Semmelweis University
Department of Anatomy, Histology and Embryology

Faculty of Dentistry
1st year 1st semester

MACROSCOPIC ANATOMY HANDBOOK
September 2021

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Macroscopic Anatomy and Embryology for Dentistry students

TEACHING DEPARTMENT:

SEMMELWEIS UNIVERSITY
Department of Anatomy, Histology and Embryology
Budapest, Tűzoltó utca 58.
H-1094 Budapest
http://semmelweis.hu/anatomia

LEARNING OBJECTIVES

Aims of the lectures in anatomy: Presentation of the important and/or complicated chapters 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 practical sessions in the dissecting room: Based on the weekly programs (see separate), students will both observe prosected cadaver specimens (bones, joints, muscles, viscera, brain) and perform dissections on parts of, or on an entire, enbalmed cadaver.
Students are supervised by the lab instructors. Bones, joints, muscles and peripheral nervous system will be primarily taught in the dissecting room.
Embryology describes the intrautrine development of a human embryo/fetus and introduces the development of the organ systems.

LECTURES: First semester: 1x 45 min; second semester: 3x 45 min.
PRACTICAL CLASSES: First semester: 5 x 45 min; second semester: 5 x 45 min.
ECTS CREDITS: Altogether 14 (first semester: 6; second semester: 8).
MIDTERM TESTS: Oral
ACCEPTENCE OF THE SEMESTER:
Active participation in dissection room sessions is obligatory for every student. Students should attend at least 75% of the scheduled hours to gain a signature proving the validity of the semester. Absences are therefore limited in **25%**. Attendance will be recorded in the dissection room classes.

TYPE OF EXAMS: oral and written
First semester: semifinal examination, second semester: final exam
Semifinal and final examinations consist of written and oral (practical and theoretical) parts
1. Written pretest (e-learning module – access to SeKA account is obligatory)
2. Macroscopic Anatomy (identification of structures on true anatomical specimens) including relevent theoretical questions

COURSE DESCRIPTION

Macroscopic Anatomy and Embryology I.

Lectures and dissection classes
Subject matter : Macroscopy and clinically oriented anatomy of the parts of the musculoskeletal system, i.e. osteology, arthrology and myology, together with the vascular and nervous supply of the limbs and the trunk. Skull (viscerocranium, neurocranium). Cavities, muscles of the head & neck region. Macroscopy of the brain and spinal cord, membranes (dura, arachnoid and pia mater). General Embryology describes the intrautrine development of a human embryo/fetus and introduces the development of the locomotor system.
Credits: 6 **Prerequisite:** none

Academic Year 2021/2022
Faculty of Dentistry
ED I. Macroscopic Anatomy and Embryology I.

Weeks	Lectures *Tuesdays 10.45 - 11.30*	Lecturers	Dissection room classes *Wednesdays 14.30-16.30 and Fridays 12.00-14.05*
Week 1 09. 6-10.	1. The role of anatomy in the medical curriculum. Terminology. General arthrology and myology	Gerber	General introduction to practical work in the dissection room, tools and rules Bones of the upper limb and the girdle, shoulder joint
Week 2 09. 13-17.	2. Clinical anatomy of the upper limb	Székely	Muscles of the upper limb/ girdle Elbow joint arm, forearm Muscles and joints of the hand
Week 3 09. 20-24.	3. Clinical anatomy of the lower limb	Lendvai	Dissection of muscles, vessels and nerves of the upper limb (branches of the axillary a+v, brachial plexus)
Week 4 09.27 - 10. 1.	4. Gametes, fertilization, cleavage, blastulation	Puskár	Dissection of the muscles, vessels and nerves of the upper limb (branches of the axillary a+v, brachial plexus)
Week 5 10. 4-8.	5. Implantation, structure of the placenta, placentar circulation. Fetal membranes	Tóth Zs	Lower limb, pelvis, hip joint Dissection of muscles, vessels and nerves Cadaver and free limb dissection
Week 6 10. 11-15.	6. Gastrulation, formation and derivatives of germinal layers. Folding of the embryo. Body axes, cranio-caudal and dorsoventral differentiation.	Kozsurek	Lower limb, pelvis, hip joint Dissection of muscles, vessels and nerves Cadaver and free limb dissection
Week 7 10. 18-22.	7. Components, muscles, joints, ligaments and movements of the vertebral column. Ribs, components and movements of the thorax. Diaphragm	Durst	Dissection of the limbs and superficial regions of the the trunk Knee joint, bones, ligaments joint and muscles of the leg and foot
Week 8 10. 25-29.	8. Components of the abdominal wall. Rectus sheath. Subinguinal hiatus. Inguinal canal. Adductor and femoral canals	Vereczki	Dissection of the limbs and superficial regions of the the trunk (cadaver) Femoral vessels, lumbar plexus **<u>Midterm test (oral, obligatory)</u>** **Upper and lower limbs**
Week 9 11. 1-5. ***Nov. 1 National Holiday***	9. Bony framework of the skull: spaces of the viscerocranium.	Shahbazi	Sacral plexus Diaphragm Components of the body wall, rectus sheath, hernia canals
Week 10 11. 8-12.	10. Introduction to the study of the nervous system. General organization of the central and peripheral nervous systems.	Pálfi	Bones of the skull Internal and external skull bases
Week 11 11.15-19.	11. Blood supply to the brain. Meninges, CSF, ventricles	Kozsurek	Bones of the skull , facial skeleton, mandible. Orbit, nasal cavity, pterygopalatine fossa
Week 12 11. 22-26	12. Macroscopy of the brain stem, cerebellum and spinal cord.	Gerber	Dissection of the brain, dural spaces Morphology of the brain and spinal cord; Blood supply, meninges, sinuses
Week 13 11.29-12.3.	13. Neurulation. Development of the central nervous system.	Gallatz	Morphology of the brain and spinal cord; Blood supply, meninges, sinuses. CSF circulation, cisterns. Telencephalic hemispheres, gyri and sulci, Diencephalon, lateral and 3rd ventricles, brain stem, cerebellum, 4th ventricle. Frontal sections of the brain
Week 14 12. 6-10.	14. Development of the skull, vertebral column and the limbs	Gerber	Revision **<u>Non-obligatory assessment (oral, elective)</u>** **Musculoskeletal system. Skull, bones and spaces.** **Macroscopy of the brain and spinal cord**

Subject matter of the 1st semester

Macroscopic Anatomy and Embryology I.

Macroscopy and clinically oriented anatomy of the parts of the musculoskeletal system

- osteology
- arthrology
- myology (except for the muscles of mastication, facial expression and neck muscles)
- vascular* and nervous supply of the limbs and the trunk
  *(*arteries starting from the brachial or femoral arteries)*

Skull (viscerocranium, neurocranium).

Macroscopy of the brain and spinal cord, membranes (dura, arachnoid and pia mater).

General Embryology (fertilization, cleavage, implantation, gastrulation, derivatives of germinal layers, neurulation, development of the musculoskeletal system & skull)

Test I. ***(OBLIGATORY ORAL MIDTERM EXAMINATION)***
Topics: Gross anatomy of the limbs, together with their girdles (bones, joints, muscles and fasciae, action, innervation, blood supply)
Date: 8th week, October 29.

Test II. *(ELECTIVE/ NON- OBLIGATORY ORAL TEST)*
Topics: Musculoskeletal system. Skull, bones and spaces. Macroscopy of the brain and spinal cord
Date: 14th week, December 10.

Semifinal examination

Topics: Subject matter of the semester

1) **Written 'e-learning type' pretest**

2) **Practical examination and theoretical questions** (oral examination)
Gross anatomy of the musculoskeletal system including the skull including relevant developmental questions.
Gross anatomy of the CNS and peripheral nerves

ED I ANNOUNCEMENTS

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

Semester acceptance (i.e. signature):

1. Active participation in dissection room lab sessions is obligatory. 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%**.
2. Successful obligatory midterm test passed with at least a mark 2.

Midterm examinations: During the semester, both practical and theoretical knowledge will regularly be evaluated. Anatomy mid-terms are held as oral/practical tests. The test will include both identification of several structures on the specimen and theoretical questions related to the subject. The results of all tests will appear on the personal achievement cards.

Test 1 is obligatory and will have to be taken only on the date specified in the Midterm announcement. Midterms cannot be retaken to „upgrade" the mark. Unsuccessful midterms will have to be retaken or in case the student was absent from the midterm test. Two retake possibilities are offered during the last two weeks of the semester.

Test 2 is not obligatory and students who pass the test with a 3-4-5 will be exempted* from the practical part of the semifinal examination with the mark earned at the test. This test cannot be retaken.

Cadaver dissection – every students is required to produce a fully dissected specimen during the 1st or the 2nd semester to prove excellence and be exempted from the dissection part of the final examination. The specimen will be evaluated by a departmental jury.

Semifinal examinations are composed of the following parts:

1. written pretest
2. oral examination (unless exempted*) - composed of practical and theoretical questions in Macroscopy i.e., identification and full description of the morphological features of the relevant body parts and. Please note, that relevant theoretical and Embryology questions may arise during the practical examination parts.

***Please note**: Students may register for, or deregister from, the examination 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). Students may apply with the department to be exempted from passing the prerequisite.

RULES AND REGULATIONS IN THE DISSECTING ROOM

Students are expected to be prepared for the practical work.

Everybody is supposed to behave in the dissecting room conforming to the spirit of the site. Loud speech, out-of-place jokes and any kind of behaviour, disregarding the dignity of human corpses, should strictly be avoided.

Students should take care of the equipment of the dissecting room. Do not sit on the dissection tables or stand on the tripod stools to avoid accidents. **Fire and work safety regulations** should be maintained. The dissection room is a hazard area. **Cleanliness and order** should be kept. The **white lab coats** should be worn while in the dissection room, to protect one's clothing from contacting the cadaver specimen.

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

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

No photos, recordings or videos are to be made in the dissection room.

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

Dissecting rooms are closed between 6:00 PM to 8:00 AM and over the weekends (with the exception of special workdays appearing in the schedule). Students may not stay in the dissecting room without supervision of lab instructor.

IT IS STRICTLY FORBIDDEN TO eat, drink, to chew a gum, or to use music devices. Bags and coats should ALWAYS be left in the lockers PRIOR TO entering the dissecting room.

The lockers will have to be locked using your OWN padlocks. Please, remember to keep your valuables always on you, or lock them in the lockers. The department takes no responsibility for lost items.

SMOKING IS STRICTLY FORBIDDEN ON THE DEPARTMENTAL PREMISES, INCLUDING THE GARDEN AND THE YARD

WORK / ENVIRONMENTAL PROTOCOL AND INFECTION CONTROL

GENERAL RULES

1. Please keep a **1.5 -2 m social distance** towards everybody.
2. Do not touch or come into close contact with other people (e.g., no handshakes).
3. Frequently wash your hands using soap and warm water.
4. Sanitise your hand frequently.
5. Do not touch your face or eye.
6. 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).
7. 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. Use hand sanitizers upon entering.
2. You may clean the surfaces with hygenic towels before you start using them.
3. Consumption of food and/or drinks is **strictly forbidden**.

SPECIFIC RULES CONCERNING THE DISSECTION ROOMS

1. Lab coats (buttoned up) must be worn in the dissecting room at all time.
2. Use hand sanitizers upon entering. Rubber gloves are provided for dissection.
3. Loose/long hair must be tied back before dissection.
4. Food and drinks are **strictly forbidden** on the premises of the department.
5. Only books, sketch, or notebooks, atlases and dissection tools (as well as ID, cards, phones etc) to be used during the dissection classes are allowed in the labs. All other items should be left in the lockers.
6. Have your own padlock on you to lock your stuff and/or clothes in the lockers
7. No valuable items should be left in the lockers, the department does not bear the responsibility for lost items/valuables.
8. Scalpels, blades and tweezers will have to be carried in a tightly closed and hard box. Please make sure that nobody is harmed when working with the sharp and pointed tools.
9. Accidents must be reported to the teacher first and wounds will be dressed with the help of the dissection room assistants.

10. Lab coats and rubber gloves are to be worn in the dissection room units only! Do not step out (not even for using the washroom) from the dissection unit while still wearing a lab coat.
11. It is strictly forbidden to take bones or other anatomical specimens or samples etc. from the dissecting room.
12. Dry and wet samples must be treated separately. Please wash the gloves during dissection before you start handling bones or dry /plastinated specimen.
13. There is a bell ringing 5 minutes before the end of the practical classes. Then all cadaver specimens will have to be properly wrapped and put away in their bags or boxes.
14. Dissection leftovers should be discarded in the special containers and the trays should be left clean and dry.
15. Dissection tools should be properly washed.
16. Disposable scalpels/blades could be disposed of **in special yellow/red containers designed for sharps and hazardous material**. Gloves must be discarded in labelled bins only, but NEVER in communal/paper waste!
17. The dissection unit may only be left following a thorough handwash using a disinfectant soap.
18. Please make sure that you leave the dissecting room quickly to provide time for the personnel to clean the surfaces between classes.

FIRE SAFETY PROTOCOL

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

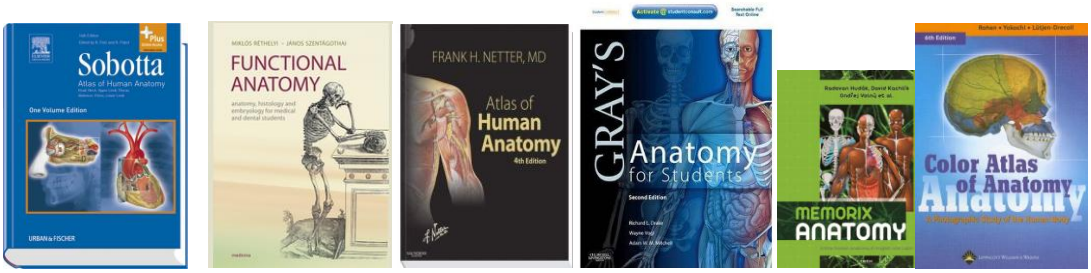
1. The use of naked light or smoking is **STRICTLY PROHIBITED** on the premises of the Department, including the building and the yard.
2. In case of fire, a loud fire alarm signal is to ring throughout the building. In case of a fire drill, the building must be left organized, with the guidance of the teacher/instructor of the group, using the exits as quick as possible. Escape routes are illustrated on every floor.
3. The use of elevators is STRICTLY PROHIBITED during a fire drill.
4. Every lecture room has 3 accessible entrances/exits. Students usually enter and leave through the lower single entrance under normal circumstances. When necessary, i.e. in case of fire, the upper 2 doors could also be opened using the keys kept in the fire cassettes next to the doors.
5. All fire cases or signs/ suspicion of a possible fire should be reported to the teacher of the group.
6. No electrical devices should be plugged in a connector different from the designated ones. Only electrical devices in an intact and perfect condition should be used.

LIST OF TEXTBOOKS

Sobotta's Atlas of Human Anatomy (Package), 15th English ed. Musculoskeletal system, internal organs, head, neck, neuroanatomy, By Waschke & Paulsen, ISBN-13: 9780702052507 2013
Gray's Anatomy for students with STUDENT CONSULT Online Access, 3rd Edition by R. Drake, A. W. Vogl, A. Mitchel, Elsevier; 2014; ISBN 9780702051319
McMinn and Abrahams' Clinical Atlas of Human Anatomy with STUDENT CONSULT Online Access , 7th Edition By Abrahams, Spratt, Loukas & van Schoor ISBN-13: 9780723436973 , 2013
Human Anatomy, Color Atlas and Textbook, 6th Edition by J Gosling, P Harris, J Humpherson, I Whitmore and P Willan; ISBN 9780723438274 Elsevier, 2016.
Fitzgerald's Clinical Neuroanatomy and Neuroscience, 7th Edition, Elsevier, 2015.
Oral Anatomy, Histology and Embryology, 4th Edition, by B. Berkovitz Paperback with STUDENT CONSULT Online Access and e-book ISBN: 9780723434115 Copyright: 2009
McMinn's Color Atlas of Head and Neck Anatomy, by Logan, Reynolds, Rice & Hutchings, 5th Edition, Elsevier 2016
Functional Anatomy, Histology and Embryology for medical and dental students by M. Réthelyi and J. Szentágothai, Medicina, 2018.
The Developing Human – Clinically Oriented Embryology, 10th ed. by KL Moore, TVN Persaud and M Torchia, Saunders, 2015; ISBN 9780323313384

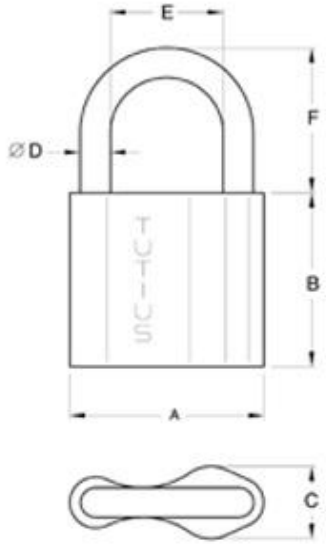
Illustrated Dental Embryology, Histology, and Anatomy, 3rd Edition by Mary Bath-Balogh ISBN: 9781437717303, 2011.
Netter's Head and Neck Anatomy for Dentistry, 3rd Edition, Elsevier, 2016.
Anatomy, A Photographic Atlas, 8th Edition by Rohen, Yokochi; Wolters Kluwer, 2016, ISBN: 978-1-4963-0870-2
Bräuer: Sobotta Flashcards (Muscles; Bones, Ligaments, and Joints) URBFI, 2013.
KL Moore–AF Dalley: Clinically Oriented Anatomy. 4th ed. Lippincott William and Wilkins, 1999.
RMH McMinn: Last's Anatomy, Regional and Applied. Churchill Livingstone, Edinburgh 1990. ISBN 0-443-03484-4
Neuroanatomy An Illustrated Colour Text, 4th Edition by Crossman & Neary Publication Date: 13/04/2010 ISBN-13: 9780702030864
Langmann's Medical Embryology, 13th Edition by TW Sadler, Wolters Kluwer, ISBN 9781469897806, 2014

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).



During dissection classes keep your belongings in the lockers and lock them with your padlock!

PADLOCK SIZE: 6 mm



Please, remember to keep your valuables always on you, or lock them in the lockers since the department takes no responsibility for lost items.

DISSECTION ROOM TOOLS

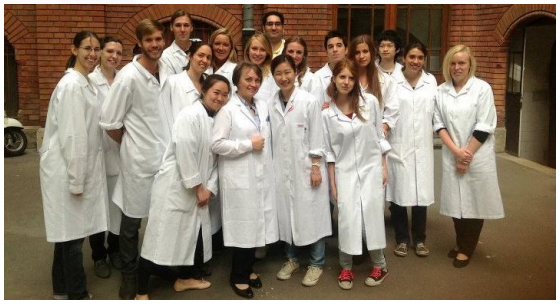
SCALPEL

OR

A PAIR OF ANATOMICAL FORCEPS

RUBBER GLOVES

PROTECTIVE CLOTHING (LABCOAT)



GOGGLES

TOPICS OF THE SEMIFINAL EXAMINATION

Musculoskeletal Anatomy
General osteology, classification of bones
Continuous connections of bones. Components and classification of joints
General myology
Structure and movements of the vertebral column, the gross anatomy of the muscles acting upon it
Movements and muscles of the head&neck (atlantooccipital and atlantoaxial joints)
Osteofibrous structure of the thoracic cage (bones, joints, ligaments, movements)
Joints of the shoulder girdle, the gross anatomy of the muscles acting upon them
Shoulder joint, the gross anatomy of the muscles acting upon it
Axillary fossa, quadrangular and triangular spaces
Muscles and cross section of the arm
Muscles and cross section of the forearm
Elbow joint, the gross anatomy of the muscles acting upon it
Cubital fossa
Structure and movements of the radiocarpal joint, gross anatomy of the muscles acting upon it
Osteofibrous spaces and muscle compartments of the hand, tendinous sheaths
Muscles, joints and movements of the fingers
Composition of the pelvis (bones, ligaments and membranes)
Hip joint and the gross anatomy of the muscles concerned with the movements
External and internal muscles of the hip, supra- and infrapiriform hiatuses.
Osteofibrous compartments, muscles and of the thigh
Knee joint and the gross anatomy of the muscles concerned with the movements. Popliteal fossa
Subinguinal hiatus, vascular and muscular compartments; adductor canal, femoral canal
Osteofibrous spaces and muscle compartments and cross section of the leg (crus)
Ankle joint together with the gross anatomy of the muscles acting upon it
Subtalar and talocalcaneonavicular joints, the muscles acting upon them
Structure of the foot, arches of the foot
Diaphragm
Muscles and spaces of the abdominal wall, rectus sheath
Inguinal canal, femoral canal
Pelvic floor (muscles); urogenital diaphragm, perineal muscles
Components and connections of the anterior, middle and posterior cranial fossae.
External skull base, connections
Walls and connections of the orbit
Walls and connections of the nasal cavity
Oral cavity, temporal and infratemporal fossae
Walls and connections of the pterygopalatine fossa

Macroscopy of the nervous system
Blood supply to the brain, meninges, CSF
Hemispheres, lateral ventricles, diencephalon, the 3rd ventricle
Brain stem, cerebellum, the 4th ventricle, spinal cord
Frontal sections of the brain
Dorsal branches of the spinal nerves, intercostal nerves
Cervical plexus
Brachial plexus
Lumbar plexus
Sacral plexus

General Embryology

Gametes and fertilization
Cleavage of the zygote
Blastocyst formation; the bilaminar embryonic disc
Implantation
Major parts of the early embryo (primary and secondary yolk sacs, amnion, chorion, chorionic cavity, body stalk)
Gastrulation, formation of the intraembryonic mesoderm; the notochord
Neurulation (neural tube and neural crest)
Derivatives of ectoderm, endoderm and mesoderm
Folding of the embryo
Development of the fetal membranes (chorion and amnion)
The umbilical cord
Placenta (structure and formation)
Twin formation
Development of the skull
Development of the vertebral column and limbs
Development of the musculoskeletal system