

## Histology and Embryology

<p>Short description of subject</p>	<p>Subject of Histology and Embryology lasts 2 semesters and ends up with practical and theoretical exam. Lectures (30h per semester) are held once a week for 2 hours and cover topics from embryology and histology of organs. Practical classes (30h per semester, 2h every week) are obligatory and are divided into theoretical and practical parts. Students gain knowledge about histological structure of tissues and organs which they analyse under microscopes. They may take down notes in a colourful exercise books or printed slides schemes. Detailed rules of the classes and work safety will be demonstrated during the first class. Detailed description of topics are available in Syllabus.</p>
<p>Necessary requirements for practicals</p>	<p>Medical apron is required for practical classes. Students should have exercise books or printed slides schemes from the website. Students should be prepared for coming class</p>
<p>Location</p>	<p>Lectures are in Lecture hall A – Collegium Veterinarium Classes are in classroom no. 236 – Collegium Veterinarium</p>
<p>Person responsible</p>	<p>Collegium Veterinarium, room no. 203 <a href="mailto:karol.rycerz@up.lublin.pl">karol.rycerz@up.lublin.pl</a> Department of Histology and Embryology, Faculty of Veterinary Medicine</p>
<p>Schedule</p>	<p><b>Lectures:</b> <b>Fall semester:</b> 1. Stages of embryonic development, formation of gonads in bird and mammal. 2. Gametogenesis: oogenesis in mammals and birds, primary and secondary egg membranes, spermatogenesis and hormonal regulation, a structure of spermatozoid and comparison of spermatogenesis and oogenesis. 3. Sexual cycle (prooestrus, oestrus, metoestrus, dioestrus) and hormonal regulation. 4. Internal and external insemination, fertilization in mammals: spermatozoid capacitation, acrosome reaction, block to polyspermic fertilization, karyogamy, fertilization in birds – physiological polyspermia 5. Cleavage, types of cleavages depending on types of eggs. 6. Gastrulation in birds. 7. Formation of primary organs in birds: neural tube, neural crest, surface ectoderm, somites, nephrotomeres, lateral mesoderm 8. Embryonal development mechanisms: morphogenetic movements, embryological induction, effect of genes, embryonic regulation, morphogenetic regulation -</p>

apoptosis.

9. Formation of final organs in bird embryo.

10. Formation of fetal membranes in birds and their functions: yolk sac, amnion, allantois and allantoic circulation, chorion.

11. Embryonal development in mammals: embryonic and foetal, preimplantation and postimplantation period.

12. Cleavage in mammalian embryos: morula, blastula, blastocyst.

13. Gastrulation of mammalian embryo.

14. Primaty organs in mammals: neural tube, neural crist, surface ectoderm, somites, nephrotomeres, lateral bilaminar mesoderm

15. Organogenesis in mammalian embryo – formation of sclerotomes, dermatomes, myotomes and their differentiation, formation of kidneys from nephrotomes, surface ectoderm and neuroectoderm differentiation (formation of brain, spinal cord, ganglions), digestive system development form endoderm, development of blood vessels and heart of mammals.

**Spring semester:**

16. Foetal membranes and their functions in mammals: yolk sac, yolk circulation, amnion formation, chorion and its types, amnion and its circulation. Umbilical cord, monoovular and biovular twins.

17. Types of uterus: uterus duplex, uterus bipartite, uterus bicornulate, uterus simplex.

18. Implantation in mammals: superficial, interstitial, different locations of the blastocyst in uterus (middle, eccentric), bastodisc orientation (mesometrial, antimesometrial, orthomesometrial). Hormonal preparation of the uterus for implantation and the course of implantation.

19. Placenta, classification (vitelline, choriovitelline, chorioallantoic), placenta spuria, placenta decidualis, placenta diffuse, cotyledonary placenta, zonary placenta, discoid placenta.

20. Types of placenta according to placental barrier: epitheliochorial, syndesmochorial, haemochorial, haemoendothelial.

21. Functions of placenta: nutritional, respiratory, excretory, endocrine, immunological, fructogenic and glycogenic placenta

22. Pig's placenta.

23. Horse's placenta.

24. Ruminants' placenta

25. Carnivores' placenta.

26. Digestive system: structure and functions of liver and pancreas.

27. Respiratory system: nasal cavity, throat, larynx,

	<p>trachea, lung construction (bronchial and alveolar tree, gas exchange, pulmonary vascularization).</p> <p>28. Excretory system: kidney and kidney types, nephrons, juxtaglomerular apparatus, urinary processes, urinary tract.</p> <p>29. Endocrine system: pituitary gland, adrenal gland, thyroid gland, parathyroid glands, pineal organ, single-celled endocrine glands.</p> <p>30. Integument. Structure and functions of: skin, hair, skin glands. Development, structure and function of the mammary gland, histological structure of the hoof.</p> <p><b>Classes:</b></p> <p><b>Fall semester:</b></p> <ol style="list-style-type: none"> <li>1. Microscope and selected methods of histological study.</li> <li>2. Polymorphism.</li> <li>3. Simple epithelia.</li> <li>4. Stratified epithelia and glands. (1,2,3 test)</li> <li>5. Connective tissue proper.</li> <li>6. Connective tissue proper (continuation).</li> <li>7. Cartilage and bone tissue. (4,5,6 test)</li> <li>8. Blood and marrow.</li> <li>9. Muscle tissue: striated skeletal muscle tissue, smooth muscle tissue.</li> <li>10. Cardiac muscle tissue. (7,8,9 test)</li> <li>11. Nervous tissue.</li> <li>12. Glial tissue.</li> <li>13. Neuronal endings. (10,11,12 test)</li> <li>14. Cardio-vascular system.</li> <li>15. Lymphatic system.</li> </ol> <p><b>Spring semester:</b></p> <ol style="list-style-type: none"> <li>16. Alimentary system – Oral cavity. (13,14,15 test)</li> <li>17. Salivary glands.</li> <li>18. Oesophagus and ruminants' forestomach.</li> <li>19. Stomach of birds and mammals. (16,17,18 test)</li> <li>20. Small and large intestines.</li> <li>21. Large alimentary glands.</li> <li>22. Respiratory system. (19,20,21 test)</li> <li>23. Urinary system.</li> <li>24. Male reproductive system.</li> <li>25. Female reproductive system.</li> <li>26. Endocrine system. (22,23,24,25 test)</li> <li>27. Integumentary system.</li> <li>28. Revision classes.</li> <li>29. Practical colloquium.</li> </ol>
Didactic materials	<p>Pdf files with lecture materials, photos and schemes</p> <p>Books:</p> <ol style="list-style-type: none"> <li>1. Samuelson, Don A. Textbook of veterinary histology. St. Louis : Saunders Elsevier, cop. 2007.</li> <li>2. Dellmann H., Brown E.M. Textobook of veterinary</li> </ol>

	histology. Philadelphia : Lea & Febiger, 1981. 3. Hyttel P., Sinowatz F., Vejlsted M. Essentials of domestic animal embryology. Edinburgh [etc.] : Saunders Elsevier, 2016.
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