

<b>Level:</b> master				
<b>Course title:</b> CELL DETERMINATION AND DIFFERENTIATION				
<b>Status:</b> elective				
<b>ECTS:</b> 5				
<b>Requirements:</b> -				
<b>Learning objectives</b> Learning objective is to offer students a detailed insight into determination and differentiation mechanisms of animal cells, as well as insight into contemporary knowledge and research in the discipline. With regard to previously obtained knowledge on cell biology, embryology and genetics, this subject discusses determination and differentiation as specific mechanisms in morphogenesis and growth of animal tissue cells and organs.				
<b>Learning outcomes</b> Upon successful completion of pre-examination and examination tasks students will be able to understand: <ul style="list-style-type: none"> <li>- determination mechanism of embryo cells and influencing factors</li> <li>- differentiation process of animal cells and mechanism for preservation of the differentiated condition</li> <li>- differentiation mechanism of particular cell types, as well as the process of cell organisation into tissues</li> <li>- ways to control cell differentiation</li> <li>- ways to control cell growth, tissues and organs</li> </ul>				
<b>Syllabus</b> <i>Theoretical instruction</i> Determination of embryonic cells. Fate maps. Cytoplasmic determinants. Principles of cell differentiation. Intercellular communication. Cell adhesion. The role of extracellular matrix in cell differentiation. Cytoskeleton and changes in cell shape. Gene expression during differentiation. Mechanisms to preserve differentiated condition of cells (division of differentiated cells, differentiation of stem cells, differentiation of pluripotent stem cells). Differentiation of liver cells. Differentiation of cartilage and bone cells. Skeletal muscle differentiation and regeneration. Cell differentiation control. Cell organisation within tissues. Tissue culture. Organism growth mechanism. Hormones and growth factors. Control of cell cycle and growth. Cancer genesis. Mitogenic processes (growth factors, transcription factors, cytoskeleton-associated protein). Growth measurement. <i>Practical instruction</i> Monitoring the differentiation process of different cell types and their organisation into tissues by application of computer animation (virtual exercises). Monitoring and measuring the cell growth on fibroblast cultures. Introduction to Internet information use on processes of particular cell types determination and differentiation, as well as influencing factors.				
<b>Weekly teaching load</b>				Other:-
Lectures: 2	Exercises: -	Other forms of teaching: 3	Student research:-	