Semmelweis University
Department of Anatomy, Histology and Embryology
2022/2023

Faculty of Dentistry
1st year, 2nd semester

HANDBOOK
Macroscopic Anatomy and Embryology II
Microscopic Anatomy and Embryology I

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Macroscopic Anatomy and Embryology II.

TEACHING DEPARTMENT:

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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, enbalmed 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: 6x 45 min; second semester: 5x 45 min.
ECTS CREDITS: Altogether 16 (first semester: 7; second semester: 7).
MIDTERM TESTS: Oral

ACCEPTENCE 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 relevent theoretical/embryological questions

RULES AND REGULATIONS IN THE DISSECTING ROOM

IT IS STRICTLY FORBIDDEN TO eat, drink, to chew a gum, or to use music devices / phones.
Bags and coats should ALWAYS be left in the lockers PRIOR TO entering the dissecting room.
The lockers will have to be locked using your OWN padlocks. Please, remember to keep your valuables always on you, the department takes no responsibility for lost items.

Students are expected to be prepared for the practical work.

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.

Students should take care of the equipment of the dissecting room. Do not sit on the dissection tables or stand on the tripod stools to avoid accidents. **Fire and work safety regulations** should be maintained. The dissection room is a hazard area. **Cleanliness and order** should be kept.

Working in the dissection room involves the use of **sharp and pointed tools**, injuries should be reported to the lab instructor. The technical personnel will provide first aid when necessary.

The **white lab coats** should be worn while in the dissection room to protect one's clothing from contacting the cadaver specimen. The department is not responsible for valuables left in the dissecting room.

Only the members of the study group can participate in the sessions, visitors may be present only with prior permission from the lab instructor. Students can leave the sessions only with the approval of the lab instructor.

It is strictly prohibited to make recordings in the dissection room.

Specimen preparations should be wrapped and labeled. Dissection materials of other groups or individuals should not be handled. Dissected cadaver pieces should be discarded in a designated container and discarded blades have to be collected separately.

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.

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 **anywhere** on the premises of the department (including lecture halls, dissection rooms, histology laboratories or on the hallways, staircases.
5. Use paper tissues in case you cough or sneeze and dispose of them immediately in the designated bins.

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 of the department.

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 books, sketch, or notebooks, atlases and dissection tools (as well as ID, cards, phones etc) to be used during the dissection classes are allowed in the labs. All other items should be left in the lockers.

6. Have your own padlock on you to lock your stuff and/or clothes in the lockers
7. No valuable items should be left in the lockers, the department does not bear the responsibility for lost items/valuables.
8. 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.
9. Accidents must be reported to the teacher first and wounds will be dressed with the help of the dissection room assistants.
10. 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.
11. It is strictly forbidden to take bones or other anatomical specimens or samples etc. from the dissecting room.
12. Dry and wet samples must be treated separately. Please wash the gloves during dissection before you start handling bones or dry /plastinated specimen.
13. 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.
14. Dissection leftovers should be discarded in the special containers and the trays should be left clean and dry.
15. Dissection tools should be properly washed.
16. 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!
17. The dissection unit may only be left following a thorough handwash using a disinfectant soap.
18. 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

Please make sure to adhere to the rules of fire safety regulation with full compliance, paying special attention to the following:

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. The use of elevators is STRICTLY PROHIBITED during a fire drill.
4. Every lecture room has 3 accessible entrances/exits. Students usually enter and leave through the lower single entrance under normal circumstances. When necessary, i.e. in case of fire, the upper 2 doors could also be opened using the keys kept in the fire cassettes next to the doors.
5. All fire cases or signs/ suspicion of a possible fire should be reported to the teacher of the group.
6. No electrical devices should be plugged in a connector different from the designated ones. Only electrical devices in an intact and perfect condition should be used.

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 presenting themselves at the obligatory midterm test, to gain a signature proving the validity of the semester. Absences are therefore limited in 25%.

Obligatory midterm test (oral)

Date: Week 7, 1st practical class of the week (March 27)

Topics: Maxillofacial Anatomy

In case of an absence students will have to attend a retake midterm exam (13th and/or 14th week).

Non-obligatory practical assessment

Date: Week 14, May 17. (last practical class)

Topics : ***Upper and lower limbs**

*Internal organs (except for the viscera of the head & neck region)

***Exemptions:** *Students earning marks 3, 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 14, we invite students having a 4 or a 5 from the Maxillafacial 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 compatitin 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 prosections, including relevant theoretical questions)

Marking system

The final result of the examination is calculated form 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)

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Macroscopic Anatomy and Embryology II. ED I 1-5

Week	Lectures *Tuesday 8.00-9.40 Wednesday 15.30-16.15 (Lenhossék Lecture Hall)*	Lecturers	Dissection classes *Mon 14.00-16.00 and Wed 10.30-12.15*
Week 1 02.13 - 02.17.	1. Composition of the oral cavity, palate, tongue and the faucial isthmus 2. Temporomandibular joint, muscles of mastication 3. Anatomy of teeth	1 2 3	Muscles of facial expression, neck muscles, triangles, cervical fasciae Muscles of mastication, TMJ
Week 2 02.20 - 24.	4. Nasal cavity, paranasal sinuses 5. Morphology of the pharynx and esophagus, peripharyngeal spaces 6. Anatomy of the larynx	4 5 6	Oral cavity, teeth, tongue Pharynx, nasal cavity, larynx
Week 3 02.27- 03.03.	7. Classification of cranial nerve nuclei 8. Salivary glands 9. Autonomic nervous system. Sympathetic and parasympathetic nervous systems	7 8 9	Dissection of the temporal region Dissection of the face, neck and parotid region (cadaver)
Week 4 03.06 - 10.	10. Trigeminal nerve (CN 5). Cutaneous innervation 11. Facial (CN 7) and hypoglossal (CN 12) nerves 12. Glossopharyngeal (CN 9), vagus (CN 10) and accessory (CN 11) nerves	10 11 12	Dissection of the infratemporal and pterygopalatine regions (cadaver) Head and neck prosections
Week 5 03.13 - 03.17. ***03.15. National holiday***	13. Orbit, eye bulb. Extraocular muscles and eye movements. Oculomotor (CN3), trochlear (CN4) and abducent (CN6) nerves ***March 15. - National holiday ONLINE LECTURES*** 14. Vessels, lymph nodes and lymphatic drainage of the head&neck 15. *Development/derivatives of the foregut together with the pharyngeal clefts/arches/pouches*	13 14 15	Head and neck prosections Dissection of the orbit Cranial nerve branches (cadaver) ***March 15. - National holiday*** ***no dissection class on Wednesday***
Week 6 03.20 -24.	16. Innervation of the teeth and the gingiva, the anatomy of dental local anaesthesia 17. Face development together with developmental malformations. 18. Imaging anatomy of the jaws, teeth and the maxillary sinus (Radiology lecture)	16 17 18	Dissection of cranial nerve branches ***MAXILLOFACIAL MIDTERM***
Week 7 03.27 – 31.	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. Morphology of the trachea and the lung. Pleura.	19 20 21	Cadaver dissection, opening of the thorax. Morphology of the heart
Week 8 04.03 - 07. ***Friday is holiday***	22. *Development of the heart.* Fetal circulation 23. *Development of arteries and veins* 24. Stomach and small intestines (duodenum, jejunum, ileum	22 23 24	Morphology of the heart Dissection of the posterior mediastinum
Week 9 04.10 - 14. ***Easter Monday is holiday***	25. Large intestine, rectum 26. *Development of midgut and hindgut.* 27. Liver, gall bladder, pancreas, spleen. Portocaval anastomoses	25 26 27	***Easter Monday - no dissection class*** Cadaver dissection. Opening of the abdominal cavity, celiac trunk Superior mesenteric artery, duodenum
Week 10 04.17- 21.	*28.* Peritoneum, peritoneal recesses, peritoneal relations of abdominal organs. 29. *Development of the peritoneum, Separation of body cavities*. 30. Macroscopy of urinary organs	28 29 30	Inferior mesenteric artery Dissection of the kidney, renal capsules and the retroperitoneal region (cadaver)
Week 11 04.24 -28.	31. *Development of the lung. Circulatory adaptation in the newborn* 32. *Development of urinary organs*. 33. Morphology and coats of the testicle. Epididymis.	31 32 33	Ureter, urinary bladder, male urethra Dissection of the retroperitoneal organs (cadaver)
Week 12 05.01 - 05.	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 uterus 36. Vagina, external genital organs. Female and male perineum.	34 35 36	***May 1 - no dissection class*** Male genital organs Female genital organs
Week 13 05.08 - 12.	37. *Development of genital organs* 38. Topographical and sectional anatomy of the pelvis 39. Topographical and sectional anatomy of the abdomen	37 38 39	Macroscopy of the pelvic floor Revision; cross sectional anatomy
Week 14 05.15 - 19.	40. Topographical and sectional anatomy of the thorax 41. Topographical and sectional anatomy of the neck 42. Topographical and sectional anatomy of the head.	41 41 42	Revision ***Non-obligatory assessment*** *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 lympahtic 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

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 ang 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 braches 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

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)
ACCEPTENCE 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 relevent 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 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 strucure of internal organs

Cardiovascular,
gastrointestinal,
respiratory and urogenital systems

Obligatory midterm test

Topics: Histology of basic tissues, peripheral nervous system, vessels
Date: Week 6
In case of absence, or an unsuccessful midterm result, students will have to attend a retake exam (on weeks 13 or 14) 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

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Microscopic Anatomy I. ED I 1-5

Week	Lectures *Monday 12.00-13.45 (Huzella lecture hall)*	Lecturers	Histology Laboratory ***Monday 9.45 -11.15***
Week 1 02.13 - 02.17.	1. Concept of tissues. Epithelial tissues, cell contacts 2. Glandular epithelium	1 2	Simple and stratified epithelia
Week 2 02.20 - 24.	3. Connective tissue cells and fibres. 4. Connective tissue fibres, types of connective tissue	3 4	Transitional epithelium Glandular epithelium
Week 3 02.27- 03.03.	5. Supporting tissues (cartilage, bone) 6. Ossification, bone remodelling	5 6	Connective tissue fibres and cell types
Week 4 03.06 - 10.	7. Muscle tissues 1 (striated muscle) 8. Muscle tissues 2 (smooth muscle, cardiac muscle)	7 8	Supporting tissues (cartilage, bone) Types of bone formation
Week 5 03.13 -03.17. ***03.15. National holiday***	9. Histology of vessels 10. Histology of the tongue and salivary glands	9 10	Types of muscle tissues Histology of the peripheral nervous system Histology of vessels
Week 6 03.20 -24.	11. Tooth development, malformations 12. Histology of teeth 1 (enamel, dentin)	11 12	***Midterm*** (***basic tissues, nerve tissue, vessels)*** Tooth development, tooth, lip
Week 7 03.27 – 31.	13. Histology of the esophagus and stomach 14. Histology of teeth 2 (cementum, dental pulp)	13 14	Salivary glands, tongue, lingual papillae Esophagus, cardia
Week 8 04.03 - 07. ***Easter Friday is holiday***	15. Histology of teeth 3 (parodontium) 16. Microscopical anatomy of the small intestine	15 16	Stomach, small intestine, large intestine Liver, gall bladder and pancreas
Week 9 04.10 - 14. ***Easter Monday is holiday***	17. ***Easter Monday*** 18. ***Easter Monday***	17 18	***Easter Monday – no class***
Week 10 04.17- 21.	19. Histology of the liver, gall bladder and pancreas 20. Microscopical anatomy of the large intestine	19 20	Larynx, trachea, lung
Week 11 04.24 -28.	21 Histology of the airways. 22 Microscopical anatomy of the kidney	21 22	Histology of the urinary system (kidney, ureter, urinary bladder) Male genital system 1.
Week 12 05.01 - 05.	***May 1 online lectures*** 23. Microscopical anatomy of urinary passages (ureter, urinary bladder) 24. Histology of the testicle	23 24	***May 1 - no class***
Week 13 05.08 - 12.	25. Histology of the epididymis, spermatic cord, seminal vesicle and prostate 26. Histology of the ovary, oogenesis	25 26	Male genital system 2. Female genital system 1.
Week 14 05.15 - 19.	27. Histology of the Fallopian tube, uterus and vagina 28. Histology of the placenta, umbilical cord. Microscopical anatomy of the mammary gland.	27 28	Female genital system 2 Placenta, umbilical cord, mammary gland

ED I. Microscopic Anatomy I. List of slides

Week	Digital histology slides *Histology laboratory practices Mondays 9.45 – 11.15*
Week 1	**Simple epithelial tissues** 50. Simple squamous epithelium (endothelium, elastic artery, HE) *2. Simple cuboidal epithelium (kidney, HE)* *Demonstration*: 19. *Umbilical cord (HE)* *3. Simple columnar epithelium (gall bladder, HE)* 4. Pseudostratified simple columnar epithelium (epididymis, HE) **Stratified epithelial tissues** **5. Stratified squamous nonkeratinized epithelium (esophagus, HE)** **6. Stratified squamous keratinized epithelium (palmar skin, HE)** 7. Stratified columnar epithelium (penis, HE)
Week 2	8. Transitional epithelium (urinary bladder, HE) **Glandular epithelium** 10. Goblet cells (large intestine, HE) **11. Holocrine secretion (sebaceous gland, hairy skin, HE)** 12. Apocrine secretion (prostate, HE) **13. Merocrine secretion (submandibular gland, HE)**
Week 3	**Connective tissue fibres** 14. Collagen fibres (tendon, HE) 15. Elastic fibers (large artery, RF) 16. Reticular fibers (liver, silver impregnation) **17. Differentiation between epithelial and connective tissues (hairy skin, Azan)** **18. Collagen and elastic fibres (hairy skin, Hornowsky)Connective tissue cells** 19. Embryonic connective tissue - mesenchyme (umbilical cord, HE) **20. Connective tissue cells (scar tissue, HE)** *Demonstration: 81. Cell rich connective tissue (uterus, HE)* 21. Mast cells (peritoneum, toluidine blue) *46. Reticular connective tissue (spleen, HE)* 22. Fat cells – adipocytes (tongue, Sudan III.) **52. Blood cells (blood smear – May-Grünwald-Giemsa)**
Week 4	**Supporting tissues** **Types of ossification, bone restructuring** **23. Hyalin cartilage (rib, HE**) **28. Endochondral ossification (phalanx, HE)** 24. Elastic cartilage (epiglottis, RF) **29. Intramembranous ossification (calvary, HE)** 25. Fibrous cartilage (meniscus, HE) 26. Bone – cross section (Schmorl) 27. Bone – longitudinal section (Schmorl)
Week 5	**Smooth, striated and cardiac muscle types** **30. Smooth muscle – cross and longitudinal sections (Jejunum, HE)** **31. Striated muscle – longitudinal section (HE)** **32. Striated muscle – cross section (HE)** **34. Cardiac muscle - cross section (HE)** **35. Cardiac muscle - longitudinal section, Purkinje-fibers (HE)** **Blood vessels** **50. Elastic artery (carotid artery, HE)** *Demonstration : 15. Elastic artery (RF)* **51 Medium-sized artery and vein (HE)** *Demonstration: Muscular artery and vein (RF)* **34. Arterioles, capillaries, venules, (cardiac muscle, HE)** **Peripheral nervous system** **36. Peripheral nerve – cross section (HE)** *Demonstration : Peripheral nerve (OsO4); Periph nerves in skin (HE)* **37. Pseudounipolar neurone (DRG, HE)** **38. Multipolar neurones (autonomic ggl, AgNo3)** *Demonstration: Myenteric plexus in the gut wall (HE)*
Week 6	**MIDTERM** **Tooth development, lip** **57. Developing tooth (AZAN)** *Demonstration: ÁOK 54 a, b. Ground tooth (unstained)* **53. Lip (HE)**
Week 7	**Gastrointestinal tract** **54. Filiform papillae (tongue, HE)** **56. Circumvallate papillae (tongue, HE)** *Demonstration: ÁOK 50. Foliate papillae (tongue, HE)* **8. Parotid gland (HE)** **60. Submandibular gland (haematoxylin and mucicarmin stain)** **13. Submandibular gland (HE)** **59. Sublingual gland (HE)**

Week 8	**Gastrointestinal tract** **5. Esophagus, HE** **61. Esophago-gastric junction (cardia) (HE)** **63. Stomach (fundus) (PAS-Congo-haematoxylin stain)** **62. Stomach (fundus) (HE)** **64. Pylorus (gastro-duodenal junction, HE)** **65. Duodenum (HE)** **30. Jejunum (HE)** **66. Ileum (HE)** **10. Colon (HE)** **67. Appendix (vermiform appendix; HE)** **68. Liver (swine, AZAN)** **69. Liver (human, HE)** **16. Liver, (AgNO3 impregnation)** **3. Gall bladder (HE)** **70. Pancreas (HE)**
Week 9	***Easter Monday (no class)***
Week 10	**Respiratory tract** **71. Larynx, (HE)** **72. Trachea (HE)** **73. Lung (HE)** *Demonstration: ÁOK 61. Fetal lung (HE)*
Week 11	**Urinary system and placenta** **2. Kidney (HE)** **8. Urinary bladder (HE)** **91. Ureter (HE)** **Male genital system I.** **74. Testis (HE)** **12. Prostate gland (HE)** **75. Spermatic cord (HE)**
Week 12	***May 1 (no class)***
Week 13	**Male genital system II.** **Female genital system** I. **76. Seminal vesicle (HE)** **78. Ovary (H-E)** **7. Penis (HE)** **79. Ovary, corpus luteum (HE)** **77. Glans penis (HE)** **80. Uterine tube (oviduct) (HE)**
Week 14	**Female genital system** **81. Uterus, proliferation phase (HE)** **82. Uterus, secretory phase (HE)** **84. Vagina (HE)** **19. Umbilical cord (HE)** **3. Placenta (HE)** **93. Mamma lactans (HE)** **85. Mamma non-lactans (HE)**

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 vili, 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 (prolipherative, 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. Mitchel, 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, 4th 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, 3rd 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) URBFI, 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, 4th 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, 6th Edition by B Young, G O'Dowd and P Woodford ISBN 9780702047473, Churchill Livingstone, Edinburgh, 2013.*
- *Illustrated Dental Embryology, Histology, and Anatomy, 3rd 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).