REQUIREMENTS

Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme

Name of the host institution (and any contributing institutions):
Department of Anatomy, Histology and Embryology

Name of the subject: Developmental Biology II. (principles of regenerative medicine).

in English: Developmental Biology II. (principles of regenerative medicine).

in German: Medizinische Embryologie II.

Credit value: 2

Semester: 2
(as defined in the curriculum)

Total number of classes per week: 2	**lectures:** 2	**practical lessons:** 0	**seminars:** 0

Type of subject: compulsory optional <u>elective</u>
(PLEASE UNDERLINE AS APPLICABLE)

Academic year:2023/2024

Language of instruction, for optional or elective subjects: English

Course code:AOVANT834_2A
(In the case of a new subject, this cell is filled in by the Dean's Office, following approval)

Course coordinator: Dr. Nagy Nándor

Place of work, phone number: Department of Anatomy, Histology and Embryology, 53613

Position:professor

Date and number of habilitation: Semmelweis Univ, 2011. 06. 09; ID: 325

Objectives of the course and its place in the medical curriculum:
It is an elective subject, the aim of which is to present the embryology of the human body at the molecular level. Introduce the stem cells, organoids and basis of regenrative medicine.

Place of instruction (address of lecture hall or seminar room etc.):
Department of Anatomy, Histology and Embryology,

Competencies acquired through the completion of the course:
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.

Prerequisites for course registration and completion:
Developmental Biology I.

Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject:

Student headcount conditions for starting the course (minimum, maximum) and method of student selection:
minimum: 1
maximum: 90

Detailed course description:
(Theoretical and practical instruction must be broken down into lessons (weeks), numbered separately. Please provide the names of lecturers in both types of lessons, indicating guest lecturers. This information is not to be attached separately. CVs of guest lecturers, however, must be attached.)

1st week: Neural stem cells: pattern formation of neural tube, development of the nervous system (Krisztina Herbert-Minkó)
2ns week: Placods and their derivaties (Imre Oláh)
3rd week: Neural stem cells II.: Neural crest and its derivatives. Development of the enteral nervous system. (Nándor Nagy)
4th week: Neural stem cells III: Cranial neural crest, development of skull (Nándor Nagy)
5th week: Vasculogenesis, early hemopoiesis (Krisztina Herbert-Minkó)
6th week: Somitogenesis, molecular regulation of paraxial mesoderm development (Dávid Dóra)
7th week: Epithelial-mesenchymal interaction (EMI): lung and glands (Katalin Kocsis)
8th week: Epithelial-mesenchymal interaction (EMI); development of the kidney (Imre Oláh)
9th week: Early development of the heart, molecular changes accompanying the heart field development (Ildikó Bódi)
10th week: Development of pancreas and liver (Katalin Kocsis)
11th week: Molecular regulation of limb development (Nándor Nagy)
12th week: Molecular background of the thymus development, Epithelial-mesenchymal interaction (Ildikó Bódi)
13th week: Organoids (Tamás Kovács)

Related subjects due to interdisciplinary fields (both compulsory and elective) and potential overlaps between subjects:
Microscopic Anatomy and Embryology I.-II.
Molecular cell biology I.

Attendance requirements; conditions under which students can make up for absences and the method of absence justification:
Attendance on the lectures is obligatory. Attendance on at least 75% of the lectures is needed for the end-term signature, no possibility of replacement.

Form of assessment in the study period:
(including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)
There are no assessments during term time.

Number and type of assignments for individual work and the deadline for submission:

Requirements to obtain the teacher's signature:
Attendance on at least 75% of the lectures is needed for the end-term signature

Type of assessment *(comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, no examination)***:**
written (electronic / Moodle type) test

Examination requirements:
(*list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills)*

Neural stem cells: pattern formation of neural tube, development of the nervous system Placods and their derivaties
Neural stem cells II.: Neural crest and its derivatives. Development of the enteral nervous system.
Neural stem cells III: Cranial neural crest, development of skull
Vasculogenesis, early hemopoiesis and its molecular regulation
Somitogenesis, molecular regulation of paraxial mesoderm development
Epithelial-mesenchymal interaction (EMI) development of lung and glands
Epithelial-mesenchymal interaction (EMI); development of the kidney
Early development of the heart, molecular changes accompanying the heart field development
Development of pancreas and liver
Molecular regulation of limb development
Molecular background of the thymus development, Epithelial-mesenchymal interaction
Organoids

Method and type of grading:
(*Share of theoretical and practical examinations in the overall evaluation. Inclusion of the results of the end-of-term assessment. Possibilities of and conditions for offered grades.)*

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.

List of course books, textbooks, study aids and literature facilitating the acquisition of knowledge to complete the course and included in the assessment, precisely indicating which requirement each item is related to (e.g., topic by topic) as well as a list of important technical and other applicable study aids:
Schoenwolf, G.C., Larsen's Human Embryology, (4th Edition)
Gilbert, S.F., Developmental Biology, (11th Edition), 2016

Essentials of Stem Cell Biology (2014) Robert Lanza and Anthony Atala Organoids and Mini-Organs (2018) Jamie Davies and Melanie Lawrence
Signature of habilitated instructor (course coordinator) announcing the course:
Signature of the director of the host institution:
Date of submission: