подслизистая основа	Мышечная оболочка		Серозная оболочка	Адвентициальная оболочка
	эпителий	Собственная пластинка	Мышечная пластинка			Гладкомышечная ткань	Поперечнополосатая		
Губа (слизистая часть)									
Язык (спинка)									
Десна									
Глотка									
Пищевод (верхняя треть)									
Пищевод (нижняя треть)									


Handout

Microscopes

Micro-preparations for studying and sketching

1. Language. Staining- hematoxylin-eosin.
2. The hyoid gland. Staining- hematoxylin-eosin.

5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

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6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.

7. Literature

Main literature

1. Inderbir Singh. Textbook of Human Histology. With Color Atlas and Practical Guide/8th Edition. Jaypee Brothers Medical Publishers .2016.-302 p. Перевод Гистология человека
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) Перевод заглавия: Клеточная биология и гистология

Additional literature

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

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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.
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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/>

8. Control Questions

1. Morphofunctional characteristics of the digestive system
2. Sources and course of development of embryonic development
3. Features of the structure of the oral mucosa
4. The structure of the language.
5. Large salivary glands
6. Tonsils

7. Histophysiology of the esophagus

Tests

1. The formation of tooth enamel involves:
 - A. Odontoblasts
 - B. Enameloblasts
 - C. Mesenchymocytes
 - D. Osteoblasts
 - E. External enamel cells
2. The following are involved in the formation of dental dentin:
 - A. Dentinoblasts
 - B. Enameloblasts
 - C. Mesenchymocytes
 - D. Osteoblasts
 - E. Cementocytes
3. Tooth pulp develops from ...
 - A. Dental plaque
 - B. Intermediate enamel cells
 - C. Mesenchyma of the dental papilla
 - D. Internal enamel cells
 - E. Odontoblasts
4. Cementoblasts originate from ...
 - A. Dental plaque
 - B. Intermediate enamel cells
 - C. Mesenchyma of the dental papilla
 - D. Internal enamel cells
 - E. Osteogenic jaw cells
5. The epithelium of the oral cavity develops from ...
 - A. Endoderm
 - B. Mesoderm
 - C. Ectoderm
 - D. Mesenchyma
 - E. Splanchnotomes
6. The muscular plate of the mucous membrane is present in ...
 - A. Lip
 - B. Cheek
 - C. Gum
 - D. Esophagus
 - E. Tongue
7. The mobility of the mucous membrane on the lower surface of the tongue is provided by ...
 - A. Epithelium
 - B. Its own layer
 - C. Muscle layer
 - D. Submucosa
 - E. Muscle membrane
8. Epithelium lining the surface of the mucous membrane of the esophagus:
 - A. Single-layer cylindrical edged
 - B. Single-layer prismatic glandular
 - C. Multilayer flat non-horny
 - D. Multilayer flat keratinized
 - E. Multi-row prismatic ciliated
9. The esophagus's own glands are located in ...
 - A. Submucosal base

- B. Epithelium of the mucous membrane
- C. The proper plate of the mucous membrane
- D. The muscular membrane
- E. The adventitious membrane
- 10. The cardiac glands of the esophagus are located in ...
- A. The submucosal base
- B. The epithelium of the mucous membrane
- C. The proper plate of the mucous membrane
- D. The muscular membrane
- E. The adventitious membrane

Tasks

- 2 types of glands were found in the micro-preparation of the esophageal wall. One group of glands secretes a mucosal secret, the other pepsin. Name these glands and membranes; in which they are located.
- Biopsy sections of the esophagus revealed glands in the mucous and submucosal membranes and smooth muscle tissue in the muscle membrane. What is the cut level of the esophagus? Name the types of glands.
- Micro-preparations of three large salivary glands are treated with Schiff-iodic acid (CHIC reaction), which gives a crimson color to the cells that produce mucus. On what basis can the parotid, submandibular and sublingual glands be identified in these drugs?
- Preparations of a number of lymphoid organs are presented for microscopic analysis: thymus, lymph node, tonsils. What feature can be used to identify the amygdala among them?
- In the preparation, the walls of the hollow organ of the digestive system revealed a multilayer epithelium without signs of keratinization, glands in the submucosa, the muscular membrane represented by striated muscle tissue. Determine which organ the drug is made from.

Lesson No. 2

1. Topic: Stomach.

2. Purpose: To know the microscopic and ultramicroscopic structure of the walls of the stomach and intestines

3. Learning objectives:

- Learn to identify the stomach and small intestine in histological preparations
- Learn to identify the cells of the glands of the stomach and intestinal epithelium at the microscopic and ultramicroscopic level
- To understand the meaning of the villi-crypt system in the digestive process
- Have an understanding of the endocrine cells of the stomach and intestines

4. The main issues of the topic:

Complete tasks

1. Present the structure of the stomach wall in the table.


Shells	Relief	Plates and layers	The shape of the glands
of the mucous membrane	name of the fabric	composition	

2. Make a histo-functional characteristic of the gastric glands in the form of a table.

Gastric Glands	Cell Types	Cell Functions
Own		
Cardinal		
Pyloric		

3. To conduct a comparative analysis of the structure of the stomach and esophagus. Fill in the table.

Signs of Esophagus	Stomach
Shells	
Type of lining epithelium	
The presence of glands and their topography	

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The function of the glands

Muscle membrane (number of layers and type of tissue)

4. Fill in the table, remembering the features of the structure of the wall of the small intestine.

Mucous membrane relief

shell name Tissue composition of the plate and layers

5.Fill in the table, giving a histofunctional characteristic of the villi and crypts of the small intestine

Structures	Functional value	Fabric composition	Types of epithelial cells
Villi			
Crypts			

6.Заполните таблицу, проводя сравнительный анализ строения желудка и тонкой кишки

Signs	Stomach	The duodenum	The jejunum and ileum

Handout material

Microscopes

Micro-preparations for studying and sketching:

1. The bottom of the stomach. Staining- hematoxylin-eosin.

2. The small intestine. Staining- hematoxylin-eosin.

5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.

7. Literature.

Main literature

1. Inderbir Singh. Textbook of Human Histology. With Color Atlas and Practical Guide/8th Edition. Jaypee Brothers Medical Publishers .2016.-302 p. Перевод Гистология человека

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8. Control Questions

1. The structure of the stomach wall
- 2.Cardiac, pyloric and intrinsic glands of the stomach
3. The structure of the small intestine
4. Crypt villi and their involvement in digestion

Tests

- 1.The gastric mucosa is lined with epithelium:
 - A. single-layer flat
 - B. single-layer cubic
 - C. single-layer prismatic
 - D. multilayer flat non-keratinizing
 - E. multilayer flat keratinizing
2. Cells of the stomach's own glands that stain basophilically and secrete the enzyme pepsinogen:
 - A. cervical mucocytes
 - B. Parietal exocrinocytes
 - C. Main exocrinocytes
 - D. endocrinocytes
 - E. Additional mucocytes
- 3.The epithelium of the small intestine is dominated by:
 - A. Goblet-shaped exocrinocytes
 - B. Columnar epithelial cells
 - C. EC cells
 - D. A cells
 - E. Additional mucocytes
4. The part of the intestine containing in the submucosa of the gland:
 - A. jejunum
 - B. ileum
 - C. 12-duodenum
 - D. colon
 - E. vermiform process
- 5.Cells of the stomach's own glands that stain oxyphilically and secrete enzyme chlorides:
 - A. cervical mucocytes
 - B. Parietal exocrinocytes
 - C. Main exocrinocytes
 - D. endocrinocytes

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- E. Additional mucocytes
- 6. Intestinal villi are covered with epithelium:
 - A. Single-layer prismatic edged
 - B. Single-layer prismatic glandular
 - C. Multilayer flat
 - non-horny D. Single-layer flat
 - E. Multi-row prismatic ciliated
- 7. The stomach's own glands are located in the composition:
 - A. Submucosal base
 - B. Epithelium of the mucous membrane
 - C. Proper plate of the mucous membrane
 - D. Muscular membrane
 - E. Serous membrane
- 8. The stomach's own glands contain cells:
 - A. Parietal, major, mucous, endocrine, cervical undifferentiated
 - B. Parietal, main, mucous, endocrine
 - C. Mucous, cervical undifferentiated, main, parietal
 - D. Main, mucous, endocrine, cervical undifferentiated
 - E. Main, parietal, mucous, cervical undifferentiated
- 9. The enzyme pepsinogen is secreted by cells:
 - A. Parietal
 - B. Mucous
 - C. Major
 - D. Endocrine
 - E. Cervical mucocytes
- 10. Duodenal glands consist of:
 - A. Mucous cells, cambial cells, endocrinocytes
 - B. Cambial cells, endocrinocytes
 - C. Mucous cells, endocrinocytes
 - D. Paneta cells, columnar epithelial cells, endocrinocytes, Columnar epithelial cells, goblet-shaped exocrinnocytes, Paneta cells

Tasks

1. In two micro-preparations of biopsy material taken from different parts of the stomach, the following signs were found: in one, mucocytes are mainly contained in the glands of the mucous membrane, in the other, numerous main and parietal cells are observed. What are these parts of the stomach? What secret do these cells secrete?
2. Upon examination of the patient, it was found that protein products are poorly digested in his stomach. The analysis of gastric juice revealed low acidity. Which stomach cells are impaired in this case?
3. Two pieces were taken from different parts of the stomach. Preparations have been prepared. When viewed, it turned out that these are preparations of the bottom and pyloric part of the stomach. By what features of the structure was this determined?
4. Cells containing acidophilic granules in the apical part are found in the crypts of the small intestine. What is their functional significance?
5. Among the microphotographs presented to students, one was taken from a stomach preparation, and the second from a small intestine preparation, it is necessary to select those that show the duodenum. What feature can be used to do this?

Lesson No. 3

Subject: Small intestine.

2. Purpose: To know the microscopic and ultramicroscopic structure of the intestinal walls

3. Learning objectives:

- Learn to identify the small intestine in histological preparations
- Learn to identify intestinal epithelial cells at the microscopic and ultramicroscopic level
- To understand the importance of the villi-crypt system in the digestive process. Have an idea about the endocrine cells of the intestine

4.The main issues of the topic:

Complete tasks

4. Fill in the table, remembering the features of the structure of the wall of the small intestine.

Shells The relief of the mucous membrane and the layers of the shell name Tissue composition

5.Fill in the table, giving a histofunctional characteristic of the villi and crypts of the small intestine

Structures	Functional value	Fabric composition	Types of epithelial cells
Villi			
Crypts			

6.Заполните таблицу, проведя сравнительный анализ строения желудка и тонкой кишки

Signs	Stomach	The duodenum	The jejunum and ileum

Handout material

Microscopes

Micro-preparations for studying and sketching:

1. The small intestine. Staining- hematoxylin-eosin.


5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.

7. LITERATURE.

Main literature

1. Inderbir Singh. Textbook of Human Histology. With Color Atlas and Practical Guide/8th Edition. Jaypee Brothers Medical Publishers .2016.-302 p. Перевод Гистология человека
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8. Control

Questions

1. The structure of the small intestine
2. Crypt villi and their involvement in digestion

Tests

1. The epithelium of the small intestine is dominated by:
 - A) Goblet-shaped exocrinocytes
 - B) Columnar epithelial cells
 - C) EU cells
 - D) A - cells
 - E) Additional mucocytes
2. The part of the intestine containing the gland in the submucosa:
 - A) jejunum
 - B) the ileum
 - C) 12-duodenum
 - D) colon
 - E) vermiform process
3. Intestinal villi are covered with epithelium:
 - A) Single-layer prismatic edge
 - B) Single-layer prismatic ferruginous
 - C) Multi-layered flat non-horny
 - D) Single-layer flat
 - E) Multi-row prismatic ciliated
4. Duodenal glands consist of:
 - A) Mucous cells, cambial cells, endocrinocytes

- B) Cambial cells, endocrinocytes
- C) Mucous cells, endocrinocytes
- D) Paneth cells, columnar epithelial cells, endocrinocytes
- E) Columnar epithelial cells, goblet-shaped exocrine cells, Paneta cells

Tasks

- Cells containing acidophilic granules in the apical part are found in the crypts of the small intestine. What is their functional significance?
- Among the microphotographs presented to students, one is made from a stomach preparation, and the second is from a small intestine preparation, it is necessary to select those on which the duodenum is represented. What feature can be used to do this?
- Two pieces were taken from different parts of the stomach. Preparations have been prepared. When viewed, it turned out that these are preparations of the bottom and pyloric part of the stomach. By what features of the structure was this determined?

Lesson No. 4

1. Subject: Colon. Liver.

2.Purpose: To know the microscopic and ultramicroscopic structure of the liver and pancreas

3. Learning objectives:

- Learn to identify the structural elements of the liver under a microscope
- To understand the microscopic and ultramicroscopic structure of hepatocytes and their functional significance
- Have an idea about the peculiarities of blood supply to the liver
- Learn to distinguish between exo- and endocrine sections of the pancreas under a microscope

4.The main issues of the topic:

Complete tasks

1. Present the structure of the colon wall in the table

Shells	Features of the mucous and muscular membranes	Plates and layers	
		title	Fabric composition

2.2.Fill in the table, summarizing the material on the structure of the liver parenchyma

Histofunctional units	The main components	Their cellular composition	The main functions of cells

3.Fill in the table, indicating the features of the topography of the liver vessels

Vessels bringing blood to the lobules		Intra-lobular vessels	Vessels carrying blood from the lobules	
non-organ	intra-organ		non-organ	intra-organ

4. Make a table of the structure of the gallbladder wall

Shells	Plates and layers	
	title	Fabric composition

5. Составьте таблицу, дав структурно-функциональную характеристику поджелудочной железы.

Parts of the gland	What are they represented	Glandular cells	
		title	function
Экзокринная			
Эндокринная			

Handout

Microscopes

Micro-preparations for studying and sketching:

1. The pancreas. Staining with hematoxylin-eosin
2. Liver. Staining with hematoxylin-eosin
3. The colon. Staining with hematoxylin-eosin.

5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.

7. Literature

Main literature


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Tests

- The lobule of the liver, according to the old classical representation, has the shape:
 - cubic
 - hexagonal
 - process
 - round
 - conical
- The vessel of the liver, between the endotheliocytes of which there are Kupfer cells (stellate macrophages):
 - lobar artery
 - segmental artery
 - intracellular sinusoidal capillary
 - intracellular artery
 - interlobular artery
- Hepatic beams in the lobules of the liver consist of:
 - one row of hepatocytes
 - two rows of fibroblasts
 - one row of fibroblasts
 - two rows of hepatocytes
 - three rows of adipocytes
- The structural and functional unit of the exocrine part of the pancreas is:
 - interlobular excretory duct
 - intralobular excretory duct
 - lobule of the gland
 - common pancreatic duct
 - pancreatic acinus
- Insulocytes of pancreatic islets of the pancreas that secrete the hormone insulin into the blood:
 - D cells
 - D1 cells
 - A cells
 - B cells
 - PP cells
- The pancreas secretes into the cavity 12 of the duodenum
 - Elastase
 - Glucagon
 - Trypsinogen
 - Pancreatic polypeptide
 - Somatostatin
- In pancreatic islets, insulin is secreted by:

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- A. α - cells
- B. β - cells
- C. γ - cells
- D. pp – cells
- E. g-cells
- 8. Pancreatic islets are located in ...
 - A. the composition of the pancreatic acinuses
 - B. between the pancreatic acinuses
 - C. the interlobular connective tissue
 - D. the wall of the intralobular excretory ducts
 - E. the wall of the pancreatic excretory ducts
- 9. In pancreatic islets, glucagon is secreted by:
 - A. α - cells
 - B. β - cells
 - C. γ - cells
 - D. pp – cells
 - E. g-cells
- 10. β - cells of pancreatic islets are:
 - A. 20-25%
 - B. 70-75
 - C. 5-10%
 - D. 2-5%
 - E. 0,5-1%

Tasks

- In some heart diseases, venous stagnation of blood is observed, which leads to deterioration of trophic and tissue respiration of organs. Which parts of the liver lobules will suffer in these conditions in the first place?
- During microscopy of the liver preparation, the students argued about the vein located between the classic liver lobules. One student called her mezhdolkova, the other – poddolkova. Help the students resolve the dispute (by what signs can these veins be distinguished?)
- When asked about bile capillaries, the student replied that this is the space between the wall of the intracellular capillaries and the hepatic beams; another called the answer incorrect, since there is no such space. Evaluate the answers and provide a justification.
- When ligating the excretory duct of the pancreas, due to a violation of secretion, part of the glandular cells die in it. Which glandular cells die in these conditions, and which ones remain?
- The researcher is tasked with studying the cells in the pancreas that produce the hormone insulin. Which cells should be studied, where are they located?

Lesson No. 5

1.Topic: Central organs of the endocrine system

2. Purpose: To know the microscopic and ultramicroscopic structure of the central organs of the endocrine system


3. Learning objectives:

- Learn to identify the structural elements of the endocrine system organs under a microscope
- Be able to characterize the sources of development and the basic principles of classification of endocrine glands
- To understand the mechanisms of hypothalamic control of endocrine functions
- To understand the ultramicroscopic structure of endocrine cells
- To form ideas about hormonal regulation of homeostasis in the body

4.The main questions of the topic:

- Enter the names of the relevant organs in the table, recalling the classification of the endocrine glands.

The central department of the	The peripheral part of the endocrine system
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endocrine system	Pituitary-dependent structures	Hypo-life-dependent structures

2. Make a table of the microanatomy and function of the hypothalamus, consolidating knowledge about the structure and function of its main departments.

Structure and function	Hypothalamic region	
	The front department	The Middle department
The main cores Hormones produced Physiological effects of hormones Which part of the pituitary gland is associated with?		

3. Make a table of the structural features and functions of the pituitary gland.

Аденогипофиз				
части	Источник развития	Типы клеток	Выделяемые гормоны	Физиологические эффекты гормонов
Передняя				
Средняя				
Туберальная				

Нейрогипофиз			
Источник развития	Основные структуры	гормоны	Физиологические эффекты гормонов

Micropreparations for studying and sketching:

1. Pituitary gland. Coloring with a mixture of Mallory according to Heidenhain.

5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.


7. Literature

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Additional literature

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Перевод Учебник по гистологии человека

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8. Control

Questions

1. Morphofunctional characteristics of the endocrine system
2. Classification, sources and course of development
3. Features of the hypothalamus structure
4. The structure of the pituitary gland and its connection with other endocrine glands
5. The epiphysis.

Tests

- 1.Embryonic source of adenohypophysis development:
 - A. somites of the mesoderm
 - B. neural
 - plaques C. epithelium of the oral fossa
 - D. neuroglia of the medial cerebral bladder
 - E. neuroblasts of the ganglion plate
2. Cells located on the periphery of the trabeculae of the adenohypophysis and containing secretory granules in the cytoplasm:
 - A. chromophobic
 - B. chromophilic
 - C. fibroblastic
 - D. macrophagic
 - E. muscle
- 3.Hypothalamic hormones controlling the secretory activity of adenocytes:
 - A. vasopressin, oxytocin
 - B. serotonin,
 - C. melatonin
 - D. liberins, statins

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E. androgens, estrogens

F. corticoids

4. The part of the pituitary gland containing process neuroglial pituitary cells and Hoering's accumulative corpuscles:

A. anterior lobe

B. intermediate lobe

C. tuberal part

D. posterior lobe

E. pituitary pedicle

5. Cells of the central parts of the lobules of the epiphysis having secretory inclusions and processes in contact with capillaries:

A. fibroblasts

B. pinealocytes

C. gliocytes

D. macrophages

E. myocytes

Tasks

1. The preparations contain two glands. In one preparation, the gland has developed secretory departments, from which the secret is secreted through the excretory duct into a nearby cavity. In the second case, the gland is represented by a cluster of secretory cells permeated by a dense network of blood capillaries through which the secret is transported. Which of the glands is endocrine?

2. The researcher analyzes two fields of vision in the pituitary gland preparation. In one, small process cells and nerve fibers between them are visible. In the other, there are strands of epithelial cells with various tinctorial signs. Which parts of the pituitary gland are being analyzed?

3. When analyzing the cellular composition of the adenohypophysis using general morphological and histochemical staining methods, it was found that some adenocytes are selectively stained with aldehyde fuchsin and give a positive reaction to glycoproteins. Which pituitary adenocytes have similar tinctorial and histochemical properties? What hormone do they secrete?

Lesson No. 8

1.Topic: Peripheral organs of the endocrine system

2. Purpose: To know the microscopic and ultramicroscopic structure of the peripheral organs of the endocrine system

3. Learning objectives:

- * Learn to identify the structural elements of the organs of the peripheral endocrine system under a microscope
- Be able to characterize the sources of development and the basic principles of classification of endocrine glands
- To understand the ultramicroscopic structure of endocrine cells

4.The main issues of the topic:

4. Составьте таблицу особенностей строения и функций щитовидной и околощитовидной желез.

Структура и функция	Щитовидная железа	Околощитовидная железа
Типы клеток Источники развития Секретируемые гормоны Физиологические эффекты гормонов Являются ли гипофиззависимыми?		

5. Составьте таблицу развития, строения и функции надпочечника.

Структура и функция	Надпочечник	
	Корковое вещество	Мозговое вещество
Источник развития Названия зон Секретируемые гормоны Физиологические эффекты гормонов Являются ли гипофиззависимыми?		

Раздаточный материал.

Микроскопы

Micropreparations for studying and sketching:

1. Thyroid gland. Staining hematoxylin with eosin.
2. The adrenal gland. Staining with iron hematoxylin.

5. The main forms/ methods/ technologies of training to achieve the LO discipline: working in small groups, filling out a checklist of histological preparations and microphotographs.

6. Types of control to assess the level of achievement of the LO discipline: the checklist for evaluating the practical lesson.

7. Literature


Main literature

1. Inderbir Singh. Textbook of Human Histology. With Color Atlas and Practical Guide/8th Edition. Jaypee Brothers Medical Publishers .2016.-302 p. Перевод Гистология человека
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8. Control

Questions

1. Morphofunctional characteristics of the endocrine system
2. Classification, sources and course of development
3. The structure of the thyroid gland
4. The structural and functional unit of the thyroid gland
5. Parathyroid glands
6. Adrenal glands, cortical and medulla
- 7.Ultrastructural and functional features of adrenal cortex cells

Tests

1. The gland, the parenchyma of which is represented by strands of basophilic and oxyphilic epithelial cells secreting the hormone parathyrin:
 - A) pituitary gland
 - B) hypothalamus
 - C) epiphysis
 - D) thyroid
 - E) Parathyroid
2. The part of the adrenal gland containing clusters of epithelial glomeruli:
 - A) glomerular area
 - B) the beam zone
 - C) Mesh area
 - D) brain matter
 - E) a layer of highly specialized sudanophobic cells
3. The area of the adrenal gland, in which epithelial cells that produce sex hormones are poor in lipid inclusions:
 - A) glomerular area
 - B) a layer of highly specialized sudanophobic cells
 - C) the beam zone

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D) mesh area

E) brain matter

4. Vesicular formation of the thyroid gland, the wall of which is formed by a single layer of epithelial cells, and the cavity is filled with a colloid:

A) partition

B) a slice

C) follicle

D) acinus

E) trabecula

5. A part of the adrenal gland consisting of bundles of epithelial cells containing drops of lipids and granules of vitamin C:

A) glomerular area

B) a layer of highly specialized sudanophobic cells

C) the beam zone

D) mesh area

E) brain matter

Tasks

1. The preparations contain two glands. In one preparation, the gland has developed secretory departments, from which the secret is secreted through the excretory duct into a nearby cavity. In the second case, the gland is represented by a cluster of secretory cells permeated by a dense network of blood capillaries through which the secret is transported. Which of the glands is endocrine?

2. In the experiment, one group of animals underwent castration, the other - thyroidectomy. Which pituitary adenocytes will respond preferentially to surgery in each group? Explain the reason.

3. Microscopic analysis of the thyroid gland revealed that the follicles are small in size, contain little colloid, which is highly vascularized, thyrocytes are high, prismatic. What functional state of the organ does such a structure correspond to? Explain the possible reasons.

4. Looking through a series of adrenal preparations, the researcher noted that on different sections there are areas of the organ consisting of strands of epithelial cells located near the connective tissue capsule in the form of rounded clusters; from lighter cells that form strands oriented in one longitudinal direction; from clusters of large basophilic cells that are on specially colored the preparations show affinity with chromium, silver and osmium salts. Which parts of the adrenal gland were analyzed in each case? What is the functional significance of the constituent cells?