WARSZAWSKI
UNIWERSYTET
MEDYCZNY

Katedra i Zakład Histologii i Embriologii
Centrum Biostruktury
Warszawski Uniwersytet Medyczny

HISTOLOGY with EMBRYOLOGY and CYTOPHYSIOLOGY 2025/2026

Obligatory literature:

- Junqueira's Basic Histology: Text and Atlas, last edition
- Sadler T. W. "Langman's Medical Embryology", 2015, Wolters Kluwer Health, thirteenth edition.
- Cell and Molecular Biology Lippincott's illustrated Review by Chandar, Viselli

Supplementary literature:

- Stevens A., Lowe J. "Human Histology" 2005, Elsevier Mosby, third ed.
- Ross M.H., Pawlina W. "Histology: A text and atlas", 2011, Lippincott Williams & Wilkins, sixth ed.
- Gartner L. P., "Textbook of Histology", Elsevier, last edition.
- Schoenwolf, Bleyl, Brauer, Francis-West "Larsen's Human Embryology" 5th Ed.
- Nanci A. "Ten Cate's - Oral Histology", 2008, Elsevier, seventh edition or newer

GENERAL HISTOLOGY WITH CYTOPHYSIOLOGY

SEMINAR: MICROSCOPE, HISTOLOGICAL TECHNIQUE.
PRACTICAL CLASS: CELL TYPES. PRINCIPLES OF WORKING WITH A LIGHT MICROSCOPE.

1. fibroblasts (slide # 97),
2. isolated cells from smooth muscles (slide # 19),
3. nerve cells impregnated with silver nitrate (slide # 112),

SEMINAR: ELECTRON MICROSCOPE. CELLULAR COMPARTMENTS.
PRACTICAL CLASS: ULTRASTRUCTURE OF CYTOPLASMIC ORGANELLES.

SEMINAR: ULTRASTRUCTURE OF THE CELL NUCLEUS.
PRACTICAL CLASS: CELL DIVISION.

1. mitosis in sections of limb obtained from 16.5-day-old mouse fetus (slide # 4),
2. mitosis in in vitro cultured cells (slide # 1),

SEMINAR: EPITHELIAL TISSUE.
PRACTICAL CLASS: SPECIALIZED STRUCTURES ON THE EPITHELIAL SURFACE. GLANDS – HISTOLOGICAL STRUCTURE.

1. simple squamous epithelium - cornea (slide # 3),
2. simple columnar epithelium - jejunum (slide # 51a),
3. simple cuboidal epithelium - thyroid gland (slide # 8),
4. stratified squamous epithelium – cornea (slide # 3),
5. pseudostratified columnar epithelium - trachea (slide # 60),
6. stratified cuboidal epithelium (transitional) - urinary bladder (slide # 67),

SEMINAR: TYPES OF CONNECTIVE TISSUE PROPER, ADIPOSE TISSUE – WHITE AND BROWN.
PRACTICAL CLASS: CONNECTIVE TISSUE PROPER. ADIPOSE TISSUE.

1. loose connective tissue – mesentery, mast cells, elastic fibers (slide # 9),
2. dense connective tissue – tendon (slide # 7),
3. unilocular (yellow) adipose tissue – hypodermis or synovial membrane of joint capsule (slide # 38),
4. multilocular (brown) adipose tissue (slide # 110),
5. reticular fibers - spleen (slide # 113),

SEMINAR: TYPES OF CARTILAGE AND BONE TISSUE.
PRACTICAL CLASS: DEVELOPMENT OF VARIOUS TYPES OF BONE TISSUE – BONE REMODELING.

1. hyaline cartilage (slide # 10),
2. elastic cartilage – epiglottis (slide # 12),

3. compact bone – ground section (slide # 14),
4. compact bone, decalcified (slide # 16),
5. intramembranous ossification (slide # 17),
6. endochondral ossification – late stage (slide # 18),
7. synovial membrane of joint capsule (slide # 59), (Fragment of synovial membrane from human knee joint. A layer of synoviocytes rests on the cushion of fat cells. Numerous blood vessels are present. The layer of synoviocytes contains both fibroblasts (F cells) and macrophages (M cells), but they are difficult to distinguish without special staining. F cells usually have elongated nuclei with the long axis parallel to the surface of the synovial membrane. Nuclei of M cells are usually larger and more rounded. L. general structure of synovial membrane; H. a layer of synoviocytes.)

SEMINAR: TYPES OF MUSCLE TISSUE.
PRACTICAL CLASS: MUSCLE TISSUE – SKELETAL, CARDIAC, AND SMOOTH.

1. smooth muscular tissue - the wall of jejunum (slide # 13),
2. cross-striated muscle - tongue (slide # 20),
3. cardiac muscle (slide # 23 and # 23W – demonstration slide – heart muscle with intercalated discs),
4. cross-striation in the muscle (slide # 22),

SEMINAR: NERVOUS TISSUE.
PRACTICAL CLASS: PERIPHERAL NERVOUS SYSTEM – GANGLIA AND PERIPHERAL NERVES.

1. isolated nerve fiber (slide # 25),
2. peripheral nerve (slide # 27),
3. peripheral nerve – impregnated with OsO_4 (slide # 26),
4. dorsal root ganglion (slide # 76),
5. nerve cells in the spinal cord – tigroid (slide # 75),

SEMINAR: BONE MARROW AND BLOOD CELL FORMATION.
PRACTICAL CLASS: EVALUATION OF BLOOD AND BONE MARROW CELL MORPHOLOGY.

1. blood film (slide # 104),
2. smear of bone marrow cells (slide # 35a),
3. the section of red bone marrow (slide # 35),
4. foetal liver (no. 54a),

SEMINAR: SLIDE DEMONSTRATION – GENERAL HISTOLOGY.
PRACTICAL CLASS: PRACTICAL INTERMEDIATE EXAMINATION IN GENERAL HISTOLOGY.

INTERMEDIATE EXAMINATION - MCQ IN CYTOPHYSIOLOGY AND GENERAL HISTOLOGY

MICROSCOPIC ANATOMY

SEMINAR: CIRCULATORY SYSTEM, STRUCTURE AND FUNCTION OF ENDOTHELIAL CELLS.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF BLOOD AND LYMPHATIC VESSELS.

1. heart (slide # 33),
2. aorta stained with resorcin (elastic membranes and fibers) (slide # 31),
3. aorta stained with HE (slide # 30),
4. muscular artery and vein (slide # 29),
5. capillaries – mesentery (slide # 28),

SEMINAR: LYMPHATIC SYSTEM – CELL TYPES AND THEIR FUNCTIONS.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE AND FUNCTIONS OF LYMPHATIC ORGANS.

1. spleen (slide # 34),
2. lymph node (slide # 36),
3. thymus (slide # 37),
4. palatine tonsil (slide # 46),

SEMINAR: STRUCTURE OF ORAL CAVITY COMPONENTS; TOOTH DEVELOPMENT.
PRACTICAL CLASS: DIGESTIVE SYSTEM (1) – STRUCTURE OF THE TOOTH AND ORAL MUCOSA, OESOPHAGUS.

1. filiform papillae – tongue (slide # 41),
2. circumvallatae papillae – tongue (slide # 42),
3. tooth germ (slide # 103),
4. dentine, ground section (slide # 100),
5. oesophagus (slide # 47),

SEMINAR: STRUCTURE AND FUNCTION OF THE STOMACH, SMALL AND LARGE INTESTINES.
PRACTICAL CLASS: DIGESTIVE SYSTEM (2) – HISTOLOGICAL STRUCTURE OF DIFFERENT SECTIONS OF THE DIGESTIVE TRACT.

1. stomach (slide # 48),
2. duodenum (slide # 50),
3. small intestine – jejunum (slide # 51),
4. ileum – Peyer's patches (slide # 55),
5. large intestine – colon (slide # 52),

SEMINAR: STRUCTURE AND FUNCTION OF THE LIVER, PANCREAS, AND SALIVARY GLANDS.
PRACTICAL CLASS: DIGESTIVE SYSTEM (3) – HISTOLOGICAL STRUCTURE OF DIGESTIVE GLANDS. LYMPHATIC TISSUE OF THE DIGESTIVE SYSTEM.

1. parotid gland (slide # 44),
2. sublingual gland (slide # 45),
3. liver (slide # 54),
4. pancreas (slide # 58),
5. gall bladder (slide # 57)
6. appendix (slide # 53),

SEMINAR: FUNCTIONS OF DIFFERENT PARTS OF THE RESPIRATORY SYSTEM.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF THE RESPIRATORY SYSTEM.

1. trachea (slide # 60),
2. lung (slide # 61),
3. foetal lung (slide # 61a),
4. bronchoalveolar lavage – smear (macrophages, lymphocytes and granulocytes) (slide # 65)
5. **specimen x (slide # 32)** – please, answer the following questions:
   Can you recognise in this specimen:
   - epithelium (if the answer is yes what type is it?),
   - glands (if the answer is yes, what type are they?),
   - fibroblasts,
   - adipocytes (fat cells),
   - fibers: a)collagen, b)elastic,
   - striated muscle cells,
   - smooth muscle cells,
   - blood vessels, arterioles, venules,
   - capillaries,
   - nerves.

SEMINAR: KIDNEY FUNCTIONS, MECHANISMS OF DIURESIS.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF THE URINARY SYSTEM.

1. kidney (slide # 63),
2. urinary bladder (slide # 67),
3. ureter (slide # 66),
4. **specimen x (slide # 43)**

SEMINAR: SKIN AND SKIN APPENDAGES.
PRACTICAL CLASS: STRUCTURE OF THE EPIDERMIS AND DERMIS. SKIN RECEPTORS. STRUCTURE OF HAIR, SWEAT AND SEBACEOUS GLANDS. MAMMARY GLAND.

1. nonhairy skin (slide # 83),
2. nonhairy skin – fingertip (slide # 84),
3. hairy skin (slide # 85),
4. active (lactating) mammary gland (slide # 86),
5. inactive mammary gland (slide # 87),

SEMINAR: HISTOLOGICAL STRUCTURE OF THE CENTRAL NERVOUS SYSTEM.
PRACTICAL CLASS: STRUCTURE OF THE EYE, CEREBRAL CORTEX, CEREBELLUM, SPINAL CORD.

1. brain (slide # 77),
2. cerebellum (slide # 79),
3. spinal cord (slide # 75),
4. eye ball (slide # 81),
5. retina (slide # 82),
6. cornea (slide # 3),
7. lacrimal glad (slide # 80) – Lobal structure – LM, Single cuboidal glandular epithelium (lipid droplets and eosinophilic granules in cytoplasm), myoepithelial cells located between basal lamina epithelium, intralobular ducts – single cuboidal, epithelium, interlobular ducts – stratified columnar epithelium – HM,
8. **specimen x (slide # 91),**

INTERMEDIATE EXAMINATION IN MICROSCOPIC ANATOMY

EMBRYOLOGY

SEMINAR: ENDOCRINE GLANDS – STRUCTURE AND FUNCTION.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF ENDOCRINE GLANDS.

1. hypophysis (slide # 40),
2. thyroid gland (slide # 8),
3. parathyroid gland (slide # 90),
4. suprarenal gland (slide # 39),
5. pineal gland slide # 49),
6. chromaffin reaction in the suprarenal gland (slide # 5),
7. **specimen x (slide # 53)**

SEMINAR: FORMATION OF FEMALE REPRODUCTIVE CELLS.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF THE FEMALE REPRODUCTIVE SYSTEM.

1. ovary (slide # 72),
2. corpus luteum (slide # 94),
3. oviduct (slide # 73),
4. uterus (slide # 74),
5. fragments of uterus wall obtained from biopsy:
   - slide # 105 proliferative phase,
   - slide # 105a – secretory phase
6. vagina (slides # 96)
7. vagina and fragment of vestibule (slides # 96a)

SEMINAR: FORMATION OF MALE REPRODUCTIVE CELLS.
PRACTICAL CLASS: HISTOLOGICAL STRUCTURE OF THE MALE REPRODUCTIVE SYSTEM.

1. testis (slide # 69),
2. epididymis (slide # 70),
3. ductus deferens (slide # 71),
4. prostate (slide # 92),
5. prostate fixed in glutaraldehyde (slide # 92a),
6. human spermatozoa (smear) (slide # 69a).

SEMINAR: MECHANISMS OF EMBRYOGENESIS.
PRACTICAL CLASS: FERTILIZATION, IMPLANTATION. STRUCTURE OF THE EMBRYO, FETAL MEMBRANES, AND PLACENTA.

1. Blastocyst (slide 246) - trophoblast, embryoblast, zona pellucida, II polar body.
2. Decidual reaction (slide 111) – polyhedral cells of the endometrium.
3. Early trophoblast villi from a 5-week tubal pregnancy (slide 106) - syncytiotrophoblast, cytotrophoblast, villus mesoderm, extravillous trophoblast cells, megaloblasts.
4. Villi and extravillous trophoblast cells of the mature placenta (slide 107) - syncytiotrophoblast, villous vessels, extravillous trophoblast cells, fibrinoid.
5. Umbilical cord (slide 6) - amniotic epithelium, Wharton's jelly, vein, arteries.
6. Nucleus pulposus of the intervertebral disc, remnant of the notochord (slide 108) – notochordal cells, annulus fibrosus with isogenic groups, vertebral bodies.
7. Human embryo from a tubal pregnancy (slide 109 I /1-128 and 109 II / 70-181), - viewing sets of preparations with attached descriptions.

SEMINAR: INTERMEDIATE EXAMINATION IN EMBRYOLOGY
PRACTICAL CLASS: SLIDE DEMONSTRATION – MICROSCOPIC ANATOMY AND EMBRYOLOGY

SEMINAR: SLIDE REVIEW BEFORE THE FINAL EXAM.

PRACTICAL CLASS: PRACTICAL INTERMEDIATE EXAMINATION IN MICROSCOPIC ANATOMY AND EMBRYOLOGY.

- **INTERMEDIATE EXAMINATION - MCQ IN CYTOPHYSIOLOGY AND GENERAL HISTOLOGY – January 12, 14**
- **RETAKE: February 20**

- **INTERMEDIATE EXAMINATION - MCQ IN MICROSCOPIC ANATOMY – April 20, 22**
- **RETAKE: May 8**

- **INTERMEDIATE EXAMINATION - MCQ IN EMBRYOLOGY – June 1, 3 8:00 AM !!!**
- **RETAKE: June 12**

Exam:

PRACTICAL - 30.06.2026 (Tuesday)
MCQ - 01.07.2026

RETAKE: 3.09.2026

Dates of all examinations are not subject to negotiation.