

Module name	<b>Animal histology and embryology</b>
Module code	B-BE.046E
ISCED code	0511: Biology
Study cycle	I <sup>o</sup>
Semester	summer
Responsible for this module	dr hab. Monika Hułas-Stasiak Department Functional Anatomy and Cytobiology email: monika.hulas-stasiak@poczta.umcs.lublin.pl
Language of instruction	English
Website	
Prerequisites	Knowledge of basic issues in cytology, histology and human anatomy
ECTS	6.5
ECTS points hour equivalents	Contact hours (work with an academic teacher) – 75 - lectures: 30 - labs: 45 Non-contact hours (students' own work) – 88 - preparation for the exam: 30 - preparation for labs: 30 - literature study: 28 <b>Total number of ECTS points for the module – 6.5</b>
Learning outcomes verification methods	Laboratory: written partial tests oral presentation /activity during classes Lecture: final test participation in lectures
Course full description	<b>Histological part</b> 1. General structure of the human body - hierarchy of construction (from the cell to the body). 2. Tissues building the human body. Epithelial tissue. 3. Muscle and nervous tissue - structure, differentiation and function. 4. Connective tissue - structure, differentiation and function. 5. Digestive system - organs topography, structure and function. 6. Respiratory system - organs topography, structure and function . 7. Cardio-vascular and lymphatic systems - organs topography, structure and function. 8. Urinary system - topography of organs, structure and function. 9. Endocrine system - principle of functioning, organ topography, structure and function. 10. Nervous system - structure and function. 11. Sensory organs: sight, hearing, organ of balance 12. Skin - the epidermis and its products. Dermis and subcutaneous tissue. <b>Embryological part</b> 1. Male reproductive system - organs topography, structure and function.

	<p>2. Female reproductive system - organs topography, structure and function.</p> <p>3. Hormonal regulation of the male and female reproductive systems</p> <p>4. The first steps of embryo development</p> <ul style="list-style-type: none"> <li>- Capacitation, fertilization</li> <li>- Cleavage (types, characteristic features, furrows: vertical, horizontal), blastula</li> <li>- Gastrulation , ecto, meso- and endoderm differentiation into tissue</li> </ul> <p>5. Amphibian development</p> <ul style="list-style-type: none"> <li>- external or internal fertilization</li> <li>- frog egg organisation, cleavage (holoblastic- complete cleavage, micromeres, macromeres)</li> <li>- structure of blastula (blastocoel, blastoderm)</li> <li>- gastrulation (blastopore, germ layers: ectoderm, mesoderm (grey crescent), endoderm), fate map of a frog embryo, way of gastrulation, gastrulation in detail (bottle cells, prechordal plate, chordamesoderm cells, notochord, ectoderm, endoderm, archenteron)</li> <li>- neurulation (neurula, ectoderm differentiation into: neural tube (in future brain and spinal cord), neural crest and epidermis)</li> <li>- mesoderm differentiation (paraxial mesoderm- somites, intermediate mesoderm- nephrotomes (gonads and urinary system), lateral mesoderm- splanchnic and somatic or visceral and parietal mesoderm)</li> <li>- organogenesis (primitive organs: notochord, neural tube, gut)</li> <li>- derivatives of germ layers</li> </ul> <p>6. Bird development</p> <ul style="list-style-type: none"> <li>- chicken reproductive system</li> <li>- anatomy of an egg (polylecithal, telolecithal egg)</li> <li>- cleavage (meroblastic, discoidal, area pellucida, area opaca, blastodisc, blastoderm, epiblast, hypoblast, blastocoel, subgerminal space, Koller's sickle region)</li> <li>- gastrulation (primitive streak, primitive knot=Hensen's node, gastrulation in detail, germ cell layers, intraembryonic mesoderm, extraembryonic mesoderm)</li> <li>- ectoderm, mesoderm, endoderm differentiation (see amphibian development)</li> <li>- extraembryonic tissue (chorion, amnion, allantois, and yolk sac, function)</li> <li>- blood circulation in chicken embryo (three systems: vitelline- yolk sac, allantois and chicken circulation)</li> </ul> <p>7. Mammals development</p> <ul style="list-style-type: none"> <li>- cleavage – the unique nature of mammalian cleavage</li> <li>- embryo compaction and cavitation (outer and inner cells)</li> <li>- blastula=blastocyst (embryoblast and trophoblast,</li> </ul>
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	<p>blastocoel)</p> <ul style="list-style-type: none"> <li>- implantation (definition, phases)</li> <li>- placenta (trophoblast differentiation)</li> <li>- placenta structure and functions</li> <li>- classification of placental types</li> <li>- gastrulation (germ disc, epiblast, hipoblast, primitive streak, amnioblast, amniotic cavity)</li> <li>- germ layer (ectoderm, mesoderm, endoderm differentiation)</li> <li>- extraembryonic tissue, (chorion, amnion, allantois, and yolk sac, differences between chicken and human)</li> <li>- development of monozygotic twins</li> </ul>
Bibliography	<ol style="list-style-type: none"> <li>1. Sadler TW. Medical Embryology. Lippincott Williams and Wilkins, 2006,</li> <li>2. Gilbert SF. Developmental biology, 9th edition. Sinauer Associates.2010</li> <li>2.Stevens A., Lowe J. Human Histology, 2010</li> </ol>
Learning outcomes	<p><b>KNOWLEDGE</b></p> <p><b>Student after completing the course:</b></p> <ol style="list-style-type: none"> <li>1. Understands the importance of sexual reproduction for biodiversity and evolutionary variability of organisms</li> <li>2. Describes the stages of animal development - gametogenesis, fertilization, embryogenesis, organogenesis - their mechanisms and determining factors</li> <li>3. Knows the mechanisms of reproduction, embryonic and fetal development of animals</li> <li>4. Knows the basic notions and terminology used in histology and embryology</li> <li>5. Identifies histology and embryology as the independent disciplines in the biological sciences, can define their subject, scope and methodology</li> </ol> <p><b>SKILLS</b></p> <ol style="list-style-type: none"> <li>1. Has an ability to use the light microscope</li> <li>2. Has an ability to prepare an oral presentation of histological and embryological issues</li> <li>3. Has the ability to recognize histological and embryological slides that correspond to organs, tissues, cells and cellular structures</li> </ol> <p><b>SOCIAL COMPETENCES</b></p> <ol style="list-style-type: none"> <li>1. Adopts an active attitude towards acquisition, extension, and updating the acquired knowledge</li> <li>2. Has an ability to work in a team in order to solve problems, fulfil tasks efficiently and prepares presentation</li> </ol>
Practice	-
Teaching methods	-microscopic observations

	<ul style="list-style-type: none"><li>-demonstration of models and anatomical organs</li><li>- multimedia presentation</li><li>-presentation of oral speeches prepared by students</li><li>- team work</li><li>- didactic discussion</li><li>- explanation</li></ul>
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