



Examination questions from Histology and Embryology 2 for General Medicine, academic year 2023/2024

A. TECHNIQUES USED IN HISTOLOGY AND GENERAL HISTOLOGY

1. Tissue preparation for light microscopy.
2. Principles of light microscopy, and its use in medicine. Histochemistry and Immunohistochemistry.
3. Principles of electron microscopy, and its use in medicine. Types of electron microscopes.
4. Morphological and functional characteristics of the cell. Cell death. Morphological description of apoptosis and necrosis.
5. The cytoplasm and the cell membrane (their structure and function).
6. The structure and the function of the nucleus (nucleolus, chromatin, nuclear envelope...).
7. The structure and the function of membranous organelles (mitochondrion, endoplasmic reticulum, Golgi apparatus, lysosome, peroxisome...).
8. Morphological characteristics of protein synthesis in the cell. Ribosomes.
9. The cytoskeleton. Microtubules, microfilaments, and intermediate filaments. The centrioles, basal bodies, and cilia.
10. Cell junctions (the adhering and the communicating junctions). Surface characteristics/specificities.
11. Cytoplasmic inclusions and pigments. Endocytosis and exocytosis.
12. The epithelial tissue (types, nutrition and the function of the epithelia). The structure of the basal lamina and the basement membrane.
13. The lining (covering) epithelium; their structure, classification, and localization.
14. The glandular epithelium (the exocrine and the endocrine glands).
15. Connective tissue (its classification and structure). Fibres of the connective tissue (their types, function, and visualization - staining).
16. Loose connective tissue (their structure, localization, and function). Cells of the connective tissue.
17. Dense connective tissue (the regular and the irregular types). The microscopic structure of tendons, ligaments, and aponeuroses.
18. Special types of connective tissues: the muroid (gelatinous) connective tissue, the reticular tissue, the white and the brown adipose tissues, the elastic tissue (their structure, function, and localization).
19. The hyaline cartilage, the elastic cartilage, and the fibrous cartilage (fibrocartilage) (their structure, localization, and functional histology).
20. Bone (osseous) tissue. Compact and spongy (cancellous) bones. Cells of the bone tissue.
21. Lamellar bone. The Haversian system. Periosteum and endosteum (their structure and functional histology)
22. Osteogenesis: the intramembranous and the endochondral (cartilaginous) ossifications. Woven (primary) and lamellar (secondary) bones.
23. Epiphyseal cartilage (growth plate). Bone remodelling and bone fracture healing.





24. Microscopic structure of the joints and the synovial membrane. The structure and the function of the articular cartilage.
25. Muscle tissue (its types, structure, and the functional histology). Regeneration and innervation of the muscle tissue.
26. Cardiac muscle (myocardium) (its structure and functional histology). Cardiac conducting muscle cells.
27. Skeletal (striated) muscle. Smooth muscle tissue (their structure and functional histology).
28. Nerve tissue (its structure and functional histology). Degeneration and regeneration of the nerve tissue.
29. Neurons (nerve cells) (their types, microscopic structure, and functional histology). Nerve fibres and the myelinating process (myelination). Synapses.
30. Neuroglia (their types, microscopic structure, and the functional histology). Blood – brain barrier.
31. Microscopic structure of the grey and the white matters of the CNS.
32. Blood and its composition. The morphology of red blood cells (erythrocytes) and their development (erythropoiesis). Platelets (thrombocytes) (their structure and development).
33. Morphology and the development of white blood cells (leukocytes) and cells of the mononuclear phagocyte system.
34. The peripheral blood smear and the differential blood count.
35. Morphological overview of the haematopoiesis and the bone marrow. Erythrocytopoiesis, myelopoiesis and lymphocytopoiesis.

B. MICROSCOPIC ANATOMY

1. Arteries and veins (types and the microscopic structure). Structural differences between arteries and veins.
2. Types of capillaries (their microscopic structure and function).
3. The heart (its microscopic structure and function). Conducting system of heart.
4. The lymph node (its microscopic structure and function).
5. Tonsils (their microscopic structure and function).
6. The spleen (its microscopic structure and function).
7. The thymus (its microscopic structure and function).
8. The pituitary gland (*the hypophysis*) and the pineal gland (*the epiphysis*) (their microscopic structure and function).
9. The thyroid and parathyroid glands (their microscopic structure and function).
10. The adrenal (suprarenal) gland (its microscopic structure and function).
11. The oral cavity, tongue, and teeth (their microscopic structure and function).
12. General description of the microscopic structure of the alimentary canal.
13. The pharynx and the oesophagus (their microscopic structure and function).
14. The stomach (its microscopic structure and function).
15. The small intestine (its microscopic structure and function).
16. Differences between the microscopic structure of the small and the large intestines.
17. The large intestine and the anal canal (their microscopic structure and function).
18. The liver (its microscopic structure and function). The blood circulation in the liver.





19. The ultrastructure and the function of hepatocytes. The perisinusoidal space of Disse and sinusoids.
20. Salivary glands (their classification, microscopic structure, and function).
21. The gallbladder and the bile ducts (their microscopic structure and function).
22. The pancreas (its microscopic structure and function).
23. The nasal cavity, the epiglottis and the larynx (their microscopic structure and function).
24. The trachea and branches of the bronchial tree (their microscopic structure and function).
25. Lungs (their microscopic structure and function). Blood circulation in the lungs.
26. Respiratory portion of the lungs. Pulmonary alveolus and the blood-air barrier.
27. The kidney (its microscopic structure and function). The structure of the nephron.
28. The filtration barrier of the nephron. Juxtaglomerular complex of the kidney (its microscopic structure and function).
29. Excretory urinary passages, the urinary bladder, and the male/female urethra (their microscopic structure and function)
30. The ovary (its microscopic structure and function). The ovarian cycle.
31. The uterine (fallopian) tube (its microscopic structure and function).
32. The uterus and the cervix (their microscopic structure and function).
33. The uterine (menstrual) cycle.
34. Vagina (its microscopic structure and function). Cyclic changes in the vaginal epithelium.
35. Testis (its microscopic structure and function).
36. The epididymis and the ductus deferens (their microscopic structure and function).
37. The prostate and the seminal vesicles (their microscopic structure and function).
38. Penis (its microscopic structure and function).
39. The skin and its appendages (their microscopic structure and function).
40. The mammary gland (its microscopic structure and function).
41. The microscopic structure of the ear.
42. The microscopic structure of the eye.
43. The microscopic structure of the cerebral cortex. The microscopic structure of the meninges.
44. The microscopic structure of the cerebellum and the spinal cord.
45. The Microscopic structure of the peripheral nerve and the ganglia (their types and functional histology)

C. EMBRYOLOGY

1. The ultrastructure and the development of the spermatozoa and the ovum.
2. Fertilization. The cleavage of the zygote and the development of the blastocyst.
3. Implantation. Differentiation of the trophoblast. Decidual reaction.
4. Differentiation of the embryoblast. The bilaminar germ disc.
5. The development of the extra-embryonal structures: chorion, amnion and yolk sac.
6. The formation of the germ layers (the bilaminar and the trilaminar germ discs).
7. The development of the neural tube. Neural crest derived cells and their derivatives.
8. Somites and their derivatives.





9. The development of the umbilical cord and its anomalies.
10. The development of the placenta and its anomalies.
11. The function and the structure of the mature placenta. The placental barrier.
12. Derivatives of the ectoderm.
13. Derivatives of the mesoderm.
14. Derivatives of the endoderm.
15. Monozygotic and dizygotic twins. Fetal membranes and the placentas in twins.
16. Teratogens and the prenatal diagnosis. Clinical embryology and assisted reproduction.
17. The development of the vertebra and the vertebral column. Overview of the development of the skull. The development of the limb.
18. The development of the heart. Congenital heart anomalies.
19. Aortic arches and the development of great arteries.
20. The fetal blood circulation. Changes appear in the circulation after birth.
21. The development of lungs. The significance of the pulmonary surfactant.
22. The development of the primitive gut and its derivatives.
23. The development of the stomach and the duodenum. Rotation of the midgut loop. Physiological herniation. The development of the colon and the rectum.
24. The development of the liver and the gallbladder. The development of the pancreas.
25. The development of the urinary system (the kidney and the urinary bladder).
26. The development of the ovaries and female internal genital organs.
27. The development of the testes. The descent of the testes. The development of the male excretory genital ducts and accessory genital glands.
28. The development of the male and female external genitalia.
29. Pharyngeal (branchial) arches and their derivatives.
30. Pharyngeal clefts and pouches, and their derivatives.
31. The development of the face. The development of the nasal and the oral cavity.
32. The development of the lips, the palate and the tongue. The development of the tooth.
33. The development of sensory organs (ear, eye, olfactory region of nasal cavity).
34. The development of the skin and the mammary gland.
35. The development of the central and the peripheral nervous system.

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