HISTOLOGY, CYTOLOGY, AND EMBRYOLOGY: SELF– PREPARATION TASKS

1. Cytology: Plasma Membrane, Cell Surface, and Cytoplasmic Organelles

Read:
1. Lectures.
2. M.H. Ross, “Histology”, pp. 23–70, 100–132.

Tasks

1. Enumerate the plasma membrane functions:

(1)

(2)

(3)

(4)

2. Write out the apical cell surface (domain) modifications:

(1)

(2)

3. Write out the basal cell surface (domain) modifications:

(1)

(2)

4. Fill in the table:

Cell junctions	Their functions
1.	
2.	
3.	
4.	
5.	

5. Enumerate the cytoplasm components:

(1)

(2)

(3)

6. Fill in the table:

Membranous organelles	Their functions
1.	
2.	
3.	
4.	
5.	
6.	

7. Fill in the table:

Nonmembranous organelles	Their functions
1.	
2.	
3.	
4	

8. Determine the inclusions and specify their differences from the organelles:

2. Cytology: Nucleus, Cell Cycle, and Cell Division

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 71–91.

Tasks

1. Fill in the table:

Parts of nucleus	Their composition	Their functions
1.		
2.		
3.		
4.		

2. Specify the functions of the fibrous nuclear lamina:

3. Specify the functions of the nuclear pores:

4. Compare two types of chromatin and fill in the table (put "+"):

	Euchromatin	Heterochromatin
Dark		
Light		
Condensed		
Decondensed		
Active		
Inactive		

5. Enumerate the organelles constituting the achromatinic apparatus of mitosis:

(1)

(2)

6. Fill in the table:

Phases of mitosis	n, c	Events
1.		
2.		
3.		
4.		

7. Fill in the table:

Phases of cell cycle interphase	n, c	Events
1.		
2.		
3.		

8. Classify somatic cells according to their mitotic activity:

Population	Cells and tissues	Cell mitotic activity
1.		
2.		
3.		

3. Epithelial Tissue and Glands

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 98–145.

Tasks

1. Write out the epithelial tissue functions:

(1)

(2)

(3)

(4)

2. Suggest the embryonic origins of the epithelial tissues:

(1)

(2)

(3)

3. Write out the epithelial tissue characteristics:

(1)

(2)

(3)

(4)

(5)

4. Write out the basal lamina chemical components:

5. Compare the types of epithelium and fill in the table (put “+”):

	Simple	Stratified	Pseudostratified
All cells rest on the basal lamina			
Not all cells contact with the basal lamina			
Cells are of the same height and all of them reach the lumen			
Cells are different in shape and not all of them reach the lumen			

6. Fill in the table (put “+”):

Principles of exocrine gland classification

	Glands						
	simple	compound	branched	unbranched	tubular	alveolar	tubuloalveolar
Duct is unbranched							
Duct is branched							
Secretory portion is single							
Secretory portions are multiple							
Secretory portion is tube-like							
Secretory portion is sac-like							
Secretory portions are sac-like and tube-like							

7. Enumerate the modes (mechanisms) of secretion:

(1)

(2)

(3)

4. Blood

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 247–279.

Tasks

1. Write out the features of the internal medium tissues:

(1) (2)

(3) (4)

2. Write out the blood functions:

3. Write and learn the blood formula or hemogram:

Blood formed elements	$1mm^3$ content	1L content
Erythrocytes		
Leukocytes		
Platelets		

4. Fill in the table:

Morphofunctional characteristic of erythrocytes

Shape	
Diameter	
Nucleus	
Organelles	
Cytoskeleton	
Inclusions	
Energy production	

5. Specify what kind of erythrocytes are called reticulocytes and indicate the number of reticulocytes in the peripheral blood:

6. Write out common features of leukocytes:

(1)

(2)

(3)

(4)

7. Write and learn the leukocytic formula:

Granulocytes		Agranulocytes	
Neutrophils	%	Lymphocytes	%
Eosinophils	%	Monocytes	%
Basophils	%		

8. Fill in the table (put “+”):

Presence of cytoplasmic granules

Granules	Leukocytes	
	Granulocytes	Agranulocytes
Primary (nonspecific, azurophilic)		
Secondary (specific)		

5. Connective Tissue

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 146–181, 238–246.

Tasks

1. Write out the connective tissue functions:

(1)

(2)

(3)

(4)

(5)

2. Specify the connective tissue embryonic origin:

3. Classify the connective tissues:

Connective tissue proper		Skeletogenic connective tissue
Fibrous connective tissue	Specialized connective tissue	
1.	1.	1.
2. a. b.	2. a. b.	2.
	3.	

4. Enumerate the components of the connective tissue matrix:

(1)

(2)

a.

b.

c.

5. Fill in the table (put “+”):

Classification of fibrous connective tissue

	Loose	Dense	
		Irregular	Regular
Ground substance is abundant			
Fibres are prevalent in the matrix			
Fibres are oriented in various directions			
Fibres are oriented in one direction			
A variety of cells are present			
Cell population is sparse and single-type			

6. Enumerate the cell types of loose connective tissue and indicate their functions:

Cell types:	Functions:
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	

6. Cartilage and Bone

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 182–237.

Tasks

1. Fill in the table:

Type of cartilage	Matrix composition	Localization
Hyaline cartilage		
Elastic cartilage		
Fibrocartilage		

2. Fill in the table:

Cartilage cells	Localization in the cartilage	Capacity for mitosis	Capacity for matrix production
Chondroblasts			
Young chondrocytes			
Adult chondrocytes			

3. Specify the structure and functions of the perichondrium:

4. Suggest the kinds of cartilage growth and indicate the processes providing this growth:

(1)

(2)

5. Fill in the table:

Type of bone tissue	Localization	Matrix arrangement
Coarsely bundled bone tissue		
Lamellar bone tissue		

6. Fill in the table:

	Lamellar bone tissue	
	Compact substance	Spongy substance
Localization		
Matrix arrangement		

7. Fill in the table:

Bone cells	Localization in the bone	Functions
Osteoblasts		
Osteocytes		
Osteoclasts		

8. Complete the following statements:

The morphofunctional unit of the lamellar bone tissue is _____

The *morphofunctional unit* of *the lamellar bone compact substance is*_____

9. Suggest the embryonic origin of bone tissues and specify two ways of bone development:

7. Muscle Tissue

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 280–317.

Tasks

1. Fill in the table:

	Smooth muscle tissue	Skeletal muscle tissue	Cardiac muscle tissue
Localization			
Embryonic origin			
Morphofunctional unit			
Crossbanding			
Contractile organelles			
Organelles for calcium ion transport			
Capacity for repara-tive regeneration			
Contraction (subject/not subject to conscious control)			
Innervation (by somatic/autonomic nervous system)			

2. Fill in the table:

Skeletal muscle fibre types

	Red fibres	White fibres	Intermediate fibres
Myoglobin			
Mitochondria			
Type of contraction (fast or slow)			

3. Draw a relaxed and contracted sarcomere (see Textbook, p. 286, Fig. 11.6):

4. Suggest the satellite cell localization and specify its function:

8. Control lesson (Diagnostics) I:

Epithelial Tissue, Blood, Connective Tissue, Skeletogenic Tissues, and Muscle Tissue

Control preparations (slides):

1. Thick skin. H&E
2. Thin skin. H&E
3. Blood smear. Azure II & Eosin
4. Tendon. H&E
5. Trachea. H&E
6. Elastic cartilage. Orcein
7. Tubular bone: diaphysis (cross section). Shmorl type staining
8. Embryonic maxilla: intramembranous osteogenesis. H&E
9. Embryonic finger phalange: endochondral osteogenesis. H&E
10. Small intestine. H&E
11. Urinary bladder. H&E
12. Tongue: filiform papillae. H&E

9. Nervous Tissue

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 318–341.

Tasks

1. Suggest the embryonic origin of the nervous tissue:

2. Write out the types of neurons according to the morphological classification:

(1)

(2)

(3)

…and according to the functional classification:

(1)

(2)

(3)

3. Enumerate the organelles that are plentiful in the cytoplasm of the neuron body:

4. Fill in the table:

Neuron processes

	Dendrites	Axons
Number		
Branching		
Presence of rER and ribosomes		
Direction of impulse conduction		

5. Fill in the table:

Neuroglia	Origination	Location	Functions
Astrocytes: (a) protoplasmic b) fibrous			
Oligodendrocytes			
Ependyma			
Microglia			

6. Fill in the table:

Nerve fibres

	Myelinated	Unmyelinated
Number of axis cylinders		
Sheaths		
Impulse conduction velocity		
Nodes of Ranvier		
Schmidt-Lanterman clefts		

7. Write out the parts of a typical chemical synapse:

10. Peripheral Nervous System and Spinal Cord

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 341–348.

Tasks

1. Classify the nervous system organs:

the CNS includes:

the PNS includes:

2. Fill in the table:

Functional division of the nervous system

	Somatic NS	Autonomic NS
Voluntary/involuntary		
Innervated muscles		
Location of motor neurons		

3. Write out the nerve histological components:

(1)

(2)

a.

b.

c.

4. Specify the two types of the peripheral nerve endings:

5. Fill in the table:

PNS ganglia

	Spinal ganglia	Autonomic ganglia
Localization		
Function		
Neuron types		
Disposition of neuron processes		
Glial cell types		
Myelination of neuron processes		
Presence of synapses		

6. Fill in the table:

Histological composition of the spinal cord

	Gray matter	White matter
Neuronal bodies		
Neuronal processes		
Myelination of neuronal processes		
Glial cell types		
Blood vessels		

11. Central Nervous System: Brain

Read:

1. Lectures.
2. M.H. Ross "Histology", pp. 348–363.

Tasks

1. Fill in the table:

Cerebellar cortex layers	Neurons
1.	
2.	
3.	

2. Suggest the efferent neurons from the cerebellar cortex:

3.Fill in the table (put "+"):

Cerebellar cortex neurons

	Connecting Purkinje cells across folium	Connecting Purkinje cells along folium	Excitatory for Purkinje cells	Inhibitory for Purkinje cells
Stellate cells				
Basket cells				
Granule cells				
Golgi cells				

4. Fill in the table:

Types of cerebellar afferent fibres	Cerebellar cortex layer, which afferent fibres terminate in	Cerebellar neurons, which afferent fibres synapse with
1.		
2.		

5. Fill in the table:

Cerebral cortex layers	Neurons
1.	
2.	
3.	
4.	
5.	
6.	

6. Fill in the table:

Type of the cerebral cortex	Well-developed layers	Function
Granular type		
Agranular type		

7. Fill in the table:

Histological composition of the cerebrum

	Gray matter	White matter
Neuronal bodies		
Neuronal processes		
Myelination of neuronal processes		
Glial cell types		
Blood vessels		

12. Primary Sentient Sense Organs: Eye and Organ of Smell

Read:

1. Lectures.
2. M.H. Ross "Histology", pp. 834–865, 615–616.

Tasks

1. Fill in the table:

Eyeball tunics	Histological composition	Functions	Modifications on the anterior surface
1.			
2.			
3.			

2. Fill in the table:

Eye structures	Histological composition	Functions
Cornea		
Iris		
Ciliary body		
Lens		
Vitreous body		

3. Enumerate types of the retinal neurons:

(1)

(2)

(3)

(4)

(5)

4. Fill in the table:

Retinal layers	Histological composition
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

5. Suggest the embryonic origins of the eye development:

Embryonic origins	Eye structures arising from them
1.	
2.	
3.	

6. Enumerate the cells of the olfactory epithelium and indicate their functions:

Cells	Functions
1.	
2.	
3	

13. Secondary Sentient Sense Organs: Ear and Organ of Taste

Read:

1. Lectures.
2. M.H. Ross "Histology", pp. 866–887, 478–482.

Tasks

1. Fill in the table (put "+"):

Cochlear compartment	Containing endolymph	Containing perilymph	Containing the spiral organ
Scala vestibuli			
Cochlear duct			
Scala tympani			

2. Enumerate the cochlear duct walls:

(1)

(2)

(3)

3. Fill in the table:

Parts of the spiral organ	Their cells
Tunnel	
Inner cell group	
Outer cell group	

4. Complete the statements:

The spiral ganglion is housed in the_____ and contains_____

The dendrites of its neurons pass through the _____ and innervate_____

The axons of its neurons constitute the nerve fibres of the _____

5. Fill in the table (put “+”):

Parts of the vestibular apparatus

	Maculae	Cristae
Reside in the saccule and utricle		
Reside in the ampullae of the semicircular canals		
Contain supporting cells		
Contain neuroepithelial cells		
Are covered with the otolithic membrane		
Are covered with the cupula		
Are sensors of gravity and linear acceleration		
Are sensors of angular acceleration		

6. Enumerate the cells constituting the taste buds and indicate their functions:

Cells	Functions
1.	
2.	
3	

7. Suggest types of nerve fibers innervating receptor cells of the secondary sentient sense organs:

(1)

(2)

14. Control lesson (Diagnostics) II:

Nervous Tissue, Central and Peripheral Nervous System, and Sense Organs

Control preparations (slides):

1. Spinal ganglion. H&E
2. Spinal cord. Silver impregnation
3. Cerebellar cortex. Silver impregnation
4. Cerebral cortex. Silver impregnation
5. Cornea. H&E
6. Eye: posterior wall. H&E
7. Inner ear: cochlea. H&E
8. Tongue foliate papillae: taste buds. H&E

15. Cardiovascular System

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 364–395.

Tasks

1. Enumerate the cardiovascular system organs:

2. Suggest the embryonic origin of the blood vessels and indicate when and where they appear for the first time in embryogenesis:

3. Specify hemodynamic conditions determining structural peculiarities of the blood vessels:

4. Fill in the table:

Tissue composition of the arterial wall

Tunics	Type of artery		
	Elastic	Muscular-elastic	Muscular
1. Tunica intima			
2. Tunica media			
3. Tunica adventitia			

5. Enumerate the vessels of the microcirculatory bed:

(1)

(2)

(3)

(4)

6. Fill in the table:

Capillary types	Organs they are found in	Structural peculiarities
1.		
2.		
3.		

7. Fill in the table:

Tissue composition of the venous wall

Tunics	Vein types			
	Without muscles	With poor muscle development	With moderate muscle development	With significant muscle development
1. Tunica intima				
2. Tunica media				
3. Tunica adventitia				

8. Specify the embryonic origins of the heart development and indicate the heart wall tunics arising from them:

9. Fill in the table:

The heart wall tunics	Tunic tissue composition
1.	
2.	
3.	

16. Hemopoiesis and Central Organs of Hemopoiesis

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 264–279, 396–410.

Tasks

1. Enumerate the organs where embryonic hemopoiesis occurs:

2. Fill in the table:

Central hemopoietic organs	Developing blood elements
1.	
2.	

3. Characterize the stem hemopoietic cells:

4. Fill in the table:

Classes of hemopoiesis	Cells they include
I	
II	
III	
IV	
V	
VI	

5. Enumerate the stages of:

Erythropoiesis

Granulocytopoiesis

Monocytopoiesis

Platelet formation

Lymphocytopoiesis (antigen-independent)

6. Identify the bone marrow framework tissue:

7. Specify the type of the bone marrow capillaries:

8. Identify the thymus lobule framework tissue:

9. Write out components of the blood-thymic barrier and specify its function:

10. Suggest the functional significance of thymosin and its source of production:

17. Peripheral Organs of Hemopoiesis and Immunogenesis

Read:
1. Lectures.
2. M.H. Ross "Histology", pp.396–441.

Tasks

1. Enumerate the peripheral organs of hemopoiesis and immunogenesis:

2. Write out the cells arising from the antigen-dependent differentiation of

B lymphocytes:

T lymphocytes:

3. Fill in the table:

Parts of the lymph node	Histological composition
Cortex	
Medulla	

4. Enumerate the sinuses of the lymphatic node and determine their function:

(1)

(2)

(3)

(4)

5. Specify the tissue constituting the stroma of the lymph node and the spleen:

6. Fill in the table:

Parts of the spleen	Composition	Functions
White pulp		
Red pulp		

7. Identify the characteristic feature of the splenic circulation:

8. Fill in the table (put “+”):

Parts of lymphatic organs	T-depended zone	B-depended zone
Lymph node nodules		
Lymph node paracortex		
Lymph node medullary cords		
Splenic PALS		
Splenic nodules		
Splenic marginal zones		
Splenic red pulp		
Palatine tonsil nodules		
Palatine tonsil internodular spaces		

18. Endocrine Organs

Read:

1. Lectures.
2. M.H. Ross "Histology", pp. 686–727.

Tasks

1. Fill in the table:

Hypothalamic nuclei	Hormones they produce	Where these hormones are released in blood	Hormonal effects
1.			
2.			
3.			

2. Fill in the table:

Adenohypophysis cells	Hormones they produce	Hormonal effect
Pars distalis:		
acidophils		
basophils		
chromophobes		
Pars intermedia:		
endocrinocytes		

3. Specify the histological composition of the neurohypophysis:

(1)

(2)

(3)

4. Fill in the table:

Endocrine cells of the thyroid gland	Hormones they produce	Hormonal effects	Dependence on adenohypophysis
Follicular cells			
Parafollicular cells			

5. Identify the parathyroid gland hormone and specify its effect:

6. Fill in the table:

Parts of adrenal glands	Hormones they produce	Hormonal effects	Dependence on ade-nohypophysis
Cortex:			
zona glomerulosa			
zona fasciculata			
zona reticularis			
Medulla			

7. Suggest the embryonic origins of the adrenal gland development:

Embryonic origin	Part of the adrenal gland arising from it
1.	
2.	

19. Control lesson (Diagnostics) III:

Cardiovascular System, Hemopoietic Organs, and Endocrine System

Control preparations (slides):

1. Elastic artery (*aorta*). Orcein
2. Muscular artery. H&E
3. Muscular vein. H&E
4. Heart wall. H&E
5. Bone marrow section. H&E
6. Thymus. H&E
7. Lymphatic node. H&E
8. Spleen. H&E
9. Palatine tonsil. H&E
10. Hypophysis. Azan – Mallory
11. Thyroid gland. H&E
12. Parathyroid gland. H&E
13. Adrenal gland. H&E

20. Digestive System I: Oral Cavity, Pharynx, and Esophagus

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 476–524.

Tasks

1. Enumerate structural peculiarities of the oral cavity organs:

(1)

(2)

(3)

(4)

2. Compare the two surfaces of the tongue and fill in the table (put "+"):

Tissues, structures, and layers	Dorsal tongue surface	Lower tongue surface
Mucosa		
Papillae		
Taste buds		
Nonkeratinized epithelium		
Partially keratinized epithelium		
Submucosa		

3. Complete the statements about the tooth morphology:

*The enamel covers*_____

*The cementum covers*_____

*A calcified material that forms most of the tooth substance is*_____

*The pulp chamber contains*_____

*The blood vessels and nerves enter the pulp chamber through*_____

4. Suggest the embryonic origins of the tooth development:

Embryonic origins	Parts of the tooth arising from them
1.	
2.	

5. Fill in the table (put "+"):

Histological composition of the salivary glands

Structures	Parotid glands	Submandibular glands	Sublingual glands
Serous acini			
Mucous acini			
Mixed acini			
Intercalated ducts			
Striated ducts			
Interlobular ducts			
Excretory ducts			

6. Fill in the table:

Structural organisation of the esophagus

Tunics	Layers	Tissues	Presence of glands
1.			
2.			
3.			
4.			

21. Digestive system II: Stomach and Small Intestine

Read:
1. Lectures.
2. M.H. Ross “Histology”, pp. 524–545.

Tasks

1. Fill in the table :

Structural organisation of the stomach

Tunics	Layers	Tissues	Presence of glands, lymphatic tissue, and nerve plexus
1.			
2.			
3.			
4.			

2. Write out the cells of the gastric fundic glands and the secretion they produce:

Cell types	Secretion
1.	
2.	
3.	
4.	
5.	

3. Fill in the table:

Structural organisation of the small intestine

Tunics	Layers	Tissues	Presence of glands, lymphatic tissue, and nerve plexus
1.			
2.			
3.			
4.			

4. Compare the composition of epithelial cells in the small intestinal villi and crypts (put +"):

Epithelial cell types	Villus	Crypt
Enterocytes		
Goblet cells		
Endocrine cells		
Microfold cells		
Paneth cells		
Intermediate cells		

5. Compare the gastric mucosa and the small intestinal mucosa:

	Gastric mucosa	Small intestinal mucosa
Relief structures		
Covering epithelium		
Glands		

22. Digestive system III: Large Intestine, Liver, and Pancreas

Read:

1. Lectures.
2. M.H. Ross "Histology", pp. 545–575, 576–611.

Tasks

1. Fill in the table:

Structural organization of the large intestine

Tunics	Layers	Tissues	Presence of glands, lymphatic tissue, and nerve plexus
1.			
2.			
3.			
4.			

2. Compare the small intestinal mucosa and the large intestinal mucosa:

	Small intestinal mucosa	Large intestinal mucosa
Relief structures		
Epithelium		
Epithelial cell composition		

3. Draw the scheme of the classic hepatic lobule, portal lobule, and the hepatic acinus (See Text-book, p. 582, Fig.18.5):

4. Enumerate the structures constituting the hepatic lobule:

5. Suggest the composition of the liver portal triad:

(1)

(2)

(3)

6. Identify the type of hepatic capillaries and enumerate the cells making up the capillary wall:

7. Specify the hepatocyte poles and their involvement in hepatocytic functions:

(1)

(2)

8. Identify the composition of the pancreatic exocrine part and its products:

9. Fill in the table:

Pancreatic endocrine cells	Their hormones	Hormonal effects
1.		
2.		
3.		
4.		
5.		

23. Respiratory System and Integumentary System

Read:
1. Lectures.
2. M.H. Ross “Histology”, pp. 612–645, 442–475.

Tasks

1. Fill in the table (put “+”):

Parts of air-conducting system	Mucosa	Submucosa	Cartilaginous tunic	Adventitia
Trachea				
Large bronchus				
Middle bronchus				
Small bronchus				
Terminal bronchiole				

2. Enumerate the cell types of the mucosal epithelium of the air passages and their functions:

Cells	Functions
1.	
2.	
3.	
4.	
5.	

3. Enumerate the parts of the pulmonary acinus:

(1)

(2)

(3)

4. Enumerate the cell types of the alveolar epithelium and their functions:

Cell types	Functions
1.	
2.	

5. Enumerate the components of the air-blood barrier and identify the barrier function:

6. Compare the histological composition of the two skin types and fill in the table (put “+”):

Layers and structures	Thick skin	Thin skin
Epidermis		
Dermis papillary layer		
Dermis reticular layer		
Hypodermis		
Hair follicles		
Sweat glands		
Sebaceous glands		
Arrector pili muscle		

7. Characterize the sweat glands and their mode of secretion:

8. Characterize the sebaceous glands and their mode of secretion:

9. Enumerate the parts of a hair and a hair follicle (see Text-book, p. 456, Fig. 15.14):

24. Urinary System

Read:
1. Lectures.
2. M.H. Ross "Histology", pp. 646–685.

Tasks

1. Fill in the table:

Renal regions	Nephron parts they contain
Cortex	
Cortex medullary rays	
Medulla	

2. Fill in the table:

Nephron parts	Epithelium they are lined with	Functions
Bowman's capsule: visceral layer parietal layer		
Proximal convoluted tubule		
Loop of Henle: descending portion ascending portion		
Distal convoluted tubule		

3. Enumerate the components of the renal corpuscle:

(1)

(2)

4. Specify the chemical composition of the renal filtrate (primary urine):

5. Enumerate the components of the filtration barrier:

(1)

(2)

(3)

6. Write out the position and the functions of the mesangium:

7. Fill in the table:

Juxtaglomerular apparatus cells	Cell functions
1.	
2.	
3.	

8. Fill in the table:

Excretory passage wall tunics	Layers	Tissues
1.		
2.		
3.		

25. Control lesson (Diagnostics) IV:

Digestive System, Respiratory System, Integumentary System, and Urinary System

Control preparations (slides):

1. Tongue: filiform papillae. H&E
2. Developing tooth: enamel organ. H&E
3. Developing tooth: enamel and dentin formation. H&E
4. Parotid salivary gland. H&E
5. Submandibular salivary gland. H&E
6. Sublingual salivary gland. H&E
7. Esophagus. H&E
8. Esophageal-stomach junction. H&E
9. Stomach: fundus. H&Congo-rot
10. Stomach: pyloric region. H&E
11. Small intestine. H&E
12. Large intestine. H&E
13. Liver. H&E
14. Pancreas. H&E
15. Trachea. H&E
16. Lung. H&E
17. Thick skin. H&E
18. Thin skin. H&E
19. Kidney. H&E
20. Ureter. H&E
21. Urinary bladder. H&E

26. Male Reproductive System

Read:

1. Lectures.
2. M.H. Ross “Histology”, pp. 728–771.

Tasks

1. Enumerate the intratesticular tubules and their functions:

Intratesticular tubules	Functions
1.	
2.	
3.	

2. Fill in the table:

Spermatogenesis phase	Cells	Events	n, c
1.			
2.			
3.			
4.			

3. Fill in the table:

Phase of spermiogenesis	Events
Golgi phase	
Cap phase	
Acrosome phase	
Maturation phase	

4. Enumerate components of the seminiferous epithelium:

(1)

(2)

5. Fill in the table:

Testicular cells	Their localization	Their functions
Sertoli cells		
Myoid cells		
Leydig cells		

6. Enumerate the blood-testis barrier components and define the main barrier functions:

7. Fill in the table:

Gonadotropic hormones	Their testicular target cells	Their effects on target cells	Feedback control of their synthesis
1.			
2.			

8. Enumerate the male accessory reproductive glands:

(1)

(2)

(3)

9. Write out the prostate gland tissues:

(1)

(2)

(3)

27. Female Reproductive System

Read:
1. Lectures.
2. M.H. Ross “Histology”, pp. 772–796, 801–833.

Tasks

1. Fill in the table:

Ovogenesis phase	Cells	Events	n, c
1.			
2.			
3.			

2. Fill in the table:

Ovarian follicle	Oocyte	Oocyte envelopes
Primordial follicle		
Primary follicle		
Secondary follicle		
Graafian vesicle		

3. Fill in the table:

Follicular envelopes	Histological composition	Envelope functions
1.		
2.		
3.a.		
3.b.		

4. Fill in the table:

Endocrine ovarian structures	Hormones they produce	Hormonal control
1.		
2.		
3.		

5. Fill in the table:

Ovarian cycle	Days	Events	Ovarian hormones	Hormonal control
Follicular phase				
Ovulation				
Luteal phase				

6. Fill in the table:

Uterine tunics	Histological composition
1.	
2.	
3.	

7. Fill in the table (put “+”):

Histological composition and functional significance	Endometrial functional layer	Endometrial basal layer
Surface epithelium		
Lamina propria		
Gland ducts and gland bodies		
Gland bottoms		
Epithelial stem cells		
Spiral arteries		
Straight arteries		
Is sloughed off at menstruation		
Is retained and serves for endometrial regeneration		

8. Specify the localisation of the endometrial epithelial stem cells:

9. Fill in the table:

Menstrual cycle	Days	Events	Hormonal control
Proliferative phase			
Secretory phase			
Menstrual phase			

10. Fill in the table:

Mammary gland alveolar cells	Functions	Hormonal control
1.		
2.		

11. Indicate with “+” the female life span when the following components of the mammary gland develop and identify hormones controlling their development:

	At puberty	In first pregnancy	After childbirth	Controlling hormone
System of ducts				
Inactive alveoli				
Milk-producing alveoli				
Interglandular connective tissue				

28. Human Embryology I: Initial Stages of Development

Read:
1. Lectures.
2. M.H. Ross “Histology”, pp. 782–786, 794–795.

Tasks

1. Fill in the table:

Embryonic development period	Duration	Name of developing individual
1.		
2.		
3.		

2. Fill in the table:

Embryonic development	Events
The first week	
The second week	
The third week	

3. Define the three successive reactions:

*The reaction of sperm capacitation*_____

*The acrosome reaction*_____

*The zona reaction*_____

4. Identify the human cleavage type:

5. Fill in the table:

Blastocyst parts	Their fate
1.	
2.	

6. Define the concepts of:

Implantation window _____

*Implantation sites*_____

7. Complete the following statements about the implantation:

*The implantation begins on the*_____*days of development*

*The endometrium is prepared for implantation by the hormone*_____

*The invasion proper lasts about*_____*hours*

*The enzymes for invasion are released by*_____

*The regenerated epithelium covers the defect over the blastocyst by the*_____*day*

8. Fill in the table:

Provisory organs	Appearance time	Structure	Functions
Chorion			
Amnion			
Yolk sac			
Allantois			

29. Human embryology II: Embryonic Period and Placentation

Read

1. Lectures.
2. M.H. Ross “Histology”, pp. 796–801.

Tasks

1. Fill in the table:

Parts of an embryo (germ layers, axial organs, and their derivatives)	Tissues and organs arising from them
Surface ectoderm	
Neural tube	
Neural crest	
Endoderm	
Notochord	
Mesoderm somites: a) myotome b) dermotome c) sclerotome	
Somite cord	
Somatopleure	
Splanchnopleure	
Intraembryonic coelom	
Mesenchyme	

2. Specify the results of the embryo folding:

(1)

(2)

(3)

3. Fill in the table:

Regions of the decidua	Their relationship to the site of implantation
1.	
2.	
3.	

4. Fill in the table:

Parts of the chorion	Presence of villi	Region of the decidua they contact with	Participation in placenta forma-tion
1.			
2.			

5. Fill in the table (put “+”):

Chorionic villus composition

	Cytotro-phoblast	Syncytiotro-phoblast	Extraembryonic mesenchyme or connective tissue	Blood vessels
Primary villi				
Secondary villi				
Tertiary villi				

6. Suggest the human placenta shape and indicate its type:

7. Write out the composition of the fetal part of the placenta:

8. Write out the composition of the maternal part of the placenta:

9. Specify the functions of decidual cells:

10. Enumerate the placental barrier components:

(1)
(2)
(3)
(4)

11. Enumerate the functions of the placenta:

12. Identify the structural composition and the functions of the umbilical cord:

30. Control lesson (Diagnostics) V:

Male Reproductive System, Female Reproductive System, and Human Embryology

Control preparations (slides):

1. Testis. H&E
2. Prostate gland. H&E
3. Ovary. H&E
4. Uterus. H&E
5. Mammary gland . H&E
6. Bird embryo: fold formation. Hematoxylin
7. Placenta: fetal part. H&E
8. Placenta: maternal part. H&E

Preparations for the final examination in histology, cytology, and embryology

1. Blood smear. Azure II & Eosin
2. Elastic cartilage. Orcein
3. Tendon. H&E
4. Tubular bone: diaphysis. Shmorl type staining
5. Embryonic maxilla: intramembranous osteogenesis. H&E
6. Embryonic finger phalange: endochondral osteogenesis. H&E
7. Spinal ganglion. H&E
8. Spinal cord. Silver impregnation
9. Cerebellar cortex. Silver impregnation
10. Cerebral cortex. Silver impregnation
11. Cornea. H&E
12. Eye: posterior wall. H&E
13. Inner ear: cochlea. H&E
14. Tongue foliate papillae: taste buds. H&E
15. Muscular artery. H&E
16. Elastic artery (aorta). Orcein
17. Muscular vein. H&E
18. Heart wall. H&E
19. Bone marrow section. H&E (see slide N13).
20. Thymus. H&E
21. Lymphatic node. H&E
22. Spleen. H&E
23. Hypophysis. Azan - Mallory
24. Thyroid gland. H&E
25. Parathyroid gland. H&E
26. Adrenal gland. H&E
27. Tongue filiform papillae. H&E
28. Developing tooth: enamel organ. H&E
29. Developing tooth: enamel and dentin formation. H&E
30. Parotid salivary gland. H&E
31. Mixed salivary gland. H&E
32. Palatine tonsil. H&E
33. Esophagus. H&E

34. Esophageal-stomach junction. H&E
35. Stomach: fundus. H & Congo-rot
36. Stomach: pyloric region. H&E
37. Small intestine. H&E
38. Large intestine. H&E
39. Liver. H&E
40. Pancreas. H&E
41. Trachea. H&E
42. Lung. H&E
43. Thick skin. H&E
44. Thin skin. H&E
45. Kidney. H&E
46. Ureter. H&E
47. Urinary bladder. H&E
48. Testis. H&E
49. Prostate gland. H&E
50. Ovary. H&E
51. Uterus. H&E
52. Mammary gland. H&E
53. Bird embryo: fold formation. Hematoxylin
54. Placenta: fetal part. H&E
55. Placenta: maternal part. H&E