

**Semmelweis University**  
Department of Anatomy, Histology and Embryology  
2025/2026

**Faculty of Dentistry**  
1<sup>st</sup> year, 2<sup>nd</sup> semester

**HANDBOOK**  
**Macroscopic Anatomy and Embryology II**  
**Microscopic Anatomy and Embryology I**



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## Macroscopic Anatomy and Embryology II.

### TEACHING DEPARTMENT:

SEMMELEWEIS UNIVERSITY  
Department of Anatomy, Histology and Embryology  
Budapest, Túzoltó utca 58.  
H-1094 Budapest  
<http://semmelweis.hu/anatomia>

### LEARNING OBJECTIVES

**Aims of the lectures in anatomy:** Presentation of the important and/or complicated chapters of Human Anatomy (thorax, pelvis, hand, foot, skull, heart, chapters of the visceral organs, central nervous system, organs of special senses, topographical anatomy) together with relevant chapters of Human development.

**Aims of the practical sessions in the dissecting room:** Based on the weekly programs (see separate), students will both observe prosected cadaver specimens (bones, joints, muscles, viscera, brain) and perform dissections on parts of, or on an entire, embalmed cadaver.

Students are supervised by the lab instructors. Bones, joints, muscles and peripheral nervous system will be primarily taught in the dissecting room.

**LECTURES:** First semester: 1x 45 min; second semester: 2x 45 min.

**PRACTICAL CLASSES:** First semester: 5x 45 min; second semester: 5x 45 min.

**ECTS CREDITS:** Altogether 15 (first semester: 6; second semester: 7).

**MIDTERM TESTS:** Oral

### ACCEPTANCE OF THE SEMESTER:

Active participation in dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled hours, including the midterm tests, to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the dissection room classes. Midterm absences should be made up for on selected retake dates.

### TYPE OF EXAMS: oral and written

First semester: semifinal examination, second semester: final exam

#### Semifinal and final examinations consist of written and oral (practical and theoretical) parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevant theoretical/embryological questions

## WORK / ENVIRONMENTAL PROTOCOL AND INFECTION CONTROL

### GENERAL RULES

1. Frequently wash your hands using soap and warm water.
2. Sanitise your hand frequently.
3. Do not touch your face or eye.
4. It is **STRICTLY FORBIDDEN** to consume food, drinks or chewing gum in the **dissection rooms** and **histology laboratories**.
5. **Students are expected to be prepared for the practical work.** E
6. everybody is supposed to behave in the dissecting room conforming to the spirit of the site. Loud speech, out-of-place jokes and any kind of behaviour, disregarding the dignity of human corpses, should strictly be avoided.

### SPECIFIC RULES CONCERNING THE HISTOLOGY LABORATORIES

1. You may clean the surfaces with wet towels before you start using them.
2. Food and drinks are **strictly forbidden** on the premises.

### SPECIFIC RULES CONCERNING THE DISSECTION ROOMS

1. Lab coats (buttoned up) must be worn in the dissecting room at all time.
2. Use hand sanitizers upon entering. Rubber gloves are provided for dissection.
3. Loose/long hair must be tied back before dissection.
4. Food and drinks are **strictly forbidden** on the premises of the department.
5. Only the members of the study group can participate in the sessions, visitors may be present only with prior permission from the lab instructor/ Course Director. Students can leave the sessions only with the approval of the lab instructor.
6. **It is strictly prohibited to make any type of recording in the dissection room.**
7. Students may not stay in the dissecting room without the supervision of one of the assistants of the department. In the absence of an instructor, the technical personnel should ask the students to leave the dissecting room.
8. No valuable items should be left around, the department does not bear the responsibility for lost items/valuables.
9. Scalpels, blades and tweezers will have to be carried in a tightly closed and hard box. Please make sure that nobody is harmed when working with the sharp and pointed tools.
10. Accidents must be reported to the teacher first and wounds will be dressed with the help of the dissection room assistants.
11. Lab coats and rubber gloves are to be worn in the dissection room units only! Do not step out (not even for using the washroom) from the dissection unit while still wearing a lab coat.
12. It is strictly forbidden to take bones or other anatomical specimens or samples etc. from the dissecting room.
13. Dry and wet samples must be treated separately. Please wash the gloves during dissection before you start handling bones or dry /plastinated specimen.
14. There is a bell ringing 5 minutes before the end of the practical classes. Then all cadaver specimens will have to be properly wrapped and put away in their bags or boxes.
15. Dissection leftovers should be discarded in the special containers and the trays should be left **clean and dry**.
16. Dissection tools should be properly washed.
17. Disposable scalpels/blades could be disposed of **in special yellow/red containers designed for sharps and hazardous material**. Gloves must be discarded in labelled bins only, but NEVER in communal/paper waste!
18. The dissection unit may only be left following a thorough handwash using a disinfectant soap.
19. Please make sure that you leave the dissecting room quickly to provide time for the personnel to clean the surfaces between classes.

### FIRE SAFETY PROTOCOL

1. The use of naked light or smoking is **STRICTLY PROHIBITED** on the premises of the Department, including the building and the yard.
2. In case of fire, a loud fire alarm signal is to ring throughout the building. In case of a fire drill, the building must be left organized, with the guidance of the teacher/instructor of the group, using the exits as quick as possible. Escape routes are illustrated on every floor.
3. All fire cases or signs/ suspicion of a possible fire should be reported to the teacher of the group.

## ED I. Macroscopic Anatomy and Embryology 2 ANNOUNCEMENTS

### **Subject matter of the 2nd semester**

#### **I. Maxillofacial Anatomy**

- morphology of the structures of the head & neck region
- morphology of teeth

#### **II. Macroscopy of the cardiovascular system**

- heart
- blood vessels in general
- pulmonary circulation
- systemic circulation
- veins

#### **III. Macroscopy of internal organs**

- gastrointestinal tract
- respiratory tract
- urogenital tract
- separation of body cavities, peritoneum
- pelvic floor, perineum

### **Acceptance of the semester**

Active participation in dissection room lab sessions is obligatory. Students should attend at least 75% of the scheduled hours, as well as passing (with at least a 2) the obligatory Maxillofacial midterm test, to gain a signature proving the validity of the semester. Absences are limited in 25%.

### **Obligatory midterm test (oral)**

**Date:** Week 7, 1st practical class of the week

**Topics:** Maxillofacial Anatomy and relevant Embryology topics

*In case of an absence or unsuccessful midterms, students will have to attend a retake midterm exam (8th week and/or 13th week).*

**Non-obligatory practical assessment** – *it is a midterm-like voluntary examination to gain exemptions\* from certain parts of the final examination HELD during the last study week.*

**\*Exemptions:** *Students earning marks 4 or 5 in the non-obligatory practical assessments may request an exemption from the relevant practical parts of the final examination. Here their marks will be counted in the result of the final examination upon successfully passing the written part.*

### **Exam competition**

On week 13/14, we invite students having a 4 or a 5 from the Maxillofacial midterm to participate in a written competition test from the topics of the 2 semesters of the subject. Students achieving good marks (4 or 5) at the exam competition test may be \*exempted from written part of the final examination. The best 5 students are invited to participate in a Macroscopy pin test to determine the final order of competitors.

### **Final examination**

**Topics:** Subject matter of the two semesters of Macroscopic Anatomy

Only those students are eligible to sit for the final examination who have successfully finished their dissection task

#### **The final exam consists of practical and theoretical parts:**

1. Written pretest (Macroscopic Anatomy questions) – \*unless exempted
2. Oral examination (Identification of structures on anatomical dissections, including relevant theoretical questions)

### **Marking system**

**The final result of the examination is calculated from 5 partial marks**

1. Written test (unless exempted)
2. Limbs
3. Internal organs (except for those in the head&neck region)
4. Maxillofacial Anatomy specimens
5. Macroscopy of the central nervous system (brain and spinal cord)

**Academic Year 2025/2026 Faculty of Dentistry**  
**Macroscopic Anatomy and Embryology II. ED I 1-6 (7)**

Week	Lectures <i>Wed 14.15-15.00 (EOK Beznák lecture hall)</i> <i>Thurs 8.00-9.45 (NET brown lecture hall)</i>	Lecturers	Dissection classes
			<i>Mon 16.00-17.45 Thurs 13.00-15.00</i>
Week 1 02.16 -20	1. Temporomandibular joint, muscles of mastication 2. Composition of the oral cavity, palate, tongue and the faucial isthmus 3. Anatomy of teeth	1 Gallatz 2 Gerber 3 Shahbazi	Muscles of facial expression, neck muscles, triangles, cervical fasciae Muscles of mastication, TMJ
Week 2 02.23 -27.	4. Nasal cavity, paranasal sinuses 5. Morphology of the pharynx and esophagus, peripharyngeal spaces 6. Anatomy of the larynx	4 Lendvai 5 Vereczki 6 Székely	Oral cavity, teeth, tongue Pharynx, nasal cavity, larynx
Week 3 03.02 -06	7. Salivary glands 8. Classification of cranial nerve nuclei 9 Trigeminal nerve (CN 5). Cutaneous innervation	7 Papp 8 Shahbazi 9 Kozsurek	Dissection of the temporal region Dissection of the face, neck and parotid region (cadaver)
Week 4 03.09 -13.	10. Facial (CN 7) and hypoglossal (CN 12) nerves 11. Glossopharyngeal (CN 9), vagus (CN 10) and accessory (CN 11) nerves 12. Autonomic nervous system. Sympathetic and parasympathetic nervous systems	10 Kozsurek 11 Vereczki 12 Tóth	Dissection of the infratemporal and pterygopalatine regions (cadaver) Head and neck prosections
Week 5 03.16 -20.	13. Vessels, lymph nodes and lymphatic drainage of the head&neck 14. Orbit, eye bulb. Extraocular muscles and eye movements Oculomotor (CN3), trochlear (CN4) and abducent (CN6) nerves 15. Development/derivatives of the foregut together with the pharyngeal clefts/arches/pouches	13 Rácz 14 Shahbazi 15 Shahbazi	Head and neck prosections Dissection of the orbit Cranial nerve branches (cadaver)
Week 6 03.23 -27.	16. Face development together with developmental malformations 17. Imaging anatomy of the jaws, teeth and the maxillary sinus (Radiology lecture) 18. Innervation of the teeth and the gingiva, the anatomy of dental local anaesthesia	16 Shahbazi 17 Gerber 18 Gerber	Dissection of cranial nerve branches
Week 7 03.30 -04.03. EASTER FRIDAY	19. Internal organs of the thoracic cavity. Divisions of the mediastinum. Lymphatic drainage. 20. Chambers of the heart, external features, annuli fibrosis, valves. Vessels, conducting system of the heart. Surface projection of the heart, pericardium. Auscultation points. 21. <i>Development of the heart. Fetal circulation</i>	19 Lendvai 20 Kozsurek 21 Kozsurek	Cadaver dissection, opening of the thorax. <b>MAXILLOFACIAL MIDTERM INCLUDING RELEVANT EMBRYOLOGY TOPICS</b>
Week 8 04.06 -10. EASTER MONDAY	22. <i>Development of arteries and veins</i> 23. Morphology of the trachea and the lung. Pleura. 24. <i>Development of the lung. Circulatory adaptation in the newborn</i>	22 Kozsurek 23 Könczöl 24 Dobolyi	<b>Easter Monday - no dissection class</b> Morphology of the heart Dissection of the posterior mediastinum
Week 9 04.13 -17.	25. Stomach and small intestines (duodenum, jejunum, ileum) 26. Large intestine, rectum 27. Liver, gall bladder, pancreas, spleen. Portocaval anastomoses	25 Székely 26 Barna 27 Papp	Cadaver dissection. Opening of the abdominal cavity, celiac trunk Superior mesenteric artery, duodenum
Week 10 04.20 -24.	28. Peritoneum, peritoneal recesses, peritoneal relations of abdominal organs. 29. <i>Development of midgut and hindgut.</i> 30. <i>Development of the peritoneum, Separation of body cavities.</i>	28 Hanics 29 Gallatz 30 Minkó	Inferior mesenteric artery Dissection of the kidney, renal capsules and the retroperitoneal region (cadaver)
Week 11 04.27 -05.01.	31. Macroscopy of urinary organs 32. <i>Development of urinary organs.</i> 33. Morphology and coats of the testicle. Epididymis.	31 Vereczki 32 Puskár 33 Barna	Ureter, urinary bladder, male urethra Dissection of the retroperitoneal organs (cadaver)
Week 12 05.04 -08.	34. Morphology of the spermatic cord, seminal vesicle and prostate. Morphology of the penis and male urethra. 35. Anatomy of the ovary, Fallopian tube and 36. Vagina, external genital organs. Female and male perineum.	34 Vereczki 35 Lendvai 36 Székely	Male genital organs Female genital organs
Week 13 05.11 -15.	37. <i>Development of genital organs</i> 38. Topographical and sectional anatomy of the pelvis 39. Topographical and sectional anatomy of the abdomen	37 Kozsurek 38 Lendvai 39 Papp	Macroscopy of the pelvic floor Revision; cross sectional anatomy
Week 14 05.18 -22.	40. Topographical and sectional anatomy of the head. 41. Topographical and sectional anatomy of the neck 42. Topographical and sectional anatomy of the thorax	41 Gerber 41 Lendvai 42 Gallatz	Revision Limbs and internal organs (except for the head and neck region)

## TOPICS OF THE FINAL EXAMINATION

### Macroscopic Anatomy and Embryology I.

*(see there)*

### Macroscopic Anatomy and Embryology II.

Muscles of the neck, triangles of the neck, cervical fasciae  
Orbit, accessory organs of the eye, extraocular muscles, eye movements.

Shape, external features of heart  
Skeleton of heart, anuli fibrosi  
Structure of heart wall  
Chambers of heart  
Endocardium, ostia, valves of heart  
Pulse generating and conducting system of heart  
Vessels of the heart  
Pericardium  
Position and surface projections of heart. Radiology of heart  
Percussion and auscultation (area of cardiac dullness, heart sounds)  
Pulmonary circulation  
Parts and topography of the aorta  
Arch of aorta together with its branches  
Blood supply, venous and lymphatic drainage of the thoracic wall and mammary gland  
Thoracic duct, right lymphatic trunk  
Thoracic aorta and its branches  
Abdominal aorta and its branches  
Subclavian artery, axillary artery together with their branches  
Celiac trunk and its branches  
Superior mesenteric artery and its branches  
Inferior mesenteric artery and its branches  
External and internal iliac artery and its branches  
Superior vena cava and its tributaries  
Inferior vena cava and its tributaries  
Azygos and hemiazygos veins and their tributaries  
Portal vein and its tributaries, portocaval anastomoses

Esophagus (anatomy)  
Stomach (macroscopy and peritoneal relations)  
Duodenum (macroscopy, shape, position, vessels)  
Jejunum and ileum (macroscopy, shape, position, vessels)  
Colon (macroscopy, shape, position, vessels)  
Rectum, anal canal (macroscopy, shape, position, vessels)  
Liver (macroscopy and peritoneal relations)  
Gall bladder and biliary passages (anatomy)  
Pancreas (macroscopy, shape, position, vessels)

Trachea and bronchial tree  
Lung (macroscopy, shape, position, vessels)  
Surface projection of pleura and lung  
Pleura, pleural cavity  
Mediastinum (divisions and content)  
Kidney (macroscopy, shape, position, vessels)  
Urinary passages (macroscopy of ureter and urinary bladder)  
Macroscopy of the male and female urethrae  
Testis (macroscopy, shape, position, vessels)  
Epididymis, vas deferens, spermatic cord  
Scrotum, coats of testis  
Seminal vesicle, prostate  
Macroscopy of penis  
Ovary (macroscopy, shape, position, vessels)  
Uterine tube (shape, position, vessels)

Uterus (shape, parts, position, supporting structures, vessels)  
Broad ligament (lig. latum) and its components  
Vagina, external female genital organs  
Topography of the female pelvic organs (connective tissue spaces, peritoneal relations)  
Topography of the male pelvic organs (connective tissue spaces, peritoneal relations)  
Pelvic floor, perineum  
Peritoneum, greater and lesser omentum, mesentery, omental bursa  
Sympathetic nervous system (cervical and thoracic parts, sympathetic trunk)  
Sympathetic nervous system (abdominal and pelvic parts)  
Sacral parasympathetic system

[A1] megjegyzést írt:

[A2] megjegyzést írt:

[A3] megjegyzést írt:

### **Macroscopy questions in Maxillofacial Anatomy**

Oral cavity (divisions, boundaries)  
Frontal section of the oral cavity, sulcus lateralis linguae  
Faucial isthmus, palate  
Macroscopy of the tongue (parts, vessels, innervation)  
Floor of mouth (descriptive anatomy)  
Pharynx, muscles, para- and retropharyngeal spaces  
Nasal cavity and paranasal sinuses  
Larynx (skeleton, fibroelastic membranes joints and muscles)  
Larynx (mucous membrane, cavity)  
Types and morphology of teeth  
Tooth eruption and exfolition  
Blood supply and innervation of upper teeth  
Blood supply and innervation of lower teeth  
Temporomandibular joint  
Muscles concerned with the opening and closing of the mouth  
Muscles of facial expressions  
Muscles and mechanism of mastication  
Anatomy of the parotid gland, parotid nest  
Anatomy of the submandibular gland, submandibular region  
Anatomy of the sublingual gland, sublingual region  
Branches of the ophthalmic nerve (CN 5/1)  
Branches of the maxillary nerve (CN 5/2)  
Branches of the mandibular nerve (CN 5/3)  
Branches of the facial nerve (CN 7)  
Branches of the glossopharyngeal nerve (CN 9)  
Branches of the vagus nerve (CN 10)  
Branches of the accessory and hypoglossal nerves (CN 11 & 12)  
Lymph nodes and lymphatic drainage of the head & neck region  
External carotid artery and its branches  
Maxillary artery and its branches  
Course and branches of the internal carotid artery  
Veins of face and neck  
Cranial sympathetic and parasympathetic nervous systems  
Cervical plexus

### **Maxillofacial Embryology**

Tooth development together with their malformations  
Development of the jaws  
Development of the face  
Developmental malformations of the face  
Derivatives of pharyngeal grooves and pouches  
Derivatives of pharyngeal arches  
Development of the primary and secondary palates  
Development of the tongue

### **Organ development**

Fetal circulation  
Formation of atria, development of the interatrial septum  
Formation of ventricles, development of the aorticopulmonary septum  
Development of arteries  
Development of the inferior vena cava and the portal vein

Development of the superior vena cava, azygos and hemiazygos veins  
Development and differentiation of the midgut  
Development and differentiation of the hindgut  
Formation of the liver and pancreas  
Development of the lower airways including the lungs  
Kidney development  
Development of the urinary passages  
Gonadal development  
Development of the male genital tract  
Development of the female genital tract  
Development of the male/female external genitals  
Development and divisioning of the body cavities  
Development of the peritoneum

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## Microscopic Anatomy and Embryology I.

### LEARNING OBJECTIVES

**Histology** - 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).

**(Embryology - only in the 2nd semester, i.e. 2nd year 1st semester – the subject demonstrates the formation of the nervous system together with the organs of special senses and the endocrine glands, including the clinically relevant aspects of the development of organ systems. Teaching is done in the form of lectures and histology laboratory practical classes)**

### Competences acquired by completion of the course:

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.

**LECTURES:** First semester: 2 x 45 min; second semester: 3 x 45 min.

**PRACTICAL CLASSES:** First semester: 2 x 45 min; second semester: 2 x 45 min.

**ECTS CREDITS:** Altogether 8 (first semester: 4; second semester: 4).

**MIDTERM TESTS:** Written (in the Moodle system)

### ACCEPTANCE OF THE SEMESTER:

Active participation in laboratory sessions 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 classes.

### TYPE OF EXAMS: oral and/or written

First semester: semifinal examination (written), second semester: final exam (oral and written)

### The final examination consists of written and oral (practical and theoretical) parts

1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Oral examination (identification of structures on digitized histological slides) including relevant theoretical questions from the fields of Histology and Embryology

### COURSE DESCRIPTION

#### Microscopic Anatomy and Embryology I.

#### Lectures and histology classes

**Subject matter:** General Histology, Basic tissues; Organ Histology

**Credits:** 4

**Prerequisites:** Cell sciences

## ED Microscopic Anatomy and Embryology I. Announcements

### ***Acceptance of the semester***

Active participation in histology laboratory sessions is obligatory. Students should attend at least 75% of the scheduled hours, and attend and **PASS the obligatory midterm test**, to gain a signature proving the validity of the semester. Absences are therefore limited in 25%.

### ***Subject matter of the semester***

#### **I. Microscopy of basic tissues**

Simple/stratified epithelia,  
glandular tissues,  
connective and supporting tissues,  
muscle tissues and blood.  
Peripheral nervous system, vessels.

#### **II. Microscopical structure of internal organs**

Cardiovascular,  
gastrointestinal,  
respiratory and urogenital systems

### ***Obligatory midterm test***

**Topics:** Histology of basic tissues, peripheral nervous system, vessels

**Date:** Week 8 (obligatory to pass)

Retake midterms are offered for unsuccessful or absent students only – held on weeks 9 or 13, or their semester is not accepted

### ***Semifinal examination***

The semifinal exam consists of a written test (Histology questions and images)

Topics: Subject matter of the present semester

In case students achieved a 3, or better, at the written test, they may leave, the examination is finished. Those who have failed, or just passed (with a grade 2) the written test, should stay for an oral examination where they are given a **slide to explain** and a maxillofacial **histology/theory topic** to elaborate on.

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**Microscopic Anatomy I. ED I 1 – 6 (7)**

<b>Week</b>	<b>Lectures</b> <i>Tuesday 9.30-11.15 (EOK Hári lecture hall)</i>	<b>Lecturers</b>	<b>Histology Laboratory (CCO)</b> <i>Tuesday 15.00 - 16.30</i>
<b>Week 1</b> 02.16 -20.	1. Concept of tissues. Epithelial tissues, cell contacts 2. Glandular epithelium	1 Gerber 2 Gerber	Simple and stratified epithelia Transitional epithelium
<b>Week 2</b> 02.23 -27.	3. Connective tissue cells 4. Connective tissue fibres, types of connective tissue	3 Puskár 4 Puskár	Glandular epithelium Connective tissue fibres
<b>Week 3</b> 03.02 -06.	5. Nerve tissue (PNS) 6. Supporting tissues (cartilage, bone)	5 Tóth 6 Puskár	Connective tissue cells, types Histology of the peripheral nervous system
<b>Week 4</b> 03.09 -13.	7. Ossification, bone remodelling 8. Muscle tissues 1 (striated muscle)	7 Gerber 8 Barna	Supporting tissues (cartilage, bone) Types of bone formation
<b>Week 5</b> 03.16 -20.	9. Muscle tissues 2 (smooth muscle, cardiac muscle) 10. Histology of vessels	9 Minkó 10 Puskár	Types of muscle tissues Blood smear
<b>Week 6</b> 03.23 -27.	11. Histology of the tongue and salivary glands 12. Tooth development, malformations	11 Papp 12 Shahbazi	Histology of vessels Lip, tongue, lingual papillae
<b>Week 7</b> 03.30 - 04.03. EASTER FRIDAY	13. Histology of teeth 1 (enamel, dentin) 14. Histology of teeth 2 (cementum, dental pulp)	13 14 Gerber	Salivary glands, Tooth development, tooth
<b>Week 8</b> 04.06 -10. EASTER MONDAY	15. Histology of teeth 3 (parodontium) 16. Histology of the esophagus and stomach	15 Gerber 16 Papp	<b>Midterm (basic tissues, nerve tissue, vessels, lip, tongue, tooth)</b> Esophagus, cardia Stomach, small intestine
<b>Week 9</b> 04.13 -17.	17. Microscopical anatomy of the small intestine 18. Histology of the liver, gall bladder and pancreas	17 Könczöl 18 Dobolyi	Large intestine Liver, gall bladder and pancreas
<b>Week 10</b> 04.20 - 24.	19. Microscopical anatomy of the large intestine 20. Histology of the airways	19 Kozsurek 20 Tóth	Larynx, trachea, lung
<b>Week 11</b> 04.27 - 05.01.	21. Microscopical anatomy of the kidney 22. Microscopical anatomy of urinary passages (ureter, urinary bladder)	21 Dobolyi 22 Vereczki	Histology of the urinary system (kidney, ureter, urinary bladder)
<b>Week 12</b> 05.04 -08.	23. Histology of the testicle 24. Histology of the epididymis, spermatic cord, seminal vesicle and prostate	23 Tóth 24 Tóth	Male genital system
<b>Week 13</b> 05.11 -15.	25. Histology of the ovary, oogenesis 26. Histology of the Fallopian tube, uterus and vagina	25 Kozsurek 26 Kozsurek	Female genital system 1.
<b>Week 14</b> 05.18 -22.	27. Histology of the placenta, umbilical cord. Microscopical anatomy of the mammary gland. 28. Histology summary	27 Székely 28 Gerber?	Female genital system 2 Placenta, umbilical cord, mammary gland

## ED I. Microscopic Anatomy I. List of slides

Week	<b>Digital histology slides</b> <i>Histology laboratory practices Tues 15.00-16.30</i>
Week 1 02.16 -20.	<p><b>Simple epithelial tissues</b></p> <ul style="list-style-type: none"> <li>2. Simple squamous epithelium (kidney, HE)</li> <li>2. Simple cuboidal epithelium (kidney, HE)</li> <li>2. Simple columnar epithelium (kidney, HE)</li> <li>4. Pseudostratified columnar epithelium with stereocilia (epididymis, HE)</li> </ul> <p><b>Stratified epithelial tissues</b></p> <ul style="list-style-type: none"> <li>5. Stratified squamous nonkeratinized epithelium (esophagus, HE)</li> <li>6. Stratified squamous keratinized epithelium (palmar skin, HE)</li> <li>7. Stratified columnar epithelium (penis, HE)</li> <li>8. Transitional epithelium (urinary bladder, HE)</li> </ul>
Week 2 02.23 -27.	<p><b>Glandular epithelium</b></p> <ul style="list-style-type: none"> <li>10. Goblet cells (large intestine, HE) <span style="float: right;"><i>DEM: AOK 39 Apocrine secretion (eyelid, HE)</i></span></li> <li>11. Holocrine secretion (sebaceous gland, hairy skin, HE)</li> <li>12. (Pseudo)apocrine secretion (prostate, HE)</li> <li>13. Merocrine secretion (submandibular gland, HE)</li> </ul> <p><b>Connective tissue fibres +</b></p> <ul style="list-style-type: none"> <li>14. Collagen fibres (tendon, HE)</li> <li>15. Elastic fibers (large artery, RF)</li> <li>16. Reticular fibers (liver, silver impregnation)</li> </ul> <p style="text-align: right;"><b>52. Blood smear (MGG/Pappenheim)</b></p>
Week 3 03.02 -06.	<p><b>Connective tissue cells, types of connective tissue</b></p> <ul style="list-style-type: none"> <li>17. Differentiating staining of connective tissue elements (hairy/scalp skin, Azan)</li> <li>18. Differentiating staining of connective tissue elements (hairy/scalp skin, Hornowsky)</li> <li>19. Embryonic connective tissue - mesenchyme (umbilical cord, HE)</li> <li>20. Connective tissue cells (scar tissue, HE)</li> <li>21. Mast cells (peritoneum, toluidine blue) <span style="float: right;"><i>Demonstration: 81. Cell rich connective tissue (uterus, HE)</i></span></li> <li>22. Fat cells – adipocytes (tongue, Sudan III.) <span style="float: right;"><i>46. Reticular connective tissue (spleen, HE)</i></span></li> </ul> <p><b>Peripheral nervous system</b></p> <ul style="list-style-type: none"> <li>36. Peripheral nerve – cross section (HE) <span style="float: right;"><i>Demo : 88.b Peripheral nerve (OsO4);</i></span></li> <li>37. Pseudounipolar neurone (DRG, HE) <span style="float: right;"><i>6. Peripheral nerves in palm skin (HE)</i></span></li> <li>38. Multipolar neurones (autonomic ggl, AgNo3) <span style="float: right;"><i>Demo: 65. Myenteric plexus in the gut wall (duodenum HE)</i></span></li> </ul>
Week 4 03.09 - 13.	<p><b>Supporting tissues</b></p> <ul style="list-style-type: none"> <li>23. Hyalin cartilage (rib, HE)</li> <li>24. Elastic cartilage (epiglottis, RF)</li> <li>25. Fibrous cartilage (meniscus, HE)</li> <li>26. Bone – cross section (Schmorl)</li> </ul> <p style="text-align: right;"><b>27. Bone – longitudinal section (Schmorl)</b></p> <p><b>Types of ossification, bone restructuring</b></p> <ul style="list-style-type: none"> <li>28. Endochondral ossification (phalanx, HE)</li> <li>29. Intramembranous ossification (calvary, HE)</li> </ul>
Week 5 03.16 -20.	<p><b>Smooth, striated and cardiac muscle types</b></p> <ul style="list-style-type: none"> <li>30. Smooth muscle – cross and longitudinal sections (Jejunum, HE)</li> <li>31. Striated muscle – longitudinal section (HE)</li> <li>32. Striated muscle – cross section (HE)</li> <li>35. Cardiac muscle - longitudinal section, Purkinje-fibers (HE)</li> </ul>
Week 6 03.23 -27.	<p><b>Blood vessels</b></p> <ul style="list-style-type: none"> <li>50. Elastic artery (carotid artery, HE) <span style="float: right;"><i>Demonstration : 15. Elastic artery (RF)</i></span></li> <li>51. Medium-sized artery and vein (HE) <span style="float: right;"><i>Demonstration: ÁOK 38. Muscular artery and vein (Movat)</i></span></li> <li>34. Arterioles, capillaries, venules, (cardiac muscle, HE)</li> </ul> <p><b>Gastrointestinal tract</b></p> <ul style="list-style-type: none"> <li>53. Lip (HE)</li> <li>54. Filiform papillae (tongue, HE)</li> <li>56. Circumvallate papillae (tongue, HE) <span style="float: right;"><i>Demonstration: ÁOK 50. Foliate papillae (tongue, HE)</i></span></li> <li>34. Cardiac muscle - cross section (HE)</li> </ul>

<p>Week 7 03.30 - 04.03. EASTER FRIDAY</p>	<p><b>Tooth development</b>  57. Developing tooth (AZAN) <i>Demonstration: ÁOK 55. Tooth bud (AZAN)</i>  <b>ÁOK 54a, b.</b> Ground tooth (unstained)  58. Parotid gland (HE)  13. Submandibular gland (HE) <i>60. Submandibular gland (haematoxylin and mucicarmin stain)</i>  59. Sublingual gland (HE)</p>
<p>Week 8 04.06 - 10. EASTER MONDAY</p>	<p><b>MIDTERM TEST (written)</b> <i>basic tissues, nerve tissue, vessels</i>  <b>Gastrointestinal tract</b>  5. Esophagus (HE)  61. Esophago-gastric junction (cardia) (HE)  62. Stomach (fundus) (HE) <i>Demonstration 63. Stomach (fundus) (PAS-Congo-haematoxylin stain)</i>  64. Pylorus (gastro-duodenal junction, HE)  65. Duodenum (HE)  30. Jejunum (HE)  66. Ileum (HE)</p>
<p>Week 9 04.13 - 17.</p>	<p><b>Gastrointestinal tract</b>  10. Colon (HE)  67. Vermiform appendix (HE)  68. Liver (swine, AZAN)  69. Liver (human, HE)  16. Liver, (AgNO<sub>3</sub> impregnation)  3. Gall bladder (HE)  70. Pancreas (HE)</p>
<p>Week 10 04.20 - 24.</p>	<p><b>Respiratory tract</b>  71. Larynx, (HE)  72. Trachea (HE)  73. Lung (HE) <i>Demonstration: ÁOK 61. Fetal lung (HE)</i></p>
<p>Week 11 04.27 - 05.01.</p>	<p><b>Urinary system</b>  2. Kidney (HE)  91. Ureter (HE)  8. Urinary bladder (HE)</p>
<p>Week 12 05.04 - 08.</p>	<p><b>Male genital system</b>  74. Testis (HE)  4. Epididymis (He)  75. Spermatic cord (HE) <i>Demo: ÁOK 75. Spermatic cord (trichrome)</i>  12. Prostate gland (HE)  76. Seminal vesicle (HE) <i>Demonstration: 77. Glans penis (HE)</i>  7. Penis (HE)</p>
<p>Week 13 05.11 - 15.</p>	<p><b>Female genital system</b>  78. Ovary (HE)  79. Ovary, corpus luteum (HE) <b>81. Uterus, proliferation phase (HE)</b>  80. Uterine tube (oviduct) (HE) <b>82. Uterus, secretory phase (HE)</b></p>
<p>Week 14 05.18 - 22.</p>	<p><b>Female genital system</b>  84. Vagina (HE) <i>Dem: ÁOK 84. Vagina (trichrome)</i>  83. Placenta (HE) <b>85. Mamma non-lactans (HE)</b> <i>ÁOK 86. Placenta (HE)</i>  19. Umbilical cord (HE) <b>93. Mamma lactans (HE)</b></p>

# ED I Microscopic Anatomy 1

## Topic list for the semifinal examination

### **General Histology**

Concept of basic tissues  
Definition and classification of epithelial tissue  
Simple epithelia  
Stratified 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 and bone tissue  
Intramembranous ossification. Endochondral ossification. Growth and remodeling of bone  
Smooth muscle and myoepithelial cells  
Skeletal muscle tissue  
Cardiac muscle tissue  
Histology of arteries and arterioles  
Histology of veins and capillaries

### **Histology of organs**

Wall structure of hollow organs  
General composition of parenchymal (solid/compact) organs  
Histology of the lip and tongue  
Histology of the respiratory tract. Larynx. Trachea. Lung  
Histology of the esophagus and stomach  
Histology of the small and large intestines. Fine structure of the intestinal villi, enteroendocrine system  
Histology of the liver. Gall bladder, biliary ducts  
Histology of the pancreas  
Histology of kidney. Ureter. Urinary bladder  
Histology of the male and female gonads and genital organs/ducts  
Histology of the uterus (proliferative, secretory phases) menstrual cycle, vagina

### **Maxillofacial Histology**

Enamel; Amelogenesis  
Dentin; Dentinogenesis  
Structure of the dental papilla  
Cementum (two types)  
Parodontium  
Gingiva – subdivisions and histology  
Tooth development  
Tooth eruption  
Microscopic Anatomy of the tongue  
Microscopic Anatomy of salivary glands

## RECOMMENDED BOOKS

### List of textbooks

- **Sobotta Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013**
- **Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchell, Elsevier; 2014; ISBN 9780702051319**
- **McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access, 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973, 2013**
- **Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.**
- **Fitzgerald's Clinical Neuroanatomy and Neuroscience, 7th Edition, Elsevier, 2015.**
- **Oral Anatomy, Histology and Embryology, 4<sup>th</sup> Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009**
- **McMinn's Color Atlas of Head and Neck Anatomy, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016**
- **Functional Anatomy Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.**
  
- *Illustrated Dental Embryology, Histology, and Anatomy, 3<sup>rd</sup> Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.*
- *Netter's Head and Neck Anatomy for Dentistry, 3rd Edition, Elsevier, 2016.*
- *Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2*
- *Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBF, 2013.*
- *KL Moore–AF Dalley: Clinically Oriented Anatomy. 4th ed. Lippincott William and Wilkins, 1999*
  
- **The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384**
- **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**
- **Oral Anatomy, Histology and Embryology, 4<sup>th</sup> Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009**
- **Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.**
  
- *Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014*
- *Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033*
- *Wheater's Functional Histology, A Text and Colour Atlas, 6<sup>th</sup> Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.*
- *Illustrated Dental Embryology, Histology, and Anatomy, 3<sup>rd</sup> Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.*

**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](https://lib.semmelweis.hu/knowledge_base)).