Semmelweis University
Department of Anatomy, Histology and Embryology

Faculty of Dentistry
2nd year 1st semester

September 2025

MICROSCOPIC ANATOMY AND EMBRYOLOGY II HANDBOOK

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Microscopic Anatomy and Embryology II

TEACHING DEPARTMENT:

SEMMELWEIS UNIVERSITY
Department of Anatomy, Histology and Embryology
Budapest, Tűzoltó utca 58. (closed for reconstruction works)
H-1094 Budapest
http://semmelweis.hu/anatomia

Departmental offices are found in the City Corner Building, Üllői út 25.

Microscopic Anatomy **Lectures** are held online

Microscopic Anatomy **histology classes** are held in the City Corner Building, Üllői út 25.

LEARNING OBJECTIVES

Demonstration of the fine structure of cells and tissues composing the organs of the human body specifically to provide the future doctors of dental medicine 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).

General embryology demonstrates the steps of the formation of a new human being together with the stages of intrauterine development, including the clinically relevant aspects of the development of organ systems. Teaching is done in the form of lectures and histology laboratory 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: 2 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 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 II.

Lectures and histology classes

Subject matter: Histology of the lymphatic system, together with the histology and developmental aspects of the central and peripheral nervous systems, endocrine organs and organs of special senses, including the skin. **Credits: 4**

Prerequisites: Macroscopic Anatomy II (successful final examination)
Microscopic Anatomy and Embryology I (successful examination)

Academic Year 2025/2026 Faculty of Dentistry

ED II. Microscopic Anatomy and Embryology II.

ONLINE LECTURES

Weeks	Lectures - online	Lecturer	Histology laboratory *Tuesdays 15.00-16.30*
Week 1 09. 8-12.	1. Blood, corpuscular elements of blood. Bone marrow, erythropoiesis, leukopoeisis 2. Cellular components of lymphatic tissue. Thymus, tonsils, MALT	*1 Puskár* *2 Puskár*	Blood Lymphatic system I. – tonsils
Week 2 09. 15-19.	3. Structure and circulation of lymph nodes and spleen 4. Nerve tissue: neurons and glial cells, synapses, receptors and effectors	*3 Puskár* *4 Tóth*	Lymphatic system II. - thymus, lymph node, spleen
Week 3 09. 22-26.	5. Differentiation of the neural tube. Cranio-caudal and dorso-ventral differentiation. Differentiation of the brain vesicles 6. Microscopy of the CNS – Fine structure of the spinal cord. Spinal reflexes, receptors and effectors	*5 Kozsurek* *6 Gerber*	Nerve tissue, PNS
Week 4 09. 29 – 10.03.	7. Formation and derivatives of the neural crest and placode ectoderm 8. Brain tracts, neurotransmitters, neuronal circuits, "*connectomics*" Structure of the cerebral cortex	*7 Minkó* *8 Székely*	Nerve tissue, CNS I. (slides) *Microscopy of the CNS – consultation I.* *Spinal reflexes, development of the spinal cord* + slides
Week 5 10. 06 – 10.	9. Somato-and viscerosensory systems. Sensory pathways with special reference tot he cranial regions. 10. Thalamic nuclei. Functional connections between the sensory cortex, thalamus and insula.	*9 Kozsurek* *10 Shahbazi*	*Microscopy of the CNS – consultation II.* *Brodmann areas*
Week 6 10. 13-18.	11. Neuroanatomy of pain. 12. Structure of the cerebellum, cerebellar connections.	*11 Gerber* *12 Tóth*	*Microscopy of the CNS – consultation III.* *Sensory pathways* *Development of the telencephalon* +slides
Week 7 10. 20-24. ***Oct. 23. is a National Holiday***	13. Neuroanatomy of movements/locomotion I. Somatomotor cortical tracts. Visceromotor system, control of micturition 14. Neuroanatomy of movements/locomotion II. Planning /programming of and eliciting movements. Gait control mechanism. The role of cerebellum and basal ganglia	*13 Vereczki* *14 Vereczki*	*Microscopy of the CNS – consultation IV.* *Motor systems* *Structure, connectivity and development of the cerebellum*
Week 8 10. 27 - 10.31.	15. Central autonomic nervous system. Monoaminergic and cholinergic neurones and pathways. „Ascending Reticular Activating System" (ARAS) 16. External ear, middle ear.	*15 Kozsurek* *16 Zsiros*	***Midterm test 1*** ***Blood, lymphatic organs, microscopy of the CNS***
Week 9 11. 3-7.	17. Inner ear. Bony and membranous labyrinth. Development of the organ of hearing. 18. Control of balance / posture together with the movements of the eye and head. Perception of spatial position	*17 Tóth* *18 Tóth*	Organ of hearing and equilibrium (slides)
Week 10 11. 10-14.	19. Spiral organ of Corti. Auditory pathway. Neuroanatomy of hearing, understanding and control of speech. 20. Fibrous and vascular coats of the eyeball. Lacrimal gland, lacrimal apparatus.	*19 Puskár* *20 Székely*	Organ of vision I. *Innervation of the lacrimal gland* *External ocular muscles (revision)*
Week 11 11. 17-21.	21. Inner coat of the eyeball, retina. Development of the eye 22. Neuroanatomy of vision. Visual pathway, visual recognition, orientation in space.	*21 Lendvai* *22 Lendvai*	Organ of vision II.
Week 12 11. 24-28.	23. Circadian rythm, sleep/wake cycle; neuroanatomy of resting state and activation. 24. Endocrine system: Hypothalamus, the hypothalamo-hypophysial system, epiphysis	*23 Gerber* *24 Tóth*	Endocrine organs I.
Week 13 12. 1–5.	25. Taste sensation and olfaction. Limbic system. 26. Neuroanatomy of energy metabolism, food intake, hedonism and addiction	*25 Shahbazi* *26 Gerber*	***Midterm test 2*** ***Endocrine organs I.*** ***Organs of special senses***
Week 14 12.8-12.	27. Neuroanatomy of emotions, motivation, agression, empathy and behaviour. The reward system. 28. Neuroanatomy of stress, fear, anxiety and depression. Determination, alertedness, personality, consiousness, well-being.	*27 Vereczki* *28 Gerber*	Endocrine organs II Skin as a sensory organ Revision

List of slides (FOK series) 2025/2026 1st semester

Weeks	Histology laboratory *Tuesdays 15.00-16.30*
Week 1 09. 8-12.	**Blood** 52. Blood smear (MGG) **Lymphatic system I.** 7. Palatine tonsil (HE)) 48. Lingual tonsil (HE *DEM ÁOK 42. Palatine tonsil (T/B cell IHC)* *ÁOK 48. Pharyngeal tonsil (HE)*
Week 2 09. 15-19.	**Lymphatic system II.** 49. Thymus (HE) 44. Lymph node (HE) 45. Spleen (HE) *DEM ÁOK 1.a, b Spleen (T/B cell IHC)*
Week 3 09. 22-26.	**Histology of the peripheral nervous system** 36. Peripheral nerve (cross section, HE) 37. Pseudounipolar neurones (DRG, HE) 38. Multipolar neurones (autonomic ggl, AgNO3 impregnation) *DEM Peripheral nerve (OsO4 impregnation)* *6. nerves in the skin (HE)* *43. Motor end plate (striated muscle, ACh est)*
Week 4 09. 29 – 10.03.	***Microscopy of the CNS – consultation I. Spinal reflexes, development of the spinal cord*** 39. Spinal cord (multipolar neurones, Nissl) *DEM AOK Muscle spindle (HE)*
Week 5 10. 06 – 10.	***Microscopy of the CNS – consultation II. - Brodmann areas*** **Histology of the central nervous system** 40. Cerebral cortex (pyramidal neurones, Bielschowsky) 42. Cerebral cortex (pyramidal neurones, Golgi) 94. Hippocampus (HE)
Week 6 10. 13-18.	***Microscopy of the CNS – consultation III.*** ***Sensory pathways & Development of the telencephalon*** 99. Mesencephalon (Luxol fast blue + Nissl) 100. medulla oblongata (Luxol fast blue + Nissl)
Week 7 10. 20-24. ***Oct. 23. is a National Holiday***	***Microscopy of the CNS – consultation IV. - Structure, connectivity and development of the cerebellum*** ***Motor systems.*** 95. Cerebellar cortex (HE) 41. Cerebellar cortex (GFAP ICC)
Week 8 10. 27 - 10.31.	***Midterm test 1*** ***Blood, lymphatic organs, microscopy of the CNS***
Week 9 11. 3-7.	**Histology of the organ of hearing & equilibrium** 98. Cochlea (semithin section, toluidine blue) AOK Macula (semithin section, toluidine blue) AOK Ear lobe (Verhoeff's stain)
Week 10 11. 10-14.	**Histology of the organ of vision I.** - *Innervation of the lacrimal gland External ocular muscles (revision)* 96. Eye bulb (HE) 33. Lacrimal gland (HE)
Week 11 11. 17-21.	**Histology of the organ of vision II.** 97. Retina (semithin section, toluidine blue)
Week 12 11. 24-28.	**Endocrine system I.** 90. Epiphysis/ pineal body (HE) 86. Hypophysis/ pituitary gland (HE) 87. Hypophysis/ pituitary gland (chrom–hematoxyline-phloxin/Gömöri) *DEM 74. Leydig cells, testicle (HE)* *78. Ovarian follicles (HE)* *79. Corpus luteum (HE)*
Week 13 12. 1–5.	***Midterm test 2*** ***Endocrine organs I. & Organs of special senses***
Week 14 12.8-12.	**Endocrine system II**. 88. Thyroid gland (HE) 89. Parathyroid gland (HE) 92. Adrenal/suprarenal gland (HE) *DEM 70. Islets of Langerhans, pancreas (HE)* **Histology of the skin** 6. Palm skin (HE) 11. Scalp/hairy skin (HE) *Revision*

ED II. Microscopic Anatomy and Embryology II.

Subject matter of the present semester

I. Histology of the blood, lymphatic organs and the nervous system

a) Corpuscular elements of blood
b) Histology of lymphoid tissue (lymph nodes, thymus, tonsils, spleen)
c) Fine structure of peripheral nerves, neurons and supporting elements
d) Receptors and effectors, interneuronal synapses
e) Histology of the brain and spinal cord

II. Microscopy of the central nervous system, i.e., NEUROANATOMY *

a) Microscopic anatomy of brain and spinal cord
b) Nuclei and tracts of brain and spinal cord
c) Microscopy of the autonomic nervous system, tracts

III. Organs of special senses (histology and embryology)

a) Organ of vision, visual pathways
b) Organ of hearing and equilibrium, auditory pathways, vestibular system
c) Organ of smell, olfactory pathways
d) Organ of taste, gustatory pathways
e) Skin and appendages

IV. Endocrine organs (histology and embryology)

a) Hypothalamo-hypophysial system
b) Endocrine glands and cells

V. Development of the nervous system and organs of special senses

a) Development and primary differentiation of the neural tube
b) Development of the peripheral nervous system (neural crest, placodes)
c) Development of the organ of vision
d) Development of the organ of hearing&equilibrium

Announcements

Evaluation is made using a five-grade scale (1-5).

Acceptance of the semester (signature)

1. Active participation in histology lab sessions is obligatory. Students should attend **at least 75% of the scheduled hours**, including the obligatory midterm examinations. Absences are therefore limited in **25%**.
2. **Successful midterm tests (passing with at least a 2).**

MIDTERM TESTS *(passing rate 50%)*

Midterm test I. Written (Moodle)
Date: 8th week
Topics: Histology of blood, lymphatic system, microscopy of the CNS

Midterm test II. Written (Moodle)
Date: 13th week
Topics: Endocrine organs I.; Organs of special senses

*Midterm tests are **obligatory** tests, they can only be done on the day specified previously, and unless they are unsuccessful, they **cannot be retaken or upgraded.***
***Unsuccessful midterms** (i.e., fail – 1)will have to be retaken at the given timepoints (TBA).*

EXAM COMPETITION – every student, whose **midterm marks are 4 or 5**, is invited to participate in a written competition on week 14.

Topic list- Subject matter of the two semesters

Students achieving **the level of a 4 or 5** at the competition may request **to be exempted from the written** part of the final examination.

FINAL EXAMINATION

Topics: Subject matter of the two semesters

1. Written pretest (moodle, ***unless exempted***)
2. Oral examination – (see the Topic list)
   a) Identification of structures on 1 digitized tissue slide
   b) 1 topic from the Microscopy of the CNS (i.e., Neuroanatomy)
   *c) A further question from the topics of CNS tests whose cumulative score is less than 15 points collected from the test during weeks 6-7-8 (*see above)*

The final mark is calculated form all 3 partial marks earned from each part.

***Please note**: Students may register for, or deregister from, the examinations via the neptun system.*
In case neither the first nor the repeated takes of a semifinal exam have been successful the exam has to be postponed to the following exam period as a 'CV' exam (if there are possibilities left).

WORK / ENVIRONMENTAL PROTOCOL

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 hygienic towels before you start using them.
2. Food and drinks are **strictly forbidden** in the Histology laboratory.

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 posted 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.

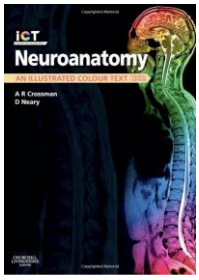
List of textbooks

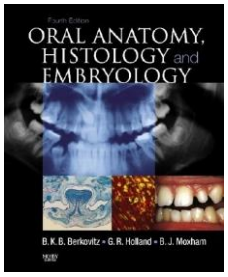
The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
Histology: A Text and Atlas: With Correlated Cell and Molecular Biology; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427
Wheater's 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.

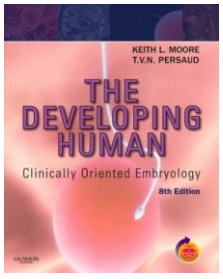
Recommended textbooks

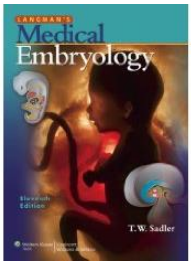
Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition 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.

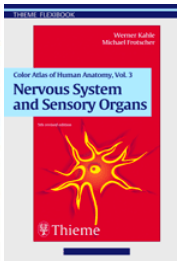
Further study aids:
To be downloaded from the homepage of the Department of Anatomy, Histology and Embryology (http://semmelweis.hu/anatomia) or from Knowledgebase on the Library homepage: (https://lib.semmelweis.hu/knowledge_base).

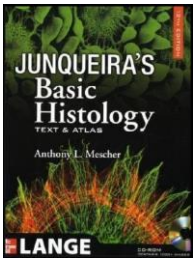












ANNOUNCEMENTS CONCERNING THE FINAL EXAMINATIONS IN MICROSCOPIC ANATOMY AND EMBRYOLOGY

Final examinations are generally held as it appears in Neptun

REGISTRATION ISSUES

Registration has to be done in neptun according to the Study and Examination Policy. Registration closes 24/23 hours before the actual exam time.

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 health problems, 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, leave your bags in a locker and gather in front of the Histology lab 10 minutes before starting time. Please make sure you have the following items on you:

ID card/student card (you may not start the examination **without** it**)**
SeKA login details *(*memorize or write them down on a small piece of paper*)* *
a pen or pencil to aid you with the explanation of the slides and the oral question
in case of a retake exam – proof of payment *(except for the 1st retake)*

*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

Phones and smart watches have to be stored elsewhere during examinations. Neither pens+papers may be with you during the written part. You cannot take notes or talk to your peers during the examination. Students found to use such items or breaking the aforementioned rules will be immediately suspended, the case recorded and the examination is terminated with a fail (1).

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 **(Students may not leave the room during the test)**

The test is composed of 40 simple / multiple choice questions
(Histology, Microscopy of CNS, Embryology:CNS, endocrine organs, organs of special senses)
Writing time: 40 minutes
Passing rate: 20 points = 50% (0-50%-fail, 50% - satisfactory, 65% - average, 75% - good, 85% - excellent)

- Following the completion of the test Students may 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.
- Students irrespective of reaching 50% percent in the written part can continue with the oral examination.

- Students failing the examination in the subsequent practical part may be exempted from the written test during the retake examination if they gained a ***good*** (4), or ***excellent*** (5), result from the written test.

ORAL / PRACTICAL PART

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

- 1 digitized tissue slide (description)
- 1 theoretical question from a topic of the material studied during the two semesters (see the Topic list).

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 the marks they earned during the examination.

- If one part of the practical part of the examination results in fail (1), the entire examination is terminated with a fail (1).
- In case the result of one of the parts is **1/2**, the overall result of the examination CANNOT be better than a pass (2). This mark can only be earned once during the examination.
- **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.

TOPICS OF THE FINAL EXAMINATION

(topics of the two semesters)

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
Histology and development of skin appendages, mammary gland

Maxillofacial Histology and Embryology

Enamel
Amelogenesis
Dentin
Dentinogenesis
Structure of the dental papilla
Cementum (two types)
Parodontium
Gingiva – subdivisions and histology

Tooth development
Tooth eruption
Development of the mandible and maxilla
Development of the face. Formation of the nasal cavity and paranasal sinuses
Microscopic Anatomy and development of the primary and secondary palates
Microscopic Anatomy and development of the tongue
Microscopic Anatomy and development of salivary glands
Derivatives of pharyngeal pouches and grooves
Derivatives of pharyngeal arches

Lymphatic organs
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 peropheral nervous system (neural crest, placodes)
Development of the organ of vision
Development of the organ of hearing&equilibrium

Histologyof the nervous system
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)
Pyramidal (tract) system

Extrapyramidal system
Limbic system (nuclei and tracts)
Reflex arc of mastication
Anatomical bases for trigeminal pain
Autonomic innervation of salivary glands
Neuroanatomy of energy metabolism, food intake, hedonism and addiction
Neuroanatomy of emotions, motivation, agression, empathy and behaviour. The reward system.
Neuroanatomy of stress, fear, anxiety and depression. Determination, alertedness together with personality, consiousness and well-being.

Endocrine organs
Microscopical anatomy of the pituitary gland; development of the posterior lobe
Microscopical anatomy and development of the anterior and intermediate lobes of the pituitary gland Blood supply of the pituitary gland
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)
Coats of the eyeball
Chambers of the eye, vitreous body
Lens, accomodation
Light reflex of the pupil
Visual pathway, visual reflexes, optic nerve (CN2)
Cornea reflex
(External ocular muscles, eye movements)
Accessory and protective apparatus of the eye (palpebrae, conjunctiva, fasciae, lacrimal apparatus)
External ear, tympanic membrane. Tympanic cavity, auditory tube. Hearing ossicles (joints, muscles)
Vestibulocochlear nerve. (CN8)
Organ of Corti. Cochlea, cochlear duct
Auditory pathway.
Vestibular system
Bony and membranous labirynth, vestibulum
Organ of olfaction, olfactory pathway, olfactory nerve (CN 1)
Organ of taste, taste buds, central processing of taste (tracts)