

## REQUIREMENTS

<p><b>Semmelweis University, Faculty of General Medicine – single, long-cycle medical training programme</b></p> <p><b>Name of the host institution (and any contributing institutions):</b> Department of Anatomy, Histology and Embryology</p>			
<p><b>Name of the subject:</b> Developmental Biology I. (stem cells and organoids)</p> <p><b>in English:</b> Developmental Biology I. (stem cells and organoids)</p> <p><b>in German:</b> Medizinische Embryologie I.</p> <p><b>Credit value:</b> 2</p> <p><b>Semester:</b> 1 <i>(as defined in the curriculum)</i></p>			
<p><b>Total number of classes per week:</b> 2</p>	<p><b>lectures:</b> 2</p>	<p><b>practical lessons:</b> 0</p>	<p><b>seminars:</b> 0</p>
<p><b>Type of subject:</b>    compulsory        optional        <u>elective</u></p> <p>(PLEASE UNDERLINE AS APPLICABLE)</p>			
<p><b>Academic year:</b> 2023/2024</p>			
<p><b>Language of instruction, for optional or elective subjects:</b> English</p>			
<p><b>Course code:</b> AOVANT834_1A</p>			
<p><b>Course coordinator:</b> Dr. Nagy Nándor</p> <p><b>Place of work, phone number:</b> Department of Anatomy, Histology and Embryology, 53613</p> <p><b>Position:</b> professor</p> <p><b>Date and number of habilitation:</b> Semmelweis Univ, 2011. 06. 09; ID: 325</p>			
<p><b>Objectives of the course and its place in the medical curriculum:</b> It is an elective subject, the aim of which is to present the development of the human body at the molecular level.</p>			
<p><b>Place of instruction (address of lecture hall or seminar room etc.):</b> Department of Anatomy, Histology and Embryology, Huzella lecture hall</p>			
<p><b>Competencies acquired through the completion of the course:</b> 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.</p>			

<p><b>Prerequisites for course registration and completion:</b>  Macroscopic Anatomy and Embryology II.  Microscopic Anatomy and Embryology I.</p>
<p><b>Conditions for concurrent course registration and permission thereof in the case of a multi-semester subject: -</b></p>
<p><b>Student headcount conditions for starting the course (minimum, maximum) and method of student selection:</b>  minimum: 1  maximum: 90</p>
<p><b>Detailed course description:</b></p> <p>1st week: Introduction to developmental biology and its significance in medical curriculum. (Nándor Nagy)  2nd week: Experimental methods of developmental biology. (Nándor Nagy)  3rd 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 Szócs)  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 Pecsénye-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)</p>
<p><b>Related subjects due to interdisciplinary fields (both compulsory and elective) and potential overlaps between subjects:</b>  Macroscopic Anatomy and Embryology I.-II.  Microscopic Anatomy and Embryology I.-II.  Molecular cell biology I.</p>
<p><b>Attendance requirements; conditions under which students can make up for absences and the method of absence justification:</b>  -</p>
<p><b>Form of assessment in the study period:</b>  (including the number, topics and scheduling of oral and written tests, their share in the overall evaluation, make-up tests and improvement tests)  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.</p>

<b>Number and type of assignments for individual work and the deadline for submission: -</b>
<p><b>Requirements to obtain the teacher's signature:</b> The result of the 2 tests written during the semester must reach at least 50% in order to obtain the end-term signature.</p>
<p><b>Type of assessment:</b> (<i>comprehensive examination, end-term examination, term-grade, term-grade on a three-grade rating scale, coursework project, no examination</i>) term grade, type of examination: written (electronic / Moodle type) test</p>
<p><b>Examination requirements:</b> (<i>list of examination topics, subject areas of tests / examinations, lists of mandatory parameters, figures, concepts and calculations, practical skills and the optional topics for exam-equivalent coursework projects, their criteria of completion and assessment</i>)</p> <p>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.</p>
<p><b>Method and type of grading:</b> (<i>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.</i>)</p> <p>In the written (electronic Moodle) test, 50% of the maximum score available must be achieved for a successful (at least satisfactory grade) test result.</p>
<p><b>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:</b> Schoenwolf, G.C., Larsen's Human Embryology, (6th Edition), 2021 Gilbert, S.F., Developmental Biology, (11th Edition), 2016 Essentials of Stem Cell Biology, 2014 Robert Lanza and Anthony Atala</p>
<b>Signature of habilitated instructor (course coordinator) announcing the course:</b>
<b>Signature of the director of the host institution:</b>
<b>Date of submission:</b>