

MICROSCOPIC ANATOMY AND EMBRYOLOGY I.

Department of Anatomy, Histology & Embryology

Head of Department: *Dr. Alán Alpár*

Course Director: *Dr. Andrea D. Székely*

Credit value: 5

Number of lessons per week: 5 lectures: 1 practical course: 4 seminars: 0

Type of the course: **compulsory course**

Subject code: AOKANT854_1A

Name of the course leader Dr Alpár Alán (full professor)

Objectives of the subject, its place in the medical curriculum:

Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future clinicians/medical doctors with a valid body of information describing the microscopical elements of clinically significant morphological structures (including cell biology, general histology and the histology of organs).

Teaching is done in the form of lectures and histology laboratory classes

Place where the subject is taught (address of the auditorium, seminar room, etc.):

Semmelweis University, Department of Anatomy, Histology and Embryology

Budapest 1094, Tüzoltó utca 58.

Successful completion of the subject results in the acquisition of the following competencies:

Understanding the microscopical composition of the human body together with the understanding of human development in order to draw parallels with macroscopical anatomy. Clear understanding of histological structure and function. Ability to identify basic structural elements within the tissue specimen. Identification of general directions/landmarks within digitized tissue slides.

Course prerequisites:

Cell science

Number of students required for the course (minimum, maximum) and method of selecting students):

Obligatory for all registered students, on the basis of registration via the NEPTUN system

How to apply for the course:

Via the NEPTUN system.

Detailed curriculum:

List of lectures

1. week:	Epithelial tissues, cell contacts, intercellular connections Glandular epithelium
2. week:	Connective tissue cells and fibres. Extracellular matrix
3. week:	Supporting tissues (cartilage, bone)
4. week:	Ossification, bone remodelling. Blood, erythropoiesis, leukopoiesis
5. week:	Muscle tissues
6. week:	Histology of vessels
7. week:	Histology of the tongue and teeth. Histology of the esophagus
8. week:	Histology of the stomach. Microscopical anatomy of the small and large intestines
9. week:	Histology of the liver and pancreas
10. week:	Histology of the airways

11. week:	Miscroscopical anatomy of urinary organs
12. week:	Histology of the male genital systems
13. week:	Histology of the female genital system I.
14. week:	Histology of the female genital system II. Placenta, mammary gland

Histology laboratories

1. week:	Introduction, epithelial tissues
2. week:	Connective tissue cells and fibres
3. week:	Blood, Cartilage, bone
4. week:	Bone formation. Nerve tissue
5. week:	Smooth, skeletal and cardiac muscle types
6. week:	Histology of vessels. Tooth bud
7. week:	Lip, tongue, lingual papillae
8. week:	Esophagus, stomach. Duodenum, jejunum, ileum, colon
9. week:	Liver, gall bladder, pancreas
10. week:	Larynx, trachea, lung
11. week:	Urinary system
12. week:	Male genital system
13. week:	Female genital system
14. week:	Placenta, revision

Other subjects concerning the border issues of the given subject (both compulsory and optional courses). Possible overlaps of themes:

Macroscopic Anatomy and Embryology I - II.

Cell sciences, cell biology

Certain chapters of Biochemistry and/or Physiology

Special study work required to successfully complete the course:

none

Requirements for participation in classes and the possibility to make up for absences:

Active participation in histology laboratory classes is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the histology laboratory classes.

Methods to assess knowledge acquisition during term time:

The knowledge of students will be checked in midterm tests (held prospectively in weeks 5 and 11). written (electronic) test. Attendance is obligatory at the two midterm tests. Students absent from the tests should reattend at one of the offered retakes. Histology and Embryology midterms are written (Moodle) examinations organised as e-learning type examination where a valid SeKa account (including user name&password) is required.

The time and topics of midterm tests will be announced in the departmental homepage at the beginning of the semester (<http://semmelweis.hu/anatomia>).

Requirements for signature:

Active participation in at least 75% of dissection room sessions, including the midterm tests (irrespective of the result) is obligatory for every student.

Type of examination:

Semifinal (written and oral) examination, topics: subject matter of the semester (Microscopic Anatomy and Embryology I). Semifinal examinations consist of written theoretical and oral practical parts.

1. Written pretest (e-learning module)
2. Microscopic Anatomy - identification of structures on digitized tissue slides - including relevant theoretical questions from the subject matter of the semester

Requirements of the examination:

During the semifinal examination the knowledge of students will be tested. Semifinal examinations are composed of written (theoretical) and oral (practical) parts with the latter being conducted with the use of digitized histological tissue slides.

Topic list for the semifinal examination:

Microscopic Anatomy and Embryology I.

General Histology

- Concept of basic tissues
- Definition and classification of epithelial tissue
- Simple epithelia
- Stratified epithelia
- Membrane specializations of epithelia
- Glandular epithelia
- Pigment epithelium, sensory neuroepithelium
- Cells of connective tissue
- Ground substance and fibres of connective tissue
- Types of connective tissue
- Blood and the corpuscular elements of blood
- Histology of the bone marrow, maturation of erythrocytes and platelets
- Differentiation of granulocytes, lymphocytes and monocytes
- Histology of cartilage
- Histology of the bone tissue
- Intramembranous ossification
- Endochondral ossification
- Growth and remodeling of bone
- Smooth muscle and myoepithelial cells
- Skeletal muscle tissue
- Cardiac muscle tissue
- Nervous tissue

Histology of organs

- Histological structure of arteries and arterioles
- Composition of capillaries and veins
- Wall structure of hollow organs
- Histology of the lip, tongue and teeth
- Structure of the esophagus
- Histology of the airways (epiglottis, larynx, trachea, lung)
- Histology of the stomach
- Structure of the small and large intestines
- Histology of the liver and biliary passages including the gall bladder
- Histology of the pancreas
- Histology of the kidney and the urinary passages (ureter, urinary bladder)
- Histology of the testicles together with the epididymis
- Histology of the prostate, seminal vesicle, spermatic cord
- Histology of the penis
- Histology of the ovary, uterine tube; corpus luteum
- Histology of the uterus
- Histology of the vagina
- Placenta, umbilical cord

Method and type of evaluation:

Semifinal examinations are composed of written theoretical and oral practical parts. The written theoretical examination is done using an e-learning module while the practical examination is conducted with the help of digitized histological tissue slides.

Students are given separate marks for each part of the examination. Unsuccessful partial examinations result in the failure of the semifinal examination. When failing at the practical part, the written test will not have to be repeated in case the result was a 4 or a 5 only. Upon the termination of the examination the Chairman of the Examination Committee composes the final mark from the partial marks earned in the

written and practical parts.

How to register for the examination?

Via the NEPTUN system

Possibilities for exam retake:

According the Study and Examination Policy

Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:

List of textbooks

Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014

Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427

Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition by B Young, G O'Dowd and P Woodford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473

Stevens & Lowe's Human Histology , Elsevier, 4th ed ISBN 978-0-723435020, 2015.

Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.

The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384

Histology Manual 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2019.

A. L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology, 4th Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885; 2015

Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033

Further study aids:

To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (<http://semmelweis.hu/anatomia>) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).