

## REQUIREMENTS

<b>Semmelweis University, Faculty of Medicine</b> <b>Name of the managing institute (and any contributing institutes):</b> Department of Anatomy, Histology and Embryology
<b>Name of the subject:</b> Developmental Biology II. (principles of regenerative medicine). <b>in English:</b> Developmental Biology II. (principles of regenerative medicine). <b>in German:</b> Medizinische Embryologie II. <b>Credit value:</b> 2 <b>Number of lessons per week:</b> 2 <b>lecture:</b> 0 <b>practical course:</b> 0 <b>seminar:</b> <b>Subject type:</b> compulsory course <u>elective course</u> optional course
<b>Academic year:</b> 2022/2023
<b>Subject code:</b> AOVANT834_2A <i>(In case of a new subject, it is filled by the Dean's Office, after approval)</i>
<b>Name of the course leader:</b> Dr. Nagy Nándor <b>His/her workplace, phone number:</b> Department of Anatomy, Histology and Embryology, 53613 <b>Position:</b> senior associated professor <b>Date and registration number of their habilitation:</b> Semmelweis Univ, 2011. 06. 09; ID: 325
<b>Objectives of the subject, its place in the medical curriculum:</b> 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 regenerative medicine.
<b>Place where the subject is taught (address of the auditorium, seminar room, etc.):</b> Department of Anatomy, Histology and Embryology,
<b>Successful completion of the subject results in the acquisition of the following competencies:</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.
<b>Course prerequisites:</b> Developmental Biology I.
<b>Number of students required for the course (minimum, maximum) and method of selecting students:</b> minimum: 1 maximum: 90

<p><b>How to apply for the course:</b> registration on the Neptun, according to the order of application</p>
<p><b>Detailed curriculum:</b> <i>(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)</i></p> <p>1st week: Neural stem cells: pattern formation of neural tube, development of the nervous system (Krisztina Herbert-Minkó) 2nd week: Placods and their derivatives (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)</p>
<p><b>Other subjects concerning the border issues of the given subject (both compulsory and optional courses!). Possible overlaps of themes:</b> Microscopic Anatomy and Embryology I.-II. Molecular cell biology I.</p>
<p><b>Special study work required to successfully complete the course:</b> <i>(E.g. field exercises, medical case analysis, test preparation, etc.)</i> There is no special study work required to successfully complete the course</p>
<p><b>Requirements for participation in classes and the possibility to make up for absences:</b> 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.</p>
<p><b>Methods to assess knowledge acquisition during term time:</b> <i>(E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results)</i> There are no assessments during term time.</p>
<p><b>Requirements for signature:</b> Attendance on at least 75% of the lectures is needed for the end-term signature</p>
<p><b>Type of examination:</b> written (electronic / Moodle type) test</p>

<p><b>Requirements of the examination:</b>  <i>(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)</i></p> <p>Neural stem cells: pattern formation of neural tube, development of the nervous system  Placods and their derivatives  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</p>
<p><b>Method and type of evaluation:</b>  <i>(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)</i></p> <p>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.</p>
<p><b>How to register for the examination?:</b>  registration on the neptun</p>
<p><b>Possibilities for exam retake:</b>  according to the Study and examination regulations</p>
<p><b>Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material:</b>  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</p>
<p><b>Signature of the habilitated instructor (course leader) who announced the subject:</b></p>
<p>Signature of the Director of the Managing Institute:</p>
<p><b>Hand-in date: 05. 07. 2020</b></p>

<p><b>Opinion of the competent committee(s):</b></p>
<p><b>Comments of the Dean's Office:</b></p>
<p><b>Dean's signature:</b></p>