

Module title:	Regenerative Medicine	ECTS	4
Polish translation:	Medycyna Regeneracyjna		
Course:	Veterinary Medicine		

Module language: English	Stage: JM-FVM		
Form of studies: ☒ intramural ☐ extramural	Type of module: ☐ basic ☐ mandatory ☒ directional ☒ elective	Semester: 10	☐ winter semester ☒ summer semester
Academic year:		Intake 2021/2022	Catalogue number:

Module coordinator:		Prof. Romuald Zabielski Dr Sc; Joanna Bajon PhD, DVM		
Teachers responsible for the module:		Academic teachers of Center for Translational Medicine (CMT), PhD students, visiting professors and other specialists in the field of study.		
Assumptions, Goals, and Course Description		Regenerative Medicine (RM) encompasses clinical activities related to the regeneration of organs and tissues using a range of tissue engineering and molecular biology techniques. RM refers to all activities aimed at treating, among others, bodily damage resulting from injuries, neoplastic diseases, and genetic disorders. Regenerative medicine also includes the cultivation of tissues and organs in laboratories for the purpose of transplantation when the body's regenerative capabilities are limited or impossible. These activities concern both human and veterinary medicine. RM should be considered in two ways: as a clinical module for modern veterinary medicine and as a module preparing for conducting in vitro and in vivo research for the benefit of human medicine (translational medicine). Regenerative medicine is an interdisciplinary field combining knowledge from tissue engineering, molecular biology, and transplantology, as well as immunology and oncology.		
Teaching forms, number of hours:		a) Lectures; hours 10; b) Laboratory classes; hours 20; c) Clinical laboratories; hours 30;		
Teaching methods:		Original multimedia presentations with the use of photographic and video materials. Practical classes conducted in laboratories equipped with the necessary apparatus for sample collection, cell culture, tissue storage, and physico-chemical analyses, etc., using consumable equipment. Practical exercises on phantoms/cadavers using veterinary materials. Preparation of a project/presentation concerning the application of regenerative medicine techniques/methods in clinical practice or the solution of a specific scientific problem – presentation and defence of the project based on data/materials available in the scientific literature. Consultations outside the regular course schedule. The method of organizing consultations will be determined by the course coordinator at the beginning of the semester.		
Formal prerequisites and initial requirements:		The student possesses the knowledge and skills acquired through the completion of core subjects in the semesters preceding the Regenerative Medicine module. Completed subjects: Histology and Embryology, Cell Biology, Biophysics, Chemistry, Biochemistry, Animal Physiology, Pathophysiology, Immunology.		
Learning effects		Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	Student knows the principles of culturing cells, tissues, and organs in the laboratory for regenerative purposes.	A.W1, A.W3., A.W4, A.W12, B.W1, B.W6	3
	2	Student understands the principles of implanting biological material into experimental animals, including techniques supporting healing processes, as well as the possibilities and limitations of therapies using stem cells.	A.W1, A.W3, A.W12, B.W1, B.W2, B.W6	3
Skills:	1	Student is able to design an experimental protocol for research in the field of regenerative medicine.	A.U2, A.U5, A.U8, B.U6, B.U13	3
	2	Student can assess the healing process and the appropriateness of applying regenerative medicine techniques.	A.U2, A.U5, A.U8, B.U6, B.U13	2
Competences:	1	Student has the competence to evaluate their own knowledge and use scientific sources to supplement it.	KS.4	3
	2	Student has the competence to share knowledge with others.	KS.6	3
	3	Student has the competence to work effectively in a team.	KS.4	2
Objectives of the module required to obtain learning effects:		Lectures: Fundamentals of Regenerative Medicine – a comparative approach. Stem cells (MSCs) – mechanisms of action and clinical applications. Platelet-rich plasma (PRP) – orthopedics and tissue regeneration. Biomaterials, biological dressings, and tissue regeneration. Production diseases of cattle in regenerative medicine.		

	Laboratory exercises: Preparation and validation of blood-derived products and their application in veterinary medicine. Isolation and culture of stem cells for clinical use in veterinary medicine. Preparation of various types of dressings, including biological collagen and chitin dressings as well as porcine skin xenografts. Preparation of protocols for the use of selected regenerative medicine procedures in veterinary practice. Clinical exercises: Collection of biological material for the production of stem cells (various biopsy techniques). Collection of biological material for the preparation of biological dressings. Treatment using blood-derived products in orthopaedics and ophthalmology in horses and small animals. Intra-articular and peri-articular administration techniques on isolated limbs. Techniques of allogeneic and xenogeneic grafts in extensive skin defects. Practice of transplantation techniques and application of biological dressings on a model.
Assessment methods:	Project, student's activity during practical classes 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:	Evaluation of the project task will be based on compliance of the content with the assigned topic, correct reasoning, formulation of rational solutions, participation in discussion, and responses to questions. Assessment of the student's level of preparation and activity during classes. In the event of a top-down suspension of on-campus classes and the necessity to implement remote or hybrid teaching, alternative methods of verifying the achieved learning outcomes may be applied, appropriate to the situation. Record into the eHMS system and documentation contained in the 'Course File' (i.e. student assessment cards, attendance lists, students' essays).
Elements impelling final grade:	The final course grade is influenced by the following elements: - evaluation of completion of the project task, - evaluation of student activity in class.
Teaching base:	Lecture and exercise rooms at the CMT and FVM, laboratories.
Mandatory and supportive materials : 1. „Principles of Regenerative Medicine“. Author: A Atala. Editor: Academic Press, 2018. 2. „Regenerative Biology and Medicine“. Author: D.L Stocum, Editor: Academic Press, 2012. 3. „Regenerative Medicine and Stem Cell Biology“. Author: N. El-Bardi, Editor: Springer, 2020, ed 1. Relevant scientific publications in the field of course, including those recommended by the module coordinators.	
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:	100 h
Total ECTS points, accumulated by students during contact learning:	3 ECTS