

# BASIC MODULE

## STUDY PROGRAMME

Second Year						
3 <sup>rd</sup> semester						
Subject code	Compulsory Subjects	Lectures	Practicals	Credit Points	Examination	Prerequisite
AOKANT003_3A	Anatomy, Cell, Histology and Embryology III.	3	4	7	semi-final	Anatomy, Cell, Histology and Embryology II., Medical Biochemistry, Molecular and Cell Biology I.
AOKELT226_1A	Medical Physiology I.	6	5	11	semi-final	Anatomy, Cell, Histology and Embryology II, Medical Biochemistry, Molecular and Cell Biology I., Medical Biophysics II.
AOKOBI290_2A	Medical Biochemistry II.	3	2,5	5	semi-final	Medical Biochemistry I.
	Molecular Cell Biology II.	3	0	3	final	Molecular Cell Biology I., Medical Biochemistry I.
AOKLEK228_3A	Hungarian Medical Terminology III.	–	4	2	pract. mark	Hungarian Medical Terminology II.
AOKTSI009_3A	Physical Education III.	–	1	–	signature	–
AOKMAG398_2A	Medical Communication	1	1	2	semi-final	–

<b>Total Number of Credit Points from Compulsory Subjects</b>				<b>30</b>		
<b>Obligatory elective subjects</b>						
AOVCSA249_1A	Introduction to Clinical Medicine	–	2	2	pract. mark	Behavioral Sciences I. (Medical Communication)*
<b>4 credit points from obligatory elective/elective subjects</b> must be collected in each semester. See the detailed list of obligatory electives and electives after the 3 <sup>rd</sup> year curriculum						
<b>Total Number of Credit Points from Obligatory elective / Elective Subjects</b>				<b>4</b>		

\* The prerequisite is that registration has been done for the marked subject – corequisite - as well

<b>Second Year</b>						
<b>4<sup>th</sup> semester</b>						
<b>Subject code</b>	<b>Compulsory Subjects</b>	<b>Lectures</b>	<b>Practicals</b>	<b>Credit Points</b>	<b>Examination</b>	<b>Prerequisite</b>
AOKANT003_4A	Anatomy, Cell, Histology and Embryology IV.	1	2	3	final#	Anatomy, Cell, Histology and Embryology III.
AOKELT226_2A	Medical Physiology II.	6	4,5	10	final#	Medical Physiology I.
AOKOBI290_3A	Medical Biochemistry III.	3	2,5	5	final#	Medical Biochemistry II.
AOKLEK228_4A	Hungarian Medical Terminology IV.	–	4	2	pract. mark	Hungarian Medical Terminology III.
AOKTSI009_4A	Physical Education IV.	–	1	0	signature	–

AOKNSG331_1A	Compulsory Nursing Practice (in summer, either after the 1st year or the 2nd year)	–	170 hours workload	–	signature	–
<b>Total Number of Credit Points from Compulsory Subjects</b>				<b>20</b>		
<b>4 credit points from obligatory elective/elective subjects</b> must be collected in each semester. See the detailed list of obligatory electives and electives after the 3 <sup>rd</sup> year curriculum						

#The grade influences the qualification of the Diploma

#### **LIST OF TEXTBOOKS** (The list may change!)

- 1 Harper's Illustrated Biochemistry, 30th edition, Lange, ISBN-10: 0071825347
- 2 Berne-Levy-Koeppen-Stanton: Physiology, 6th updated edition, Mosby. ISBN-10: 032307362X
- 3 Cockerham, William C.: Medical Sociology. Prentice Hall, Upper Saddle River, 2006.
- 4 Marthy A. & Végh Á. Egészségére! Magyar orvosi szaknyelv. Semmelweis Egyetem Egészségtudományi Kar, 2010.

#### **Recommended textbooks:**

- 1 Murray, Robert K-Granner, Daryl K-Mayes, Peter A-Rodwell, Victor W: Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. ISBN 0-07-138901-6 (online version: [www.lib.sote.hu](http://www.lib.sote.hu))
- 2 Biochemistry Laboratory Manual. Ed.Gy.Szabados. Bp. Semmelweis Univ.

# ANATOMY, HISTOLOGY AND EMBRYOLOGY I – II.

Department of Anatomy, Histology & Embryology

Course Director: *Dr. Andrea D. Székely*  
*Dr. Sándor Katz*

## LEARNING OBJECTIVES

**Aims of the lectures in anatomy:** Presentation of the important and/or complicated chapters such as introductory chapters, thorax, pelvis, hand, foot, skull, heart, chapters of the visceral organs, central nervous system, **organs of special senses, topographical anatomy.**

**Aims of the lectures in cell biology and histology:** Presentation of the cell, basic principles in cell biology (mitosis, cytoskeleton, cellular motility), detailed presentation of the basic tissues (epithelial, connective, muscle and nervous). Complementing gross anatomy with a detailed presentation of the fine structure of organs, including the ultrastructural details together with the molecular background.

Important chapters: basic tissues, viscera, central nervous system.

**Aims of the lectures in embryology:** Presentation of the early development from the differentiation of the germ cells to the formation of the human embryo (general embryology). Presentation of the development of the organs and functional systems parallel with the gross anatomical and histological lectures including the frequently occurring malformations.

**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. Discussion of the more complicated chapters of embryology is presented on small group discussions connected to the practical sessions in the dissecting room.

**Aims of the practical sessions in the histology room:** Facilitate the understanding of ground (epithelial, connective, muscle and nervous) tissues and the fine structure of the organs through the observation and interpretation of histological specimens.

*The knowledge of the students will be checked by mid-term tests.*

## TOPICS OF THE LECTURES:

Lectures: first semester: 3×45 min; second semester: 3×45 min; third semester: 3×45 min; fourth semester: 1×45 min.

**First semester:** Gross anatomy of musculoskeletal system (i.e. bones, joints and muscles), basic cytology, general histology, general embryology, development of the skull, spine and limbs.

**Second semester:** Heart and vessels, lymphatic organs, viscera and body cavities; integrated gross anatomy, cytology, histology and embryology.  
**Third semester:** Central and peripheral nervous system, organs of special senses, endocrine organs; integrated gross anatomy, cytology, histology and embryology.  
**Fourth semester:** Topographical anatomy of the head, neck, limbs and trunk including body cavities (thorax, abdomen, pelvis), ventral and dorsal regions, cross sectional anatomy.

### **PRACTICAL COURSE**

6×45 min; second semester: 6×45 min; third semester: 4×45 min; fourth semester: 2×45 min;

**First semester:** Gross anatomy of the musculoskeletal system (i.e. bones, joints, muscles, vessels and nerves), basic cytology, general histology, general embryology, development of the skull, spine and limbs.

**Second semester:** Heart and vessels, lymphatic organs, viscera, topography of body cavities; integrated gross anatomy, cytology, histology and embryology.

**Third semester:** Central and peripheral nervous system, organs of special senses, endocrine organs; integrated gross anatomy, cytology, histology and embryology. Topographical anatomy of the dorsal regions of limbs and the trunk, including spinal cord. Topographical anatomy of the viscerocranium, neurocranium and the internal organs of the neck.

**Fourth semester:** Topographical anatomy of the ventral and dorsal regions of the body, including the limbs and body cavities (thorax, abdomen, pelvis), cross sectional anatomy.

**Type of exams: oral and written.**

First semester: semifinal; second semester: semifinal; third semester: semifinal; fourth semester: final exam from the subjects of the four semesters.

**ECTS credits:** four semesters together: 27 (first semester: 8; second semester: 9; third semester: 7; fourth semester: 3)

### **Anatomy books**

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#### **LIST OF TEXTBOOKS (The list may change!)**

- 1 **Sobotta Atlas of Human Anatomy** (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
- 2 **Gray's Anatomy for students** with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchell Elsevier; 2014; ISBN 9780702051319
- 3 **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
- 4 **Netter: Atlas of Human Anatomy**, Including Student Consult Interactive Ancillaries and Guides, 6th Edition, 2014.
- 5 **Human Anatomy, Color Atlas and Textbook**, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
- 6 **Loukas, Benninger & Tubbs: Gray's Clinical Photographic Dissector of the Human Body**, with STUDENT CONSULT Online Access, Saunders,

2012.

- 7 **Stevens & Lowe's Human Histology** , Elsevier, 4th ed ISBN 978-0-723435020, 2015.
- 8 **Langmann's Medical Embryology**, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014
- 9 **Fitzgerald's Clinical Neuroanatomy and Neuroscience**, 7th Edition, Elsevier, 2015.
- 10 **Histology: A Text and Atlas: With Correlated Cell and Molecular Biology**; 7th Edition by MH Ross and W Pawlina ; Wolters Kluwer 2015, ISBN 9781451187427

### Recommended textbooks:

- 1 **Gray's Anatomy. The Anatomical Basis of Clinical Practice**; 41st edition by S.Standing: 2015 ISBN : 9780702052309
- 2 **Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints)** URBFI, 2013.
- 3 **KL Moore–AF Dalley:Clinically Oriented Anatomy**. 4th ed. Lippincott William and Wilkins, 1999.
- 4 **RMH McMinn: Last's Anatomy, Regional and Applied**. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
- 5 **A.L. Kierszenbaum Histology and Cell Biology: An Introduction to Pathology** 3rd Edition, Paperback with STUDENT CONSULT Online Access and E-Book ISBN: 9780323085885:, 2012
- 6 **Wheater's Functional Histology, A Text and Colour Atlas, 6th Edition** by B Young, G O'Dowd and P Wood ford Churchill Livingstone, Edinburgh, 2013, ISBN 9780702047473
- 7 Junqueira's Basic Histology: Text and Atlas; 13th Edition by Anthony Mescher, New York, McGraw-Hill Medical, 01/03/2013 ISBN13 978007178033
- 8 **The Developing Human – Clinically Oriented Embryology**, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384
- 9 **Regional Anatomy**, by T Tömböl, Medicina 2008, ISBN 963 242 186 8
- 10 **Anatomy of the Living Human**. by A Csillag, Könemann, 1999.
- 11 **Imaging Atlas of Human Anatomy**, 4th Edition by Jamie Weir, Peter Abrahams, Jonathan D. Spratt, and Lonie Salkowski ISBN: 9780723434573 Copy-right: 2011
- 12 **Sectional Anatomy – Workbook**, by A. Nemeskéri; István Apáthy's Foundation, 2001.
- 13 **Histology Manual** 1-3. by A. Nemeskéri and K. Kocsis: István Apáthy's Foundation, 2001.
- 14 Alberts, Bray, Hopkin, Johnson, Lewis, Raff , Roberts, Walter: **Essential Cell Biology**, third edition Garland Science, New York and London 2010.
- 15 **Neuroanatomy An Illustrated Colour Text**, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864

## 2nd year 1st semester

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### English Program

**Anatomy:** Morphology, topography and clinically oriented anatomy of the central and peripheral nervous systems (CNS, PNS), organs of special senses, endocrine organs; integrated gross anatomy, cytology, histology and embryology

**Histology:** Microscopical structure of the CNS and PNS (cerebrum, cerebellum, brain stem, spinal cord, ganglia) organs of special senses (apple of eye, inner ear), endocrine glands (pineal, pituitary, thyroid, suprarenal glands) skin and appendages, mammary gland.

**Embryology:** Development of the central and peripheral nervous system, development of the organs of senses, together with their malformations

**Credits:** 7

**Lectures:** 3 hours/week

**Dissection class:** 4 hours /week

**Histology laboratory:** 12 hrs/semester

Week	Lectures	Dissection room	Histology lab
Week 1	<ol style="list-style-type: none"> <li>1. Introduction to the study of the nervous system Meninges, hemispheres, the lateral ventricles</li> <li>2. Differentiation of the neural tube, development of the spinal cord. Neural crest. Craniocaudal and dorsoventral differentiation, malformations</li> <li>3. Differentiation of the brain vesicles. Gross anatomy of the diencephalon, the III. ventricle.</li> </ol>	Divisions of the brain, meninges, arteries and veins of the brain, surface structures of the hemispheres, basis cerebri. Specimen demonstration: dura mater, sinuses	-
Week 2	<ol style="list-style-type: none"> <li>4. Macroscopy and development of the brain stem and cerebellum, IV. ventricle</li> <li>5. Development and derivatives of the placode ectoderm and the neural crest</li> <li>6. Blood supply to the brain, CSF circulation</li> </ol>	Lateral ventricles, third ventricle Brain stem, fourth ventricle, cerebellum	-
Week 3	<ol style="list-style-type: none"> <li>7. Gross anatomy and blood supply of the spinal cord, spinal segment. Dermatomes.</li> <li>8. Microscopical structure of the spinal cord, Rexed zones. Spinal reflexes, receptors and effectors, proprioceptive reflex arc.</li> <li>9. Nociceptive (withdrawal) and autonomic reflex arcs. Spinal pathways, injuries, symptoms</li> </ol>	Cross sections of the brain. Specimen demonstration: spinal cord together with the membranes	-
Week 4	<ol style="list-style-type: none"> <li>10. Cells of the CNS: neurons, glia cells. Axon, dendrite, synapses, synaptic transmission,</li> <li>11. Microscopy of the cerebral cortex. Cortical fields, Brodmann areas</li> <li>12. Sensory systems</li> </ol>	<ol style="list-style-type: none"> <li>1. Revision</li> <li>2. <b>Midterm test 1:</b> Anatomy and development of the brain and the spinal cord</li> </ol>	-

<b>Week</b>	<b>Lectures</b>	<b>Dissection room</b>	<b>Histology lab</b>
Week 5	13. Motor systems and tracts, pyramidal tract 14. Structure and connections of the basal ganglia. Motor pathways arising from the brain stem 15. Microscopy of the cerebellum, pathways. Functional considerations	Dissection of the back muscles, suboccipital trigone.	Nervous system I. Peripheral nerve, motor end plate, spinal cord, brain-stem
Week 6	16. Diencephalon, thalamic nuclei 17. Introduction to cranial nerves. Classification of sensory, motor and autonomic nuclei 18. Reticular formation, monoaminergic systems	'In situ' dissection of the spinal cord. Demonstration of the spinal ganglia, spinal nerves, membranes.	Nervous system II. Cerebellar and cerebral cortices Pineal body
Week 7	19. Microscopy of the brainstem 20. Trigeminal nerve, trigeminal neuralgia 21. Cranial nerves 3, 4, 6, 7. Central and peripheral paresis	'In situ' brain dissection, Demonstration of the membranes, ventricles, thalamus, brain stem, cranial nerve exits.	–
Week 8	22. Glossopharyngeal, vagus, accessory and hypoglossal nerves 23. Sympathetic nervous systems 24. Parasympathetic nervous systems. Autonomic innervation and reflexes of pelvic organs	Cranial nerves 5, 7 and 9. Dissection of the superficial and deep regions of the head (frontal, infraorbital, buccal, infratemporal, parotidomasseteric regions and the parapharyngeal space)	–
Week 9	25. Fibrous and vascular coats of the eyeball. Lens, chambers of the eye, vitreous body, accommodation 26. Inner coat of the eyeball, retina. Morphological basis for colour vision. 27. Optic nerve, visual pathway, visual cortex, disorders. Visual reflexes	Cranial nerves 10, 11 and 12 Dissection of the submandibular, carotid, median cervical regions	–



Week	Lectures	Dissection room	Histology lab
Week 10	28. Extraocular muscles and eye movements, conjugated eye movements, strabism. 3D vision 29. Protective and lacrimal apparatus of the eye. Development of the eye. Malformations. 30. Skin and appendages. Mammary gland	1. <b>Midterm test 2.</b> (written) Microscopy of CNS, cranial nerves 2. Dissection of the eye (coats and muscles, chambers, optic nerve)	–
Week 11	31. The organ of hearing in general. External ear, auditory tube, tympanic cavity, tympanic membrane, auditory ossicles 32. Bony and membranous labyrinth. Vestibular system 33. Spiral organ of Corti. Auditory pathway, auditory cortex	Dissection of orbit, extraocular muscles	Organs of special senses I. Eyeball, retina, lacrimal gland
Week 12	34. Development of the auditory and vestibular system. Clinical relevances 35. Olfactory and gustatory systems 36. Limbic system	Dissection and demonstration Tympanic cavity, inner ear, temporal bone	Organs of special senses II. Organ of Corti, palm skin, scalp skin, mammary gland
Week 13	37. The hypothalamo-hypophysial system. The pituitary gland 38. Endocrine organs: pineal body, thyroid, parathyroid, adrenal glands 39. Patient demonstration	Midterm test 3: Organs of special senses, head and neck regions	Endocrine organs Pituitary, thyroid, parathyroid, suprarenal glands, Endocrine cells in the testicle, ovary, corpus luteum and pancreas
Week 14	40. Drugs of abuse, opiates, endogenous cannabinoids and receptor mediated actions in the CNS 41. Research in the field of neuroscience 42. Research in the field of neuroscience	Revisions Brain in situ, cranial nerves	Revision

## **TOPICS OF THE SEMIFINAL EXAMINATION**

### ***Endocrine organs***

Gross and microscopical anatomy of the pituitary gland; development of the posterior lobe  
Blood supply, histology and development of the anterior and intermediate lobes of the pituitary gland  
Gross and microscopical anatomy of the pineal gland  
Gross and microscopical anatomy and the development of the thyroid gland  
Gross and microscopical anatomy and the development of the parathyroid gland  
Gross and microscopical anatomy and the development of the suprarenal gland  
Histology of the Langerhans islets  
Endocrine cells and function of the male and female gonads  
Microscopical structure of the eyeball  
Histology of the lacrimal gland  
Microscopical structure of the cochlea  
Microscopical structure of the skin (scalp and palm)  
Histology of the mammary gland (lactating and non-lactating)

### ***Microscopical structure and development of the central nervous system***

Development and primary differentiation of the neural tube  
Development of the spinal cord; neurohistogenesis  
Differentiation of the prosencephalon vesicle; development of the hemispheres and the lateral ventricle  
Differentiation of the diencephalon vesicle, development of the third ventricle  
Differentiation of the mesencephalon and rhombencephalon vesicles, development of the fourth ventricle  
Roots, branches and components of the spinal nerves; spinal segment  
Fine structure (microscopy) of the spinal cord  
Neurons and function of the spinal proprioceptive (stretch) reflex  
Neurons and function of the spinal flexion (withdrawal) reflex  
Neurons and functions of the visceral reflexes  
Microscopical anatomy of the medulla  
Microscopical anatomy of the pons  
Microscopical anatomy of the midbrain  
Nuclei of the cranial nerves

Microscopical anatomy of the cerebellum  
Afferent and efferent cerebellar connections  
Microscopical anatomy of thalamus, divisions, connections and transmitters  
Hypothalamus, hypothalamo-hypophyseal systems  
Microscopical anatomy of the basal ganglia, divisions, connections and transmitters  
Histology of the cerebral cortex; cortical fields  
Internal capsule, divisions  
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)

***Gross anatomy and development of the peripheral nervous system***

Development, fate and differentiation of the cells in the neural crest  
Development of the peripheral nervous system  
Nuclei and branches of the IIIrd, IVth and VIth cranial nerves  
Nuclei of the trigeminal nerve; course and fiber composition of the branches of the ophthalmic (V/1) nerve  
Course and fiber composition of the branches of the maxillary nerve (V/2)  
Course and fiber composition of the branches of the mandibular nerve (V/3)  
Nuclei, course and fiber composition of the branches of the facial nerve (VII)  
Nuclei, course and fiber composition of the branches of the glossopharyngeal nerve (IX)  
Nuclei, course and fiber composition of the branches of the vagus nerve (X)  
Nuclei, course and fiber composition of the branches of the accessory (XI) and hypoglossal nerves (XII)  
Cervical plexus and its branches  
Brachial plexus and its short branches to the neck and shoulder girdle  
Lumbar plexus and its branches  
Sacral plexus and its branches  
General organization of the autonomic nervous system  
The sympathetic trunk  
Cranial part of the parasympathetic nervous system

***Gross anatomy, histology and embryology of the organs of special senses***

Gross anatomy and microscopic structure of the fibrous coat of the eye ball (cornea, sclera)  
Gross anatomy and microscopic structure of the vascular coat of the eye ball (choroid, ciliary body, iris)  
Gross anatomy, microscopic structure and development of the nervous coat of the eye ball (retina)  
Neurons of the visual pathways; localization and microscopic structure of the visual cortex  
Gross anatomy, microscopic structure and development of the lens, accommodation  
Gross anatomy and content of the chambers of the eye, circulation of the aqueous humor; gross anatomy of the vitreous body  
Gross anatomy and function of the external ocular muscles.  
Visual reflexes  
Gross anatomy, microscopic structure of the eye lids; conjunctiva, Tenon's capsule and periorbit  
Gross anatomy, microscopic structure and development of the lacrimal apparatus  
Gross anatomy and development of the external ear and the tympanic membrane  
Gross anatomy and development of the tympanic cavity and the auditory tube  
Gross anatomy and development of the auditory ossicles; joints, muscles, and the mucous membrane of the tympanic cavity  
Sensory innervation and blood supply of the tympanic cavity  
Gross anatomy of the bony labyrinth  
Gross anatomy and development of the labyrinth  
Morphology, development and divisions of the vestibular apparatus  
Receptors and neuronal connections of the vestibular system  
Gross anatomy, microscopic structure and development of the cochlear duct and the organ of Corti  
Neurons of the auditory pathways  
Internal acoustic meatus  
Organ and pathways of olfaction  
Organ and pathways of taste

## 2nd year 2nd semester

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### English Program

**Anatomy, Histology and Embryology:** Topographical anatomy of the head, neck, limbs and trunk including body cavities (thorax, abdomen, pelvis), ventral and dorsal regions, cross sectional anatomy. Integrated approach including developmental and histological relevances.

**Credits: 3**

**Lectures: 1** hours/week

**Dissection class: 2** hours /week

<b>Week</b>	<b>Lectures</b>	<b>Dissection room</b>
Week 1	Topographical anatomy of the lower limb, gait mechanism	Ventral regions of the limbs ( <i>prosections</i> ) Lower limb (bones, joints, muscles, vessels, nerves)
Week 2	Topographical anatomy of the upper limb, axillary fossa	Ventral regions of the limbs ( <i>prosections</i> ) Upper limb (bones, joints, muscles, vessels, nerves)
Week 3	Topographical and surface anatomy of the thorax, clinical relevance. Regional lymph nodes, with special reference to the mamma.	Ventral regions of the thorax, mammary region ( <i>prosections</i> ) Topography and sectional anatomy. Mediastinum. Heart, valves, pericardium, lung, pleura.
Week 4	Topographical and sectional anatomy of the thorax. Topography of pleura and pericardiac punctures.	Muscles and skeletal elements of the thorax. Diaphragm ( <i>prosections</i> ). Abdominal surface projections. Topography of intraperitoneal organs.
Week 5	Topographical and surface anatomy of the abdomen. Projection of internal organs, peritoneal relations	Abdominal wall, rectus sheath, hernia canals ( <i>prosections</i> ). Retroperitoneum. Urinary system. Cross sections of the abdominal cavity.
Week 6	Topography and sectional anatomy of the abdomen and the retroperitoneum. Arterious and venous anastomotic systems	Topography of the lesser pelvis. Syntopy and blood supply of the rectum. Portocaval anastomoses. Ventral regions of limbs ( <i>prosections</i> )
Week 7	Topographical and sectional anatomy of the male pelvis and perineum.	<b>Midterm test 1. Ventral regional anatomy of the trunk and the limbs.</b> Body cavities, internal organs (except for the head&neck and the superficial perineal structures).
Week 8	Topographical and sectional anatomy of the female pelvis and perineum.	Dorsal regions of limbs and the trunk ( <i>prosections</i> ) Nape and nuchal region, spinal cord 'in situ', gluteal region.

Week	Lectures	Dissection room
Week 9	Topographical and sectional anatomy of the head. Spaces and content of the neurocranium.	Dorsal regions of limbs and the trunk ( <i>prosections</i> ) Topographical and sectional anatomy of the male pelvis and perineum.
Week 10	Topographical anatomy of the viscerocranium. External carotid artery, trigeminal nerve.	Dorsal regions of limbs and the trunk ( <i>prosections</i> ) Topographical and sectional anatomy of the female pelvis and perineum.
Week 11	Topography of cervical fasciae and spaces, sectional anatomy of the neck. Clinical relevances.	<b>Midterm test 2. Dorsal regions</b> Topography of the nuchal regions, trunk, limbs and perineum.
Week 12	Histological revision of ground tissues. Histology of vessels and lymphatic organs including cell biological relevances.	Topographical anatomy of the brain and spinal cord. Cranial nerves. Dural topography. Skull base, orbit, organs of special senses.
Week 13	Histology of the respiratory system and the gastrointestinal tract including cell biological relevances.	Topographical anatomy of the nasal cavity&paranasal sinuses, , oral cavity, muscles of facial expression and mastication, TMJ. Oral diaphragm, para- and retropharyngeal spaces. Muscles, fasciae, viscera and cross section of the head&neck region.
Week 14	Histology of the urinary and genital systems including cell biological relevances.	Prosected specimen demonstration of the final examination. Cross sections, placenta, fetus.

## TOPICS OF THE FINAL EXAMINATION

See above at the semifinal examinations.

### ***Furthermore***

#### ***Regional anatomy***

Topographical anatomy of the lower limb, gait mechanism

Topographical anatomy of the upper limb, axillary fossa

Topographical and surface anatomy of the thorax, clinical relevance. Regional lymph nodes, with special reference to the mamma.

Topographical and sectional anatomy of the thorax. Topography of pleura and pericardiac punctures.

Topographical and surface anatomy of the abdomen. Projection of internal organs, peritoneal relations

Topography and sectional anatomy of the abdomen and the retroperitoneum. Arterious and venous anastomotic systems

Topographical and sectional anatomy of the male pelvis and perineum.

Topographical and sectional anatomy of the female pelvis and perineum.

Topographical and sectional anatomy of the head. Spaces and content of the neurocranium.

Topographical anatomy of the viscerocranium. External carotid artery, trigeminal nerve.

Topography of cervical fasciae and spaces, sectional anatomy of the neck.

Clinical relevances.

Topographical anatomy of the nape and nuchal region.

## **MEDICAL PHYSIOLOGY**

### **Department of Physiology**

Subject code: AOKELT446\_1A, AOKELT446\_2A

Credit Points: 10 (I. semester) + 9 (II. semester)

Head of the Department: Dr. László Hunyady, Full Professor

Course Director: Dr. Péter Várnai, Full Professor

Tutor: Dr. András Balla

**Year: 2017/2018**

#### **Aim of Medical Physiology course:**

The goal of Medical Physiology course is to give the students the understanding of the concepts and principles of medical physiology. The lectures

provide the information base while the seminars and practices provide the student with an opportunity to assimilate and integrate the material. Appropriate clinical perspectives are presented throughout the course.

### **Schedule of the subject:**

#### **First semester**

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1. **Introduction, body fluids. Functions of cellular membranes, transport across membranes. Transepithelial transports.**
2. **Signal transduction: receptors, G proteins, second messengers. Cellular calcium metabolism, receptors of growth factors and cytokines. Membrane trafficking and vesicular transport.**
3. **Ion channels and resting membrane potential. Action potential. Physiology of nerve cells, synaptic transmission in the central nervous system.**
4. **Autonomic neurotransmitters and physiology of smooth muscle. Neuromuscular junction and physiology of skeletal muscle. Physiology of the heart I.: origin and spread of cardiac excitation.**
5. **Cardiac cycle. Regulation of cardiac output. Electrocardiography (ECG).**
6. **Physiology of blood circulation: introduction. Hemodynamics, systemic circulation. Microcirculation.**
7. **Venous circulation and lymph flow. Local control of circulation. Reflex control of circulation.**
8. **Circulation of blood in the brain and coronary circulation. Splanchnic circulation, circulation of skin and skeletal muscle.**
9. **Respiration: pulmonary ventilation. Gas exchange in the lungs. Pulmonary circulation, ventilation-perfusion relationship.**
10. **Gas transport, hypoxias. Regulation of respiration. Adaptation of cardiovascular and respiratory system.**
11. **Renal function: renal circulation, glomerular filtration. Tubular functions. Concentration, dilution.**
12. **Regulation of body fluids and osmotic concentration. Introduction to acid-base balance. Acid-base balance: role of lungs and kidneys.**
13. **General principles of regulation in the gastrointestinal tract. Motor functions of the gastrointestinal tract.**
14. **Secretory functions of the gastrointestinal tract. Digestion and absorption of food. Energy balance, quality and quantity requirement of food.**

#### **Second semester**

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1. **Haematopoiesis. Haemostasis, overview of immune system. Principles of the innate immunity.**
2. **Humoral immunity. Cellular immunity. Regulation of immune response, blood groups**
3. **Endocrine regulations. The hypothalamo-adenohypophyseal system; growth hormone, somatomedins.**
4. **Function of the adrenal cortex. Function of the thyroid gland.**



5. **Hormonal regulation of intermedier metabolism.**
6. **Calcium metabolism, bone tissue, growth. Function of the reproductive system: endocrinology of the sexual differentiation and development.**
7. **Function of the reproductive system: male sexual function; female sexual function; endocrinology of pregnancy, parturition, and lactation.**
8. **Introduction to neurophysiology. Physiology of nerve & glia cells.**
9. **Sensory functions.**
10. **Physiology of hearing and equilibrium.**
11. **Physiology of vision.**
12. **Motor functions.**
13. **Integration of autonomic responses.**
14. **Electroencephalogram (EEG); sleep phenomena. Learning and memory. Regulation of behavioral mechanisms, motivation; emotion.**

**Practices, I. semester:**

- Blood cell counting, determination of hemoglobin concentration and hematocrit, measurement of erythrocyte sedimentation rate
- Leukocyte differential count on peripheral blood smear
- Typing of Blood Groups, Blood Coagulation Test
- Measurement of transport rate on red blood cells. Hemolysis
- Measurement of cardiac output in rat
- Investigation of cardiac functions in situ
- Blood pressure measurement in humans
- Echocardiography
- Computer simulation: Neuromuscular junction
- Recording and analyzing the human ECG
- Computer simulation: Skeletal and smooth muscle
- Effects of vagal nerve stimulation on cardiac functions
- Respiratory physiology calculations
- Evaluation of acid-base parameters with the Siggaard-Andersen nomogram

**Practices, II. semester:**

- Studies on circulatory reactions of a virtual rat
- Circulatory and respiratory reflexes in rabbit (Demonstration, Practice)
- Smooth muscle of rabbit small intestine
- Human pulmonary function tests - Spirometry
- Pulse wave in human
- Electromyography (EMG), nerve conduction velocity
- Human acid-base examinations (Astrup)
- Oral glucose tolerance test (OGTT)
- Human pulmonary function tests - Body plethysmography
- EEG-demonstration
- Electrooculography (EOG) and investigation of the vestibular system
- Spiroergometry
- Human visual physiology
- Investigation of reflexes
- Practice for lab exam. Lab exam

**Attendance at classes:** The lecture hours per week are 6; the practice hours per week are 5 in the first semester and 4.5 in the second semester. The attendance of a minimum of 75% of practices (including seminars) is necessary for the end-term signature.

**Absences:**

No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited. Missed sessions must be reported to the teacher the week after. There are no extra practices. Absence from the exam must be certified at the Head of the Department or Course Director within 3 working days.

**Grading Performance in Seminars and Practices:**

The knowledge of the students is tested in a written form on a weekly base. The written short tests cover the material of lectures of the previous week. The following rules will be enforced during the short tests: electronic devices must be kept in the baggage; any form of communication is disallowed; students not complying with these rules will be disqualified immediately. Evaluating the work of the student is based on his/her classroom tests and performance practice in the regular period of the semester. Missed tests cannot be repeated. The evaluation of the weekly written test will be expressed as a percentage. The average of the best written tests (the tests in the semester minus the three worsts) and the practical grade (also is expressed as a percentage) result a five-point scale:

0-54 % = 1,

55-64 % = 2;  
65-74 % = 3,  
75-84 % = 4,  
85-100 % = 5.

This grade is taken into account in the exams.

### **Obtaining signatures:**

The attendance of a minimum of 75% of practices (including seminars) is necessary for the end-term signature. Students must write a lab report for each practice using an A4 size exercise booklet. The booklet should be signed by the teacher not later than one week after the practice. Participation in the practices is compulsory. No more than three absences from practices are allowed for any reason; otherwise the semester will not be credited.

### **Semi-final and final exams:**

In the examination period the students have to give semi-final exam in the first semester and final exam in the second semester. Participation in the final exam requires the completed “Anatomy, Cell, Histology and Embryology III” course with a successful exam.

Type and grading of exams:

The semi-final exam is oral exam. The oral exam consists of two theoretical questions (I-II). The overall result of the oral exam is based on the two theoretical grades and the lab work grade but a failed (1) theoretical question results in an overall failed (1) final exam.

The final exam consists of practical, written and oral part. The practical part (lab exam) takes place in the last week of the second semester. Passing the lab exam is not a prerequisite to participate on the final exam, but failed lab exam is taken into account in grading the final exam as fail (1) partial grade. The written and oral part of the final exam is held on the same day. The oral part consists of two theoretical questions (I-II). Failed (1) theoretical question results in an overall failed (1) final exam. The mathematical average of four or five partial grades (lab grade, written exam grade, two oral exam grades, and lab exam grade) gives the grade of the final exam.

Lists of the theoretical questions are listed in the webpage in the Department of Physiology. The following rules will be enforced during the exams: electronic devices must be kept in the baggage; baggage and overcoats should be placed next to the wall of the lecture halls; any form of communication is disallowed; students not complying with these rules will be disqualified immediately.

### **Requirements of the exams:**

Semi-final exam: material of the Medical Physiology I.

Final exam: material of the Medical Physiology I. and Medical Physiology II. (Participation in the final exam requires the completed “Anatomy, Cell, Histology and Embryology III” course with a successful exam.)

### **Registration for the exam:**

Registration for the exam must be recorded through the NEPTUN system.

Modification of the registration for the exam:

Modification in the registration must be recorded through the NEPTUN system not later than 48 hours before the start of the exam.

**Absences from the exams:**

Absence from the exam must be certified at the Head of the Department or Course Director within 3 working days. Failing to certify absence or denying it cause registering “absence” = “nem jelent meg” in the lecture book and/or in the NEPTUN system.

**List of textbooks:**

**Textbook:** Koeppen-Bruce M- Stanton- Bruce A: Berne & Levy Physiology (7th edition).

**Practice book:** Practices in Medical Physiology (Edited by: Péter Enyedi and Levente Kiss, 2017)

## MEDICAL BIOCHEMISTRY II

Teaching Secretary: *Dr. István Léránt*

### Fall Semester

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Lecture topics	
Week 1	Transformation of energy, group transfers in metabolism. Biological oxidation. Role of mitochondria.

Week 2	Glycolysis. Formation of acetyl-CoA – pyruvate-dehydrogenase. The citrate cycle.
Week 3	Terminal oxidation, oxidative phosphorylation. Gluconeogenesis. Glycogen metabolism.
Week 4	Regulation of glycolysis and gluconeogenesis. Regulation of glycogen metabolism.
Week 5	Regulation of blood glucose level. Diabetes mellitus.
Week 6	Degradation and synthesis of various carbohydrates. Metabolism of lipids – overview. Absorption of lipids.
Week 7	Oxidation of fatty acids, ketone bodies. Synthesis of fatty acids.
Week 8	Lipoprotein metabolism. Cholesterol homeostasis: sources of cholesterol in the cell, absorption of dietary cholesterol and inter-organ transport of cholesterol. Disposal of cholesterol and the role of bile acids.
Week 9	Regulatory mechanisms in cholesterol homeostasis, metabolic receptors and their function in the liver, intestine and blood vessel wall. Biochemistry of atherosclerosis.
Week 10	Metabolism of amino acids: the fate of the amino group. Metabolism of amino acid: the fate of the carbon skeleton.
Week 11	Biosynthesis of nonessential amino acids and other amino acid derivatives. Synthesis and catabolism of purine nucleotides.
Week 12	Pyrimidine nucleotide metabolism. Synthesis of deoxyribonucleotides. Metabolism of porphyrins and bile pigments
Week 13	Metabolism of red blood cells. Red blood cell enzymopathies. Metabolism of skeletal and cardiac muscle, the role of SREBP, PPAR alpha and beta

Week 14	Intermediary metabolism of kidney, metabolism in kidney cortex and medulla. Regulation of the well-fed state and starvation.
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## Laboratory program and seminars – Fall Semester

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<b>Laboratory lessons and Seminars</b>	
Week 1	Safety rules for work in the laboratory & Amidolytic activity of trypsin (laboratory lesson)
Week 2	Competitive inhibition of succinate dehydrogenase (laboratory lesson)
Week 3	Enzyme kinetics – computer simulation (laboratory lesson)
Week 4	Gene therapy (seminar)
Week 5	Oxidative phosphorylation in mitochondria (laboratory lesson)
Week 6	Lactic acidosis (seminar)
Week 7	Allosteric regulation of pyruvate kinase (laboratory lesson)
Week 8	Fructose intolerance & McArdle's disease (seminar)
Week 9	Digestion of lipids, role of bile acids (laboratory lesson)
Week 10	Signal transduction of insulin (consultation)
Week 11	Determination of serum cholesterol and triglyceride (laboratory lesson)
Week 12	Lipoprotein lipase, & carnitine deficiency (consultation)
Week 13	Purification of trypsin by affinity chromatography & Substrate specificity of trypsin and chymotrypsin. (laboratory lesson)

Week 14	Hereditary hyperammonemias & Vitamin B12 deficiency, methylmalonic acidemia (consultation)
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Lab coordinator      Dr Katalin Bartha  
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Lab staff      Mrs Éva Vallinger  
Mrs Ildikó Mártonffy

Laboratory programs are on the 1<sup>st</sup> floor, Department of Medical Biochemistry, 'C' passage.  
Office of student affairs - 1.508 room, 1<sup>st</sup> floor, 'C' passage

## MEDICAL BIOCHEMISTRY III

Teaching Secretary: *Dr. István Léránt*

### Spring Semester

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Lecture topics	
Week 1	<i>Na<sup>+</sup> / K<sup>+</sup> ATP-ase</i> . The permeability of cell membranes, P-type ATP-ase. Structure of <i>Na<sup>+</sup> / K<sup>+</sup> ATP-ase</i> . <i>Na<sup>+</sup> / K<sup>+</sup>-ATP-ase</i> isoforms. Regulation. Secondary active transports. Na-H exchange
Week 2	Chemical neurotransmission. Cholinergic neurotransmission. Biosynthesis of acetylcholine, receptors, acetylcholine esterase. Molecular mechanism of exocytosis

Lecture topics	
Week 3	Noradrenergic neurotransmission. Biosynthesis and metabolism of norepinephrine. Synaptic uptake. Molecular mechanisms of adrenergic, dopaminergic and serotonergic neurotransmission
Week 4	GABAergic neurotransmission. NO: Regulatory role of NO. Nitric oxide synthase. Guanylate cyclase. Molecular effects of nitric oxide
Week 5	Glutamatergic neurotransmission. General properties of ion channels. General properties of ion channels. Methods for studying ion channels.
Week 6	Structure of the K <sup>+</sup> channels. Methods for studying ion channels. The molecular mechanism of gating and permeation. <i>Haemostasis</i> : Pathobiochemistry of atherothrombosis and atherosclerosis. The role of cholesterol in the formation of atherosclerotic plaques. LDL oxidation and scavenger receptors. Risk factors of atherosclerosis related to cholesterol homeostasis (diabetes, hypertriglyceridemia). Biochemical background for prevention of atherosclerosis (Plant oils and alcohol consumption, exercise).
Week 7	Initiation of blood coagulation – Protein C and thrombomodulin. Termination of blood coagulation: inhibitors (antithrombin – heparin, hirudin, TFPI). Alternative pathway of blood coagulation: Factor XII. Fibrinolysis. Degradation of fibrin (D and E fragments): fibrinolytic enzymes (plasmin, elastase). Fibrin substrates, D-dimers. Activation of plasminogen: Glu-plasminogen (native), conformational and proteolytical modifications. Plasminogen activators (tPA and cofactors, uPA, streptokinase) Inhibitors of fibrinolytical enzymes, α <sub>2</sub> -plasmin inhibitor, plasminogen activator inhibitor-1 (PAI-1). Regulation of plasminogen activation and fibrinolysis, TAFI. Functions of PMN and fibrinolysis.
Week 8	Adhesion molecules. Cadherines, selectins, IgSF cellular molecules. Integrins. Platelets. Structure and function (adhesion, vWF and aggregation, fibrinogen) Activation, triggers (thrombin, collagen, PAF). Secondary activators (ADP, TXA <sub>2</sub> ). Receptors (thrombin receptor). Activation, inhibitors. PGI <sub>2</sub> and TXA <sub>2</sub> , platelet activation. The endothelium. Structure and haemostatic role. Procoagulant components. von Willebrand Factor (vWF). Anticoagulant components. NO, Endothelin, PAR1, ACE, MMP-9. Angiogenesis. Angiogenin and angiostatin. Thrombophilia. Anticoagulant therapy: Vitamin K antagonists, INR. Heparin. Hirudin. Aspirin and platelets. Plasminogen activators. Acute myocardial infarcts. Stroke.
Week 9	<i>Biotransformation</i> : reactions of the first and second phase, biological significance, clinical aspects. Reactions and significance of cytochrome P450 isoenzymes. Conjugation of xenobiotics and of endogenous substrates.
Week 10	Mechanisms of signal transduction processes mediated by cAMP. Formation, degradation of cAMP,



Lecture topics	
	PKA, cAMP and regulation of gene expression. Signal transduction processes mediated by intracellular receptors: steroid, thyroid, retinoid receptors.
Week 11	Therapeutic targeting of signal transduction pathways. Calcium signalling
Week 12	<i>The role of thyroid hormones</i>
Week 13	<i>Biosynthesis of steroid hormones in the adrenal cortex.</i> Effects of mineralocorticoids and glucocorticoids, regulation of their biosynthesis. Signal transduction of steroid hormone receptors, genomic and non-genomic actions of steroid hormones. Congenital adrenal hyperplasias.
Week 14	<i>Biosynthesis of sexual hormones.</i> Cyclic changes in the ovaries, the cooperation of granulosa and theca interna cells. Placental progesterone and estradiol synthesis. <i>Eicosanoids: prostaglandins, thromboxanes and leukotrienes.</i> The cyclooxygenase and the lipoxygenase pathways. Effects of eicosanoids on: platelet aggregation, gastric mucosal protection, myometrial contractility, inflammation.

## Laboratory program and seminars – Fall Semester

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Laboratory lessons and Seminars	
Week 1	The isoenzyme profile of lactate dehydrogenase <a href="http://semmelweis.hu/biokemia/files/2014/01/EN_lab_LDH_or_BAK-KOK_20150130.pdf">http://semmelweis.hu/biokemia/files/2014/01/EN_lab_LDH_or_BAK-KOK_20150130.pdf</a> (Laboratory lesson)
Week 2	Acute and chronic liver disease (seminar)
Week 3	Determination of transaminase enzyme activities and determination of creatine kinase activity in serum (Laboratory lesson)
Week 4	Metabolism of exercise (seminar)
Week 5	Bioinformatics (computer skills)

Week 6	Cystic fibrosis (seminar)
Week 7	Determination of blood glucose level and determination of glycosylated haemoglobin (Laboratory lesson)
Week 8	Cell adhesion (seminar)
Week 9	Experimental models of blood coagulation (Laboratory lesson)
Week 10	The K <sup>+</sup> , Na <sup>+</sup> Transport ATP-ase
Week 11	Haemostatic abnormalities (seminar) (Laboratory lesson)
Week 12	Extracellular matrix (seminar)
Week 13	Investigation of microsomal drug metabolism (Laboratory lesson)
Week 14	Research of specific literature of Biochemistry. Presentation of research at our department (Consultation)

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**Exemption:** Students who have certificates of their previous studies at other universities in biochemistry may apply for exemption under the following conditions:

1. They have to present their certificates regarding the courses to the responsible tutor of the course during the first two weeks of the semester. (Dr. István Léránt Department of Medical Biochemistry)
2. Exemptions are given only after a “checking” exam during the first month of the semester. At this exam one of the lecturers will check whether the student’s knowledge is sufficient to complete the semesters without attending lectures and laboratory programs. This exam is based on the question list of the final examination, and can be obtained from the tutor of the course. After a successful exam students are exempted from the final exam at the end of spring semester of the second academic year, including attending both lectures and laboratory programs. If students fail they must attend both lectures and laboratory programs and they have to sit for the semifinal or final exam at the end of the semesters.
3. Partial exemption is not permitted.

#### List of textbooks

- 1 Biochemistry Laboratory Manual. Ed. Gy. Szabados, Budapest <http://semmelweis.hu/biokemia/for-students/medical-biochemistry-iii/laboratory-lessons/>
- 2 Consultation manual. Ed. L. Tretter, Budapest <http://semmelweis.hu/biokemia/for-students/medical-biochemistry-iii/laboratory-lessons/>

## MOLECULAR CELL BIOLOGY II.

**Department of Medical Chemistry, Molecularbiology and Pathobiochemistry**

**Director of the course:** *Prof. Gábor Bánhegyi* M. D., Ph. D., D. Sc.

**Mandatory course; credit: 3**

Detailed program to be given by the department later – online!

# **BEHAVIORAL SCIENCES I. (MEDICAL COMMUNICATION)**

**Institute of Behavioural Sciences**

**Type of the course:**

**code:** AOKMAG398\_2A

**credit:** 2 credits

**Presenter of the course:** Dr. Adrienne Stauder

**Course leader:** Dr. Ferenc Túry

## **Semester: I.**

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### **Course objectives:**

Proper communication is essential in effective healing. The aim of the course is to teach communication strategies that can make the doctor's everyday tasks more effective: how to listen, ask, inform and collaborate with the patient. The subject also contains some recent elements of the doctor-patient relationship, like shared decision making, patient education, and suggestive communication. We emphasize difficult situations in medical practice: communicating bad news, communication with aggressive patients, communicating about sexual problems, and analyzing cultural differences in medical practice. The main goal of the course is to teach special communication knowledge to medical students that can help them create proper doctor-patient relationship and improve their effectiveness in medical practice.

### **Course Syllabus:**

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#### **Week 1-7: Lectures:**

Week 1:

Introduction. Communication difficulties and possible solutions in the everyday medical practice.

Week 2: The specialties of age in medical communication: communication with ill children

Week 3: Doctor-patient collaboration and motivational interviewing to promote behavior change.

Week 4: Suggestive communication in medical practice.

Week 5: Communication about functional complaints

Week 6: Telemedicine.

Week 7:

## **Week 5-12: Seminars**

Week 5:

Seminar. Communication in everyday life and in the medical practice. The role of non-verbal and metacommunicative signs in communication.

Week 6: Seminar. The active listening. Communication aspects in empathy.

Week 8: Seminar. Patient information, patient education.

Week 9: Seminar. Creating and maintaining compliance.

Week 10:

Seminar. Communicating bad news (practice). How to recognize communication signs of suicide?

Week 11:

Seminar. Communication with agitated patients, strategies to prevent violence. Communication about sexual problems.

Week 12: Seminar. Cultural aspects in medical communication. Review.

## **Participation and making up for absences:**

A signature will be given with the prerequisite of participation (minimum 75% of the lectures and seminars). It is possible to make up for an absence by participating in another seminar group the same week. Participation list will be recorded at the end of every lecture/seminar.

**Justification of the absence in the lectures and examinations:** medical certificat

**Checks during the semester (reports, written checks):** –

## **Requirements for the signature at the end of the semester:**

Regular participation on the lectures and seminars.

## **Method of the calculation of marks: performance on the oral exam**

**Type of the exam:** oral

**Requirements for the exam:**

## **Exam topics:**

„A” list

1. **Basic definitions in communication and their role in medical practice: basic elements, axioms and levels in communication; verbal communication.**
2. **The role of non-verbal communication.**
3. **The role of active listening and the role of empathy.**
4. **The doctor-patient consultation.**

5. **Communication issues in patient information.**
6. **Patient education and shared decision making.**
7. **Convincing strategies in medical practice: learning theories and cognitive models;**
8. **Convincing strategies in medical practice: the role of arguments, behavior change model.**
9. **The role of suggestions in doctor-patient communication.**

„B” list

1. **Communication with acute patients.**
2. **Communication with sick children.**
3. **Communication with older patients.**
4. **Communication with somatizing patients.**
5. **Communication with alcohol- and drug-dependent patients.**
6. **Communication about sexual problems.**
7. **Communication aspects with patients committing suicide attempt.**
8. **Prevention and management of violence**
9. **Communicating the diagnosis of incurable disease.**
10. **Breaking news of death and congenital disorders.**  
Telemedicine.

**Application for the exam:** Through the Neptun system.

**Changing the application for the exam:** Through the Neptun system.

**Justification of the absence from the exam:**

**Course and recommended text books:**

**Course text book:**

János Pilling (ed.): Medical Communication. Medicina Könyvkiadó, Budapest, 2011.

**Recommended text books:**

Washer, P. (2009): Clinical Communication Skills. (Oxford Core texts). Oxford University Press.

Tate, P. (2009): The doctor's communication handbook. Radcliffe Publishing, 6<sup>th</sup> edition

Hall, J.A.; Roter, D. (2006): Doctors talking with patients / Patients talking with doctors. Praeger; 2<sup>nd</sup> edition

Williams, D. (1997): Communication skills in practice: a practical guide for health professionals. Jessica Kingsley Publishers.

# INTRODUCTION TO CLINICAL MEDICINE

**Lecturer:** Prof. László Kalabay MD PhD

**Institute:** Department of Family Medicine

**Duration:** One semester, practices: 12x2,5 hours/semester

**Exam:** Written. Practical mark (written exam)

**Credit value:** 2 credit points

**Minimum/maximum group size:** 55/210

## **Thematic:**

Formation of the consciousness of profession.

Most frequent diseases in the clinical department and the general practitioner's office. Case reports.

Referral of patients. The medical consultation.

Communication with the patient and his/her relatives. The role of the family in treatment and care for acute and chronic diseases.

Effective cooperation with patients. Means to improve compliance.

The importance of prevention of disease.

Team work in medicine.

Overview of the scientific activity of the clinical department. Raising interest on joining to it.

**Application:** Péter Torzsa MD Tel: 355-8530 e-mail: ptorzsa@gmail.com

**Application date:** 1<sup>st</sup> September

**Precondition:** Only for students in the 2<sup>nd</sup> year, following completion of Medical Profession

## **DEVELOPMENTAL BIOLOGY: from gene to newborn. I. -**

*“Our real teacher has been and still is the embryo, who is, incidentally, the only teacher who is always right.”*

Hamburger 1900-2001

## **Regulatory mechanisms and early development of embryology**

**2 hours/week, 2 credits**

***Prof. Dr. Imre Oláh***

### **Department of Human Morphology and Developmental Biology**

#### **Introduction to developmental biology**

Comparative embryology, epigenesis and preformation, evolutionary embryology, medical implications

#### **Regulatory elements of the ontogenesis I.**

Hormones, growth factors, transcription factors, instructive and permissive interactions

#### **Regulatory elements of the ontogenesis II.**

DNA-methylation, X chromosome inactivation, genomic imprinting

#### **Cell-cell and cell-extracellular matrix interactions**

Adhesion molecules, integrins, cytoskeleton and cell movement, cell polarization

#### **Cell lineages**

Fate map, stem cells, peripheral blood fibrocytes, cell specification, polarity in biological system

#### **Neurogenesis**

Origin of neural cells, switch between neuronal and glial fates, axonal specificity, synaptic plasticity

#### **Neural crests and placods**

Origin of neural crest and placods, flexibility and heterogeneity of neural crest cells.

#### **Myogenesis**

Embryonic origin of skeletal, smooth and cardiac muscles. Induction of myogenesis, regulatory factors of myogenesis, regeneration of skeletal muscles

#### **Teratogenesis**

Morphogens, morphogenetic period, cancer as an altered development, stem cell therapy, teratogens.

#### **Primordial germ cells (PGC)**

Origins, migration, mitosis, differences between male and female PGC, maturations

#### **Fertilization**

Acrosome reaction, prevention of polyspermy, activation of egg metabolism

#### **Embryonic induction**

Spemann organization center, mosaic and regulative zygotes

#### **Early embryonic development**



Cleavage, neurulation, X-chromosome inactivation, parental imprinting

### **Gastrulation**

Differentiation of mesoderm, primary tissue formation

### **Axis formations in birds and mammals**

Symmetry breaking, left-right asymmetry formation.

## **ORGANOGENESIS**

2 hours/week, 2 credits

*Prof. Dr. Imre Oláh*

### **Department of Human Morphology and Developmental Biology**

#### **Axial and paraxial mesoderm**

Formation of axial skeleton, somitogenesis, clinical correlations

#### **Segmentation and Homeobox genes**

Retinoic acid, gain of function, loss of function

#### **Intermediate mesoderm I.**

Development of kidney, clinical correlations

#### **Intermediate mesoderm II.**

Development of gonads, sex determination, clinical correlations

#### **Lateral plate mesoderm, splanchnopleura I.**

Vasculogenesis, blood formation, hematopoietic stem cell.

#### **Lateral plate mesoderm, splanchnopleura II.**

Early development of the heart. Cardiac anlage, cardiac jelly, cardiac skeleton, development of coronary vessels, contribution of neural crest cells, epicardial body, clinical correlations

#### **Lateral plate mesoderm, somatopleura**

Development of the limb, evolutionary and ontogenetic aspects, clinical correlations

## **Branchiogenic arches and their derivatives**

Clinical correlations

## **Prechordal plate as head organizer, AVE-anterior ventral entoderm**

Cranial neural crest and head mesoderm, somatic and visceral head and neck, clinical correlations

## **Development of arteries**

Branchiogenic, parietal and visceral segmental arteries, clinical correlations

## **Epithelio-mesenchymal interactions**

Ecto-entoderm <<—>> mesoderm, tooth and lung development, clinical correlations

## **Neurogenesis**

Antero-posterior, and craniosacral regionalization, axon guidance, growth, synapsis formation

## **Development of eye**

Retina, lens

## **Entoderm formation**

Foregut and its derivatives (thymus, thyroid, parathyroid), development of pancreas

## **Environmental regulation of development**

Developmental symbiosis, seasonality and sex, nutritional contribution

## **Basics of Foreign Language (module 3.)**

Magyar orvosi szaknyelv 3.

### **Responsible organisational unit:**

Faculty of Health Sciences, Division of Foreign Languages and Communication

### **Programme director:**

Zöldi Kovács Katalin PhD, Head of the Division

**4 lessons per week, 2 credits,**

**Assessment:** midterm (written) and endterm (written and oral) tests

**Role of subject in fulfilling the aim of training:**

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective communication in the language they use during their field practice both in their everyday life /'survival language'/ and in their academic studies. Raising students' awareness of cultural differences is one of our top priorities.

**Brief description of subject:**

The first three modules are dedicated to learning basic general vocabulary and grammar. In the third module students acquire basic structures and the vocabulary for everyday topics / e.g. travelling in a city, travelling abroad, arranging accommodation etc. /, language for „survival.“. The course places special emphasis on phrases essential for everyday communications, e.g. past time activities, telephoning, buying/ordering tickets etc. Grammar is of less importance in this phase of language studies.

**Course content of practical lessons:**

- Lesson 1-2: What was your weekend like?
- Lesson 3-4: What did you yesterday?
- Lesson 5-6: Did you like the city?
- Lesson 7-8: Have you ever been to England?
- Lesson 9-10: What did you do on Monday?
- Lesson 11-12: Communication practice: What did you do?
- Lesson 13-14: What did your neighbour say?
- Lesson 15-16: Practising past tense
- Lesson 17-18: He didn't know that we were there. –Past tense
- Lesson 19-20: Communication practice- Practising past tense
- Lesson 21-22: Consolidation
- Lesson 23-24: Test 1 + situation
- Lesson 25-26: I'd like a ticket to London.
- Lesson 27-28: Travelling by train
- Lesson 29-30: Travelling abroad
- Lesson 31-32: Communication practice: travelling
- Lesson 33-34: Accommodation
- Lesson 35-36: Booking accommodation
- Lesson 37-38: Booking accommodation- conversations
- Lesson 39-40: At a hotel

Lesson 41-42: Communication practise: travelling and booking accommodation  
Lesson 43-46: Customs and festivities – modal auxiliaries  
Lesson 47-48: At the dentist  
Lesson 49-50: Healthy lifestyle  
Lesson 51-52: Consolidation  
Lesson 53-54: Test – situation, communication practice  
Lesson 55-56: Assessment

**Course material, recommended text book(s), professional literature and supplementary reading(s)**

Gyöngyösi Lívía - Hetesy Bálint. *Hungarian language: Jó napot kívánok!* Semmelweis Egyetem Egészségtudományi Kar, 2011.

## **Basics of Foreign Language (module 4.)**

Magyar orvosi szaknyelv 4.

**Responsible organisational unit:**

Faculty of Health Sciences, Division of Foreign Languages and Communication

**Programme director:**

Zöldi Kovács Katalin PhD, Head of the Division

**4 lessons per week, 2 credits,**

**Assessment:** midterm (written) and endterm (written and oral) tests

**Role of subject in fulfilling the aim of training:**

The role of this subject is to help students acquire the basic vocabulary, grammar and language skills they need for the effective professional communication in the language they use during their field practice. With the help of this course they become able to communicate with the patients in the Hungarian hospitals.

**Brief description of subject:**

The fourth module is dedicated to learning basic medical vocabulary. Students acquire the skills needed in taking family, social, and medical history in internal medicine. They also learn how to address the patient during an examination and give advice for the treatment.

**Course content of practical lessons:**

Lesson 1-4: Revision

Lesson 5-6:	Family history – asking for family members, names
Lesson 7-8:	Family history – describing state
Lesson 9-10:	Family history – communication practice
Lesson 11-12:	Social history – habits
Lesson 13-16:	Social history – expressing frequency
Lesson 17-18:	Body parts, internal organs
Lesson 19-20:	Symptoms
Lesson 21-22:	Consolidation
Lesson 23-24:	Test 1 + situation
Lesson 25-28:	Asking the patient about the pain
Lesson 29-30:	Describing pain and symptoms
Lesson 31-32:	Names of diseases
Lesson 33-36:	Taking medical history
Lesson 37-40:	Medication
Lesson 41-48:	Giving advice, doctor's recommendations
Lesson 49-52:	Consolidation
Lesson 53-54:	Test – situation, communication practice
Lesson 55-56:	Assessment

**Course material, recommended text book(s), professional literature and supplementary reading(s)**

Marthy Annamária – Végh Ágnes. *Egészségére!* - Magyar orvosi szaknyelv. Semmelweis Egyetem Egészségtudományi Kar, 2010.