



HISTOLOGY, CYTOPHYSIOLOGY and EMBRYOLOGY

5 years EDD PROGRAM

2024/2025

WINTER SEMESTER

Obligatory literature:

1. Junqueira's Basic Histology: Text and Atlas, last edition
2. Gartner L. P., "Textbook of Histology", 2021, Elsevier, 5th Edition,
3. Sadler T. W. "Langman's Medical Embryology", last edition
4. Daniel J. Chiego, Jr.: "Essentials of Oral Histology and Embryology": A Clinical Approach, Elsevier 5th Edition, 2018.
5. Medical genetics by Jorde Lynn B., Carey John C., Bamshad Michael J. Mosby Elsevier, last edition.

Supplementary literature:

1. Antonio Nanci, "Ten Cate's – Oral Histology", Elsevier, last edition,

GENERAL HISTOLOGY

1.

SEMINAR: MICROSCOPE, HISTOLOGICAL TECHNIQUE.

PRACTICAL CLASS: VARIOUS CELL TYPES.

1. fibroblasts (slide # 97),
2. isolated cells from smooth muscles (slide # 19),
3. nerve cells impregnated with silver nitrate (slide # 112),
4. proper use of the light microscope (text # 21),

2.

SEMINAR: COMPARTMENTS OF CELLS AND THEIR FUNCTION.

PRACTICAL CLASS: ELECTRON MICROSCOPE AND CELL STRUCTURE.

1. mitochondria (EM # 42, 51),
2. endoplasmic reticulum (EM # 2),
3. the Golgi complex & microtubules (EM # 12)
4. endosomes & lysosomes (EM # 54),
5. microtubules (EM # 33),
6. proteasomes (text & EM # 98)
7. peroxisomes (EM # 8),
8. amino acids (text # 27),
9. lipid rafts & caveolae (text #143)
10. biologically active compounds (derived from fatty acids and phospholipids) - released from cell membranes (text & fig. # 13)

3.

SEMINAR: CELL CYCLE AND ITS REGULATION.

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),
3. nucleus and nucleolus (EM # 52),
4. nucleosomes and nucleofilaments (EM # 231),
5. sex chromatin (fig. # 30),
6. motor proteins – dynein and kinesin (fig. # 11),
7. hypothetical mechanism of chromosome movement during anaphase (fig. # 3, 4),
8. microtubules attached to the kinetochore and schematic drawing of a chromosome (fig. & EM # 29),
9. human metaphase chromosomes visualized by various methods (fig. # 132),
10. inborn deformations caused by abnormal number or structure of chromosomes (text & fig. # 89)

4. SEMINAR: STRUCTURE AND FUNCTION OF EPITHELIAL TISSUE.

PRACTICAL CLASS: EPITHELIAL TISSUE, GLANDS.

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),

5. SEMINAR: STRUCTURE AND FUNCTION OF CONNECTIVE TISSUE PROPER AND ADIPOSE TISSUE.

PRACTICAL CLASS: CONNECTIVE TISSUE PROPER AND 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),
6. leptin, the hormone of satiety, secreted by adipocytes (text # 22).
7. “Crocodile people” – (photo # 24)

6. SEMINAR: STRUCTURE OF CARTILAGE AND BONE.

PRACTICAL CLASS: CARTILAGE AND BONE.

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. the aggregate of proteoglycans (fig. # 49),
6. cartilage nous proteoglycans (fig. # 97),
7. schematic representations of cartilage and bone proteoglycans (fig. # 55).
8. molecular biology of achondroplasia, hypochondroplasia and tanatophoric dysplasia (text, figure & photo # 23).
9. reconstruction of defects in articular surface cartilage with transplantation of isolated chondrocytes (text & photo # 48).

7. SEMINAR: DEVELOPMENT OF VARIOUS TYPES OF BONE TISSUE; REBUILDING OF BONES.

PRACTICAL CLASS: BONE FORMATION.

1. capsule of synovial joint (slide # 15),
2. intramembranous ossification (slide # 17),
3. endochondral ossification – late stage (slide # 18),
4. 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.)
5. vascular system of bone and bone marrow cavity (fig. # 63),
6. osteoporosis (text # 38),
7. the role of cell-to-cell interactions in osteoclast formation (text & fig. # 56),
8. changes occurring in bones in osteoporosis (fig. # 86),
9. osteogenic groove and perichondral ring (text & photo # 28).

8. SEMINAR: STRUCTURE, ORGANIZATION AND FUNCTION OF PERIPHERAL AND CENTRAL NERVOUS SYSTEM.

PRACTICAL CLASS: NERVOUS TISSUE. NERVOUS SYSTEM.

1. isolated nerve fiber (slide # 25),
2. peripheral nerve (slide # 27),
3. peripheral nerve – impregnated with OsO₄ (slide # 26),
4. dorsal root ganglion (slide # 76),
5. nerve cells in the spinal cord – tigroid (slide # 75),
6. brain (slide # 77),
7. cerebellum (slide # 79),
8. axon (EM # 79),
9. Nissl bodies (EM # 18),
10. tau protein (EM # 37),
11. molecular structure of tau & MAP proteins (fig. # 77)
12. diagram of an axon and its cover - that is, the myelin and Schwann cell - as seen with the light microscope (fig. # 64),
13. diagram of an axon and its covering sheaths in longitudinal section to show the relationship between the axon, myelin, and the cytoplasm of the Schwann cell and the node of Ranvier (fig. # 65),
14. diagram to aid in conceptualising of the relationship of myelin and cytoplasm of a Schwann cell (fig. # 66).

9.

SEMINAR: STRUCTURE, ORGANIZATION AND FUNCTION OF MUSCULAR TISSUE.

PRACTICAL CLASS: MUSCLE.

1. smooth muscular tissue - the wall of jejunum (slide # 13),
2. cross-striated muscle - tongue (slide # 20),
3. cardiac muscle (slide # 23),
4. cross-striation in the muscle (slide # 22),
5. intercalated disc (EM # 16 & 39),
6. satellite cells (EM # 7),
7. sarcoplasmic reticulum (EM # 40),
8. sarcomere (EM # 75)
9. dystrophin & utrophin (fig. # 84)

10.

SEMINAR: FORMATION OF PARTICULAR TYPES OF BLOOD CELLS.

PRACTICAL CLASS: BLOOD AND BONE MARROW.

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),
5. lymphocytes fixed as a suspension and in the smear (EM # 59),
6. scheme of platelet function (fig. # 68).
7. blood morphology analysis by flow cytometry (text & fig. # 67).

11.

SEMINAR: STRUCTURE OF VESSELS WITH PARTICULAR EMPHASIS ON FUNCTION OF ENDOTHELIAL CELLS.

PRACTICAL CLASS: CIRCULATORY SYSTEM.

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),
6. troponins – acute myocardial infarction diagnosis (text & fig. # 35)
7. Weibel – Palade body (EM # 58),
8. endocrine cells of the heart (EM # 60),
9. natriuretic hormone of atrium (atriopeptine, ANF) (text # 57).

JANUARY 17, 2025

THEORETICAL INTERMEDIATE EXAMINATION IN GENERAL HISTOLOGY (classes from 1 to 11 and lectures)

RETAKE OF THE THEORETICAL INTERMEDIATE EXAMINATION IN GENERAL HISTOLOGY – JANUARY 24. 2025

13.

SEMINAR: DEMONSTRATION OF HISTOLOGICAL SLIDES BEFORE THE INTERMEDIATE EXAMINATION IN GENERAL HISTOLOGY.

PRACTICAL CLASS: PRACTICAL INTERMEDIATE EXAMINATION IN GENERAL HISTOLOGY (classes from 1 to 11).
Students, who did not pass practical part of any examination before the date of the retake exam, will not qualify for the retake MCQ test.