Semmelweis University, Faculty of Medicine – single, long-cycle medical training
Name of the host institution (and any contributing institution):
Anatómiai, Szövet- és Fejlődéstani Intézet

Name of 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
Semester: 1. szemeszter, 2. szemeszter, 3. szemeszter, 4. szemeszter, 5. szemeszter, 6. szemeszter, 7. szemeszter, 8. szemeszter, 9. szemeszter, 10. szemeszter, 11. szemeszter, 12. szemeszter
(in which the subject is taught according to the curriculum)

Hours per week	Lecture	Practical lesson	Seminar
2.0	2.0	0.0	0.0

Hours per semester	Lecture	Practical lesson	Seminar
0.0	0.0	0.0	0.0

Type of course:
optional

Academic year:
2024/25

Language of instruction (for optional and elective subjects):
English

Course code:
AOVANT834_1A
(in the case of a new course, to be completed by the Dean’s Office, following approval)

Course coordinator name: Dr. Nagy Nándor
Course coordinator location of work, telephone availability: Department of Anatomy, Histology and Embryology, 53613
Course coordinator position:professor
Course coordinator Date and number of habilitation: Semmelweis Univ, 2011. 06. 09; szám: 325

Objective of instruction and its place in the curriculum:

It is an elective subject, the aim of which is to present the development of the human body at the molecular level.

Method of instruction (lecture, group work, practical lesson, etc.):

lecture

Competencies acquired through completion of 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.

Course outcome (names and codes of related subjects):

Prerequisites for course registration and completion: (CODE):

Macroscopic Anatomy and Embryology II

Microscopic Anatomy and Embryology I.

In the case of multi-semester courses, position on the possibility of and conditions for concurrent registration:

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The number of students required to start the course (minimum, maximum), student selection method:

minimum: 1

maximum: 90

Detailed course syllabus (if the course can be divided into modules, please indicate): (Theoretical and practical instruction must be broken down into hours (weeks), numbered separately; names of instructors and lecturers must be listed, indicating guest lecturers/instructors. It cannot be attached separately! For guest lecturers, attachment of CV is required in all cases!)

1st week: Introduction to developmental biology and its significance in medical curriculum. (Nándor

Nagy)

2nd week: Experimental methods of developmental biology. (Nándor Nagy)

3th week: Beginning of developmental biology. Organization centers, Spemann organiser and its molecular background. (Ildikó Bódi)

4th week: Regulatory factors in ontogeny I. Transcription factors and the extracellular matrix. (Ádám Soós, Emőke Szőcs)

5th week: Regulatory factors in ontogeny II. Signal molecules. Growth factors. (Krisztina Herberth-Minkó)

6th week: Regulatory factors in ontogeny III. CXCR4-CXCL12 signaling in the development. (Viktória Halasy)

7th week: Stem cell biology. (Nándor Nagy)

8th week: Role of basal membrane in cell migration, branching of epithelia. (Katalin Kocsis)

9th week: Germ cell line determination: specification, migration, development. (Dávid Dóra)

10th week: Gastrulation (Nóra Pecsenye-Fejszák)

11th week: Epithelial stem cells and endoderm differentiation. (Ildikó Bódi)

12th week: Patterning of mammalian embryo: antero-posterior and dorso-ventral patterning. (Krisztina Herberth-Minkó)

13th week: Formation of embryonic mesoderm. (Nándor Nagy)

14th week: Comparative embryology. (Nándor Nagy)

Other courses with overlapping topics (obligatory, optional, or elective courses) in interdisciplinary areas. To minimalize overlaps, topics should be coordinated. Code(s) of courses (to be provided):
AOKANT1089_1A, AOKANT1089_2A, AOKANT854_1A, AOKANT674_2A, AOKMBT795_1A

Requirements for attendance, options for making up missed sessions, and method of absence justification:

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Assessment methods during semester (number, topics, and dates of midterms and reports, method of inclusion in the course grade, opportunities for make-up and improvement of marks):
(number, topics, and dates of midterms and reports, method of inclusion in the course grade, opportunities for make-up and improvement of marks)

In the 7th and 13th weeks, electronic (Moodle) tests must be completed, the topics are the topics of 1-6. weeks' and the 7-12. week's lectures, respectively. For a successful test result, a result higher than 50% must be achieved. It is possible to make up and improve during the 14th week or the 1st week of the exam period.

Number and type of individual assignments to be completed, submission deadlines:

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Requirements for the successful completion of the course:

The result of the 2 tests written during the semester must reach at least 50% in order to obtain the end-term signature.

Type of assessment:
gyakorlati jegy_en

Examination requirements (list of examination topics, subject areas of tests, lists of mandatory parameters, figures, concepts and calculations, practical skills, optional topics for the project assignment recognized as an exam and the criteria for its completion and evaluation)

Examination topics:

Experimental methods of developmental biology.

Beginning of developmental biology. Organization centers, Spemann organiser and its molecular background.

Regulatory factors in ontogeny I. Transcription factors and the extracellular matrix.

Regulatory factors in ontogeny II. Signal molecules. Growth factors.

Regulatory factors in ontogeny III. CXCR4-CXCL12 signaling in the development.

Stem cell biology. (Nándor Nagy)

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.

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

In the written (electronic Moodle) test, 50% of the maximum score available must be achieved for a successful (at least satisfactory grade) test result.

Printed resources:

Required	No
Author	Schoenwolf, G.C.
Title	Larsen's Human Embryology
Publisher	6th Edition
Year of publication	2021

Required	No
Author	Gilbert, S.F.
Title	Developmental Biology
Publisher	11th Edition
Year of publication	2016

Required	No
Author	Robert Lanza and Anthony Atala
Title	Essentials of Stem Cell Biology
Publisher	
Year of publication	2014

Signature of habilitated instructor (course coordinator) announcing the course:

Signature of the director of the host institution:

Date of submission:
