

REQUIREMENTS

Semmelweis University, Faculty of Medicine Name of the managing institute (and any contributing institutes): Department of Anatomy, Histology and Embryology
Name of the subject: Developmental Biology I. (stem cells and organoids) in English: Developmental Biology I.(stem cells and organoids) in German: Medizinische Embryologie I. Credit value: 2 Number of lessons per week: 2 lecture: 0 practical course: 0 seminar: Subject type: compulsory course <u>elective course</u> optional course
Academic year: 2022/2023
Subject code: AOVANT834_1A
Name of the course leader: Dr. Nagy Nándor His/her workplace, phone number: Department of Anatomy, Histology and Embryology, Position: senior associated professor
Objectives of the subject, its place in the medical curriculum: It is an elective subject, the aim of which is to present the development of the human body at the molecular level.
Place where the subject is taught (address of the auditorium, seminar room, etc.): Department of Anatomy, Histology and Embryology,
Successful completion of the subject results in the acquisition of the following competencies: Upon successful completion of the course, the student will understand the regulation of basic embryological processes at the molecular level. In the teaching of morphological subjects, focus is placed on developmental biology, including stem cell development, cell differentiation, generation of miniature organs (organoids, tissue engineering) and molecular embryology. Surgery requires artificial organs, tissues and stem cells that can be transplanted. The main objectives of the two-semester Developmental Biology I.-II. elective course is to present the embryonic development of the human body at the molecular level. Introduce the types of stem cells and their contribution in modern regenerative medicine.
Course prerequisites: Macroscopic Anatomy II., Microscopic Anatomy and Embryology I.
Number of students required for the course (minimum, maximum) and method of selecting students: minimum: 1 maximum: 90
How to apply for the course: registration on the neptun, according to the order of application
Detailed curriculum: 1st week: Introduction to developmental biology and its significance in medical curriculum 2nd week: Beginning of developmental biology. Organization centers, Spemann organiser and its molecular background. 3rd week: Regulatory factors in ontogeny I. Transcription factors and Hox genes, segmentation of the body. 4th week: Regulatory factors in ontogeny II. Signal molecules. Growth factors. 5th week: Experimental methods of developmental biology 6th week: Stem cell biology and regeneration 8th week: Epithelial morphogenesis: role of basal membrane in cell migration, branching of epithelia. 9th week: Germ cell line determination: specification, migration, development 10th week: Gastrulation 11th week: Epithelial stem cells and endoderm differentiation

12th week: Patterning of mammalian embryo: antero-posterior and dorso-ventral patterning 13th week: Formation of embryonic mesoderm 14th week: Human reproductive biology
Other subjects concerning the border issues of the given subject (both compulsory and optional courses!). Possible overlaps of themes: Microscopic Anatomy and Embryology I.-II., Molecular cell biology I.
Special study work required to successfully complete the course: There is no special study work required to successfully complete the course
Requirements for participation in classes and the possibility to make up for absences: Attendance on the lectures is obligatory. Attendance on at least 75% of the lectures are needed for the end-term signature, no possibility of replacement.
Methods to assess knowledge acquisition during term time: (E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results) There are no assessments during term time.
Requirements for signature: Attendance on at least 75% of the lectures is needed for the end-term signature
Type of examination: written (electronic / Moodle type) test
Requirements of the examination: Organization centers, Spemann organizer and its molecular background. Regulatory factors in ontogeny I. Transcription factors, Hox genes, segmentation of the body. Regulatory factors in ontogeny II. Signal molecules. Growth factors. Experimental methods of developmental biology Stem cell biology and regeneration Epithelial morphogenesis: role of basal membrane in cell migration, branching of epithelia. Germ cell line determination: specification, migration, development Gastrulation Epithelial stem cells and endoderm differentiation Patterning of mammalian embryo: antero-posterior and dorso-ventral patterning Formation of embryonic mesoderm Human reproductive biology
Method and type of evaluation: In the case of the written (electronic Moodle) test, 50% of the maximum score available must be achieved for a successful (at least satisfactory grade) test result.
How to register for the examination?: Registration on the Neptun
Possibilities for exam retake: according to the Study and examination regulations
Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material: Schoenwolf, G.C., Larsen's Human Embryology, (4th Edition) Gilbert, S.F., Developmental Biology, (11th Edition), 2016 <u>Essentials of Stem Cell Biology</u> (2014) Robert Lanza and Anthony Atala Organoids and Mini-Organs (2018) Jamie Davies and Melanie Lawrence