Department of Anatomy, Histology and Embryology
Semmelweis University
Faculty of Medicine
2025/2026. Academic year, 1st semester

EM II. Microscopic Anatomy and Embryology II.

(FM and regular, new curriculum)

ANNOUNCEMENTS CONCERNING THE FINAL EXAMINATIONS

Final examinations are generally held on differing days starting at 13.00 - please, see in NEPTUN.
The exams start in the Histology Unit (placed now in the ***CITY CORNER BUILDING***, Üllői út 25.) with a written test then continue with the oral part.

REGISTRATION ISSUES

Only students whose semester is accepted may sit for the final examination.
The topics of the examination cover the subject matter of the two semesters.

Registration has to be done in NEPTUN according to the Study and Examination Policy. Registration closes 24/23 hours prior to the beginning of the examination (see in NEPTUN).
Absences – no-show at the semifinal examination reduces the remaining examination possibilities and Students will have to pay a missed examination fee via neptun. In case of a health problem, students will have to present a **doctor's note within 3 working days** to be evaluated by the Head of Department. If accepted, the number of the student's examination possibilities will not be reduced.

On the day of the examination
Please gather in front of the Histology unit (City Corner Offices, Üllői út 25.) 10 minutes before starting time (***as seen in Neptun***).
Please make sure you have the following items on you:

- ID card/student card with a photograph (you may not start the examination without it)
- SeKA login details* (memorize or write them down on a small piece of paper)
- *Students who cannot login /forgot their password will be considered as „absent" (see above) and have to sit for the examination on a different day
- In case of a retake exam – proof of payment (except for the 1st retake)
- **DRESS CODE – formal (and according to weather)**
- Phones and smart watches have to be stored elsewhere during examinations
- Neither pens nor papers may be with you during the written part
- You cannot take notes or talk to your peers during the examination
- For safety reasons you may keep your valuables (money, cards, IDs, etc) on you, however „large" items, such as phones (switched off), tablets (switched off) and pencil cases will be collected upon entering the examination room.
- No chewing gum, no food, no drinks are allowed while on the premises

PARTS OF THE SEMIFINAL EXAMINATION

WRITTEN PART ***unless exempted*** **– Histology unit (Students may not leave the room during the test)**
The test is composed of 40 simple / multiple choice questions
(General and Organ Histology, Microscopy of CNS, Embryology: CNS/PNS, organs of special senses, endocrine glands)
Writing time: 40 minutes
Following the completion of the test Students may **briefly** view their results, however, neither questions may be asked, nor notes may be taken during this time. Students may not leave the room before the inspection time expires.

Passing rate: 60% (below 60% =fail, 60% =satisfactory, 70% =average, 80% =good,90% =excellent)

- Students irrespective of reaching 60% percent in the written part can continue with the oral examination
- Students failing the examination in a subsequent practical part may be exempted from the written test during the retake examination ***ONLY*** if they gained a good (4), or excellent (5), result from the written test. These students should present themselves at the **Histology laboratory** at the **beginning of the oral examinatio**n on the day of the retake examination.

CHEATING
If students are found to use illegal devices or talk to each other during any part of the examination, the examination will be suspended and a disciplinary procedure will follow. The result of the examination is a fail (1) in such a case.

ORAL / PRACTICAL PART

This part is also held in the Histology unit. The oral examination consists of the

1. Identification of structures and explanation of theoretical background on **2 digitized tissue slides**
2. one theoretical question from *the Microscopy of the CNS* - ***see the topic list***

*Students, earning a good or excellent mark from the exam competition are exempted from the written test with the mark from the competition.

During the oral exam it is possible that further questions, other than the identification of the presented specimens, may arise, e.g. discussing the theoretical or developmental relevances. Students may be asked to produce schematic drawings as part of the examination (e.g.reflexes, cross sections of the brain stem or schematic drawings of histological images).

MARKING SYSTEM

The examination finishes in the Histology Room, where Students are given a mark calculated from all exam marks.

- If one part of the practical examination results in fail (1), the entire examination is terminated with a fail (1).
- **Students failing the examination, may repeat the exam once „free", every further attempt will be charged for.** The total number of examination seats is set (200% of the number of students in a given course), therefore the number of examination seats will not be increased.
- **Retake of a successful examination -** students unhappy with the result of the examination may apply in writing with the Course Director, to retry the examination. They will be registered by the Course Director in neptun.
  Please note, that such a retake examination does not necessarily result in a better mark.
- **Technical problems** concerning registration or deregistration via the neptun system are beyond the scope of the Department, Students should seek help from the neptun group of the Secretariat.
- The Registrar of the English Secretariat is not entitled to register or deregister students with the only exception of using the 4th chance upon getting the Dean's permission.

Dr. Andrea D. Székely
Associate Professor, Course Director

EM II TOPIC LIST OF THE FINAL EXAMINATION

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 togeteher 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

Lymphatic organs

Lymphatic tissues in general, cellular components
Histological structure of lymph nodes
Spleen (fine structure and circulation)
Thymus
Tonsils, MALT

Development of the nervous system and organs of special senses

Development and primary differentiation of the neural tube
Development of brain vesicles
Development of the peripheral nervous system (neural crest, placodes)
Development of the organ of vision
Development of the organ of hearing&equilibrium

Neurohistology

Histology of the neurons developing from the neural tube
Glial cells
Histology of the neurons and supporting cells developing from the neural crest
Fine structure of peripheral nerves
Receptors and effectors
Interneuronal synapses

Microscopy of the central nervous system

Fine structure (microscopy) of the spinal cord
Proprioceptive reflexes
Nociceptive reflexes
Autonomic reflexes
Fine structure of the medulla oblongata
Fine structure of the pons
Fine structure of the midbrain
Classification of cranial nerve nuclei
Tracts of the brain stem
Reticular formation, monoaminergic systems
Fine structure of the cerebellum
Cerebellar afferents and efferents

Fine structure of the thalamus
Hypothalamo-hypophyseal system
Fine structure of the basal ganglia
Fine structure of the cerebral cortex, cortical fields
Tracts of the protopathic sensibility (anterolateral system)
Tracts of the epicritic sensibility (posterior funiculus/medial lemniscus)
Corticospinal tract (pyramidal tract)
Extrapyramidal system
Limbic system (nuclei and tracts)
Microscopy of the autonomic nervous system, tracts

Endocrine organs
Microscopical anatomy and development of the pituitary gland. Portal circulation
Microscopical anatomy of the pineal gland
Microscopical anatomy and the development of the thyroid gland
Microscopical anatomy and the development of the parathyroid gland
Microscopical anatomy and the development of the suprarenal gland
Histology of the islands of Langerhans

Organs of special senses
Microscopical structure of the skin (scalp and palm)
Histology of the mammary gland (mamma lactans et non-lactans)
Coats of the eyeball
Chambers of the eye, vitreous body
Lens, accomodation
Visual pathway, visual reflexes
External ear, tympanic membrane. Tympanic cavity, auditory tube, hearing ossicles.
Organ of Corti. Auditory pathway
Vestibular system
Bony and membranous labyrinth
Cochlea and cochlear duct
Organs of olfaction and taste

TOPIC LIST OF THE NEUROANATOMY PART OF THE ORAL EXAMINATION

1. Development of the neural tube. Cranio-caudal and dorso-ventral differentiation.
2. Divisions of the CNS, formation of the brain vesicles
3. Formation and derivatives of the neural crest and placode ectoderm
4. Cranial nerve nuclei
5. Fine structure of the spinal cord
6. Proprioceptive and nociceptive spinal reflexe
7. Central autonomic nervous system, autonomic reflexes
8. Monoaminergic and cholinergic neurones and pathways. „Ascending Reticular Activating System”
9. Thalamus, main nuclei, functions, connections
10. Somatosensory system. Spinal and trigeminal sensory pathways
11. Viscerosensory system. Role of the reticular formation, thalamus, insula and the prefrontal cortices in visceral sensory activities
12. Neuroanatomy of pain. Referred pain. Cerebral inhibition of pain sensation
13. Motor cortical areas, planning and programming of movements
14. The role of cerebellum and basal ganglia in eliciting movements. Gait control mechanism
15. Visceromotor system. Control of micturition. Spinal motor reflexes
16. Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech
17. Fine structure of the labyrinth, tracts of the vestibular system. Control of balancing and posture together with the movements of the eye and head. Awareness of spatial position
18. Neuroanatomy of vision. Visual pathway, visual recognition, neuroanatomy of reading and understanding of written/text
19. Limbic system. Amygdala, hippocampus
20. Circadian rythm, sleep/wake cycle; neuroanatomy of resting state and activation

21. Behaviour and motivation. Neuroanatomy of emotions, empathy, well-being, agression, fear, anxiety and depression
22. Cognitive functions. Neuroanatomy of determination, planning, alertedness together with learning&memory, personality, consiousness and creativity