

Module title:	Pathophysiology	ECTS	8
Polish translation:	Patofizjologia		
Course:	Veterinary Medicine		

Module language: English		Stage: JM-FVM	
Form of studies: <input checked="" type="checkbox"/> intramural <input type="checkbox"/> extramural	Type of module: <input checked="" type="checkbox"/> basic <input type="checkbox"/> directional	<input checked="" type="checkbox"/> mandatory <input type="checkbox"/> elective	Semester: V <input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester
Academic year:		Intake 2022/2023	Catalogue number: FVM-V-JMSS-05W- B56_22

Module coordinator:	Prof. dr hab. Anna Winnicka
Teachers responsible for the module:	Academic teachers of the Institute of Veterinary Medicine; PhD students following the internal legal acts; visiting professors; other specialists in the field of study
Objectives of the module:	<p>LECTURE TOPICS [60 hours]:</p> <ul style="list-style-type: none"> • Homeostasis and its mechanisms of control. Disease – the definition and origin. Principles of nosology, categories of disease. Ageing and death. • Cytopathology. Mechanisms of reversible and irreversible cell injury. Ischemia and hypoxia. Detrimental effects of free radicals. • Inflammation (acute inflammation). Mediators of inflammation, pro- and anti-inflammatory cytokines and eicosanoids, functions and actions. • Inflammation (haematological signs of inflammation, chronic inflammation). Heterophagy and intracellular microorganism killing mechanisms. Regeneration and repair. Wound healing. • Nutrition. Deficiencies causing nutritional imbalances. Metabolic adaptation to starvation. Pathogenesis of diseases related to vitamin and mineral deficiencies. Part I and II. • Environmental factors leading to disease: changes in barometric pressure, ambient temperature (extreme cold and heat), electrical injuries, exposure to sunlight, and ionizing radiation. • Circulatory insufficiency. Cardiomyopathies, valve insufficiency, acute and chronic left heart failure. Shock - types, phases, consequences and therapeutic interventions. • Disturbances in water and mineral balance. Pathogenesis and adaptation to dehydration: isotonic, hypotonic and hypertonic. Over-hydration: hypotonic, hypertonic and isotonic. Basic mechanisms leading to the formation of oedema. Pathogenesis of oedema in heart, liver and kidney disease. • Disturbances in acid-base balance. Pathogenesis and control of acid-base balance. Metabolic acidosis and alkalosis. • Disturbances in endocrine regulations. Mechanisms of primary and secondary endocrine imbalances. Pathogenesis and clinical manifestations in endocrinopathies. • Pathophysiology of digestive tract disorders. Ventricular disorders in monogastric and ruminant animals. Rumen acidosis and alkalosis. Bloat (ruminant tympany). Pathomechanism of diarrhoea. • Metabolic diseases. Ketosis in ruminants. Parturient paresis in cattle. Myopathies in horses. • Pathophysiology of respiratory tract disorders. <p>LABS TOPICS [45 hours]:</p> <ul style="list-style-type: none"> • Blood and haematopoiesis. Pathophysiology of anaemia. • Blood and haematopoiesis. Erythrocyte disorders. • Leukocyte kinetics and disorders. Part I and II. • Disorders of blood coagulation. • Haematological signs of inflammation and other pathological conditions. • Pathophysiology of diabetes mellitus. Pathophysiology of adrenal disorders. • Phagocytosis and intracellular killing. • Thermoregulation. Fever. Acute phase response. • Pathophysiology of the circulatory system. Circulatory failure. • Local circulatory disorders (hyperaemia, ischemia, thrombus, embolus, infarct). • Cardiac rhythm disorders, ECG. • Pathophysiology of neoplasia. <p>The content of the lectures supplements the content of the laboratory classes.</p>
Teaching forms, number of hours:	Lectures: hours 60 Laboratory classes: hours 45

Teaching methods:		<ul style="list-style-type: none"> • Original multimedia presentations prepared by academic teachers. • Short presentations prepared by the students, on the topics selected from the list given by the teacher, followed by discussion. • Methods aimed at teaching practical skills: <ul style="list-style-type: none"> • microscopic practice, • students group working on the topics given by the teacher (according to the materials prepared by the teacher), including discussion, conclusion and the use of scientific sources, • individual and group work on the interpretation of basic diagnostic tests (from the materials given by the teacher) in the context of mechanisms that produce observed results. • Detailed schedule of the classes will be defined by the coordinator of the course at the beginning of semester. • Consultations 1 hr/week; the consultation schedule will be determined by the course coordinator at the beginning of the semester. 		
Formal prerequisites and initial requirements:		Passing the courses: Cell Biology, Histology and Embryology Modules 1-2, Animal Anatomy Modules 1-2, Biochemistry Modules 1-2, Biophysics, Animal Physiology Modules 1-2, Immunology		
Learning effects		Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	Student knows the mechanisms of homeostasis, its regulation and the changes during life cycle. Student understands the general criteria for differentiation between health and disease in individual animals, the herd and population. Student knows the general classification of the diseases and the types of the onset	A.W.9 A.W.2; A.W.4; A.W.5; A.W.12; B.W.1; A.W.10 A.W.7	3 2 1
	2	Student knows the mechanisms and the effects of environmental factors on the organism of certain companion and farm animal species and the herd health	A.W.11 A.W.2; A.W.4; A.W.10; A.W.12; B.W.1 A.W.7	3 2 1
	3	Student knows the mechanisms responsible for cellular function disorders, cellular regulatory mechanisms, the mechanisms of cellular pathologies and cellular death	A.W.4; A.W.10; A.W.11; A.W.12; B.W.1	2
	4	Student knows the onset and role of inflammation in the pathologies of organs and systems	A.W.10; A.W.11; A.W.12; B.W.1; B.W.2 A.W.4	2 1
	5	Student knows the causes, onset and the effects of systemic disorders that occur in the diseases of organs and systems	A.W.11; B.W.1; B.W.2 A.W.5; A.W.12 A.W.2; A.W.4	3 2 1
	6	Student knows the mechanisms of organ diseases in certain companion and farm animal species	A.W.11; B.W.1; B.W.2 A.W.2; A.W.10; A.W.12 A.W.4; A.W.5; B.W.3	3 2 1
	7	Student knows the relations among pathological processes in the organism	A.W.11; B.W.1; B.W.2 A.W.5; A.W.10; A.W.12 A.W.2; A.W.4	3 2 1
	8	Student is familiar with the current nomenclature	A.W.20	2
Skills:	1	Student is able to describe the general mechanisms responsible for health and diseases comprehensively enough for effective communication with other members of veterinary team and the animal's owner	A.U.4; A.U.7; A.U.12; A.U.13; A.U.14; A.U.15 A.U.1; A.U.5; B.U.20	3 1
	2	Student is able to use the current nomenclature	A.U.12; A.U.13; A.U.14; A.U.15 A.U.4; A.U.7; B.U.20	3 2
	3	Student is able to interpret symptoms of the diseases in the context of mechanisms that produced these symptoms	A.U.4; A.U.5; A.U.12; A.U.19; A.U.21; A.U.23 A.U.1; B.U.6; B.U.7; B.U.20	2 1
	4	Student is able to indicate the relations among pathological processes	A.U.4; A.U.5; A.U.12; A.U.19; A.U.21; A.U.23 A.U.1; B.U.6; B.U.7; B.U.20	2 1
	5	Student is able to indicate the differences among pathological processes typical for certain companion and farm animal species	A.U.4; A.U.5; A.U.12; A.U.19; A.U.21; A.U.23 A.U.1; B.U.6; B.U.7; B.U.20	2 1
	6	Student is able to interpret the results of basic diagnostic tests in the context of organ and systemic pathologies,	A.U.4; A.U.8; B.U.20 A.U.5; A.U.7; A.U.12; A.U.13; A.U.23; B.U.6 A.U.1; A.U.15; A.U.19; A.U.21; B.U.7	3 2 1
	7	Student is able to evaluate CBC in inflammation	B.U.6	2
	8	Student is able to use the scientific sources as a help in clinical issues	A.U.21; A.U.23 B.U.20	3 2
Competences:	1	Student formulates the opinions taking into account cellular and organ pathologies as a basis for clinical presentation of the disease and the onset of therapeutic process	KS.5 KS.1; KS.4; KS.6; KS.7; KS.8; KS.9	3 2
	2	Student is prepared to use the sufficient knowledge and skills for further application in the learning process	KS.4; KS.5; KS.8; KS.9 KS.1; KS.2; KS.6; KS.7 KS.3	3 2 1
	3	Student is aware of having knowledge, understands the necessity of consultancy and is prepared to share the	KS.1; KS.2; KS.3; KS.4; KS.7; KS.8; KS.9 KS.5; KS.6	3 2

		competencies with the veterinary team and the animal's owner		
	4	Student is aware of the necessity of constant education using scientific sources	KS.1; KS.2; KS.4; KS.6; KS.7; KS.8 KS.3; KS.5; KS.9	3 2
Objectives of the module required to obtain learning effects:		The discipline "Pathophysiology" introduces students to clinical medicine. The main goal is to provide students with information about the causes (aetiology) and progress (pathogenesis) of disease. Students should accomplish the understanding of how disturbances in homeostasis lead to the onset and progression of disease. The dynamics of the disorder depending on the severity of the disease should allow the evaluation of possible outcomes and prognosis for recovery.		
Assessment methods:		<ul style="list-style-type: none"> • Passing the labs: two tests – 30 questions each (multiple choice test, 0.5 points per correct answer). In each colloquium, the Student can collect max. 15 points (min. 10 points to pass). If the minimum number of points is not obtained, it can be corrected on the second entry. Both terms have the same form. To pass the labs student must collect 20 points from both colloquiums (10 points from each, possible max. 30 points). • A short presentation (topic selected by the student from the given list) must be prepared by each student once during the course. The student can collect 0-10 points for the presentation. The grade is based on the presented content and discussion. • Final exam: to enter the final exam, the student must pass the labs. The final exam contains 100 questions (multiple choice test, 1 point per correct answer). To pass, the student must collect 60 points. Retake is provided for students who failed or could not attend the first term. Both terms have the same form. • In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted. 		
Detail description of assessment methods; Formal documentation of learning outcome:		<ul style="list-style-type: none"> • No extra assessment methods are anticipated. • eHMS entry. • Records collected in the course portfolio i.e. individual records of student results, presence lists, database of oral and written questions, and written assessments of the students. 		
Elements impelling final grade:		<ul style="list-style-type: none"> • Attendance to the classes is mandatory, student can be absent on 20% of labs or according to the current academic regulations. • The final grade is based on the points from the final test and the points collected during the colloquiums and the seminar. • The following scale is used to grade the final grade: 0-80 failing grade (2), 81-92 passing grade (3), 93 – 104 passing plus grade (3.5), 105 – 116 good grade (4), 117 – 128 good plus grade (4.5), 129 – 140 excellent grade (5). 		
Teaching base:		Labs facilities and laboratories of the Institute of Veterinary Medicine, lectures – MS Teams.		
Mandatory and supportive materials:		<ol style="list-style-type: none"> 1. Robbins Basic Pathology, 10th Ed. Kumar V., Abbas A.K., Aster J. Elsevier, 2017 2. Pathologic basis of veterinary disease. M. D. McGavin and J. F. Zachary. Elsevier, 2016 3. Pathophysiology. I. Damjanov, Saunders, Elsevier, 2008 4. Fundamentals of Veterinary Clinical Pathology. S. L. Stockham, M. A. Scott. Blackwell Publ., 2008 5. Introduction to veterinary pathology. N. F. Cheville, Blackwell Publishing, 2006 6. Mechanisms of disease. A textbook of comparative general pathology. D. A. Slauson, B. J. Cooper. Mosby, 2001 Relevant scientific publications, including those of the module coordinator.		
ANNOTATIONS				

* 3 – complete and detailed, 2 – moderate, 1 – basic.

Quantitative summary of the module:

Estimated number of work hours per student (contact and self-study) essential to achieve presumed learning outcomes of the module - base for quantifying ECTS:	240 h
Total ECTS points, accumulated by students during contact learning:	4 ECTS