Experimental immunology
Educational subject description sheet

Basic information

Field of study Veterinary Medicine	**Didactic cycle** 2024/25
Speciality -	**Subject code** WETFVMS_D.520P.01715.24
Organizational unit Faculty of Veterinary Medicine	**Lecture languages** english
Study level long-cycle	**Mandatory** Elective subjects
Study form full-time studies	**Block** Basic subjects
Education profile General academic	**Disciplines** Veterinary medicine

Coordinator	Kinga Majchrzak-Kuligowska

Teacher	Kinga Majchrzak-Kuligowska

Period Semester 6	Examination Pass with grade Activities and hours Lecture: 6 Laboratory exercises: 3 Seminar exercises: 6	Number of ECTS points 1

Goals

Code	Goal
C1	Familiarize students with the methods of searching for current scientific knowledge
C2	Developing the ability to present scientific information through presentations on the selected topics from the experimantal immunology field
C3	transfer of knowledge in the field of immune cell culture

Entry requirements

Animal physiology 2, Immunology

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the differences between immune cells subset and their function in inflammation process, tumour microenvironment and autoimmune diseases	B.W1	Presentation, Test (written or computer based)
W2	the principles and staining methods for flow cytometry analysis and basic techniques for immunological assessments	B.W1, B.W6	Presentation, Test (written or computer based), Assessment of work in the laboratory
W3	the methods of immune cells isolation, activation and culture in laboratory conditions	B.W1	Test (written or computer based), Assessment of work in the laboratory
Skills – Student can:			
U1	explain the principles and requirements of immunological research studies	B.U6	Presentation, Test (written or computer based)
U2	analyse information from publicly available databases, especially scientific papers	B.U6	Presentation
U3	perform a simple staining of immune cells for flow cytometry analysis, count immune cells, handle immune cells in the laboratory condition	B.U6	Assessment of work in the laboratory
Social competences – Student is ready to:			
K1	evaluate and interpret the functioning of the immune cells in the context of antitumor immune response and inflammation	KS.4, KS.5	Presentation
K2	critically analyse scientific papers, present it and discuss it among his peers	KS.4, KS.7, KS.8, KS.9	Presentation
K3	uses scientific sources to expand and updates his knowledge	KS.8	Presentation

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	During the lectures students are receiving advanced information about immune system, how to culture different types of immune cells (lymphocytes, NK cells, macrophages and dendritic cells), how to analyse immune cell subsets (i.e. using flow cytometry). Additionally, students learn about investigation of immune system in tumour microenvironment, inflammation and autoimmune diseases. The basic knowledge about flow cytometry, molecular biology and other modern techniques in immunological research is also provided.	W1, W2, W3, U1, K1	Lecture
2.	During practical classes students participate in the research conducted in the laboratory including immune cells isolation, culture and flow cytometry analysis.	W2, W3, U1, U3, K1	Laboratory exercises
3.	During seminars groups of students present review of scientific article concerning immunological research of their choice. Students learn how to search for scientific papers, how to present scientific results and discuss presented topics.	U1, U2, K2, K3	Laboratory exercises, Seminar exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture
Laboratory exercises	Laboratory (experiment), learning by experiment
Seminar exercises	Presentation

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	75%
Laboratory exercises	Assessment of work in the laboratory	5%
Seminar exercises	Presentation	20%

Activities	Credit conditions
Lecture	Students are required to complete the test at the end of semester (test contains 15 test questions, 1 point per question; 8 points necessary to pass the test). The retake of the test is in the same form. For the test all material from the lectures and seminar as well as relevant material from supportive literature applies. During the semester, the student may receive a maximum of 20 points (15 points from the test; a minimum of 8 points is required) and a seminar (max. 5 points) + additional points for activity (discussion, answers to questions, completion of tasks) - max. 3 points. Student must get a minimum of 51% of points to pass the semester (excluding points for activity). Criterion for issuing the semester grade: 10.5 - 12 points - satisfactory (3.0) 12.5 - 14 points - satisfactory plus (3.5) 14.5 - 16 points - good (4.0) 16.5 - 18 points - good plus (4.5) 18.5 - 20 points - very good (5.0)

Activities	Credit conditions
Laboratory exercises	The student is required to participate in the research conducted in laboratory and take notes from the experiments performed, in accordance with the instructions of the teacher. At the end of the class, the teacher checks laboratory notes and asks verification questions. The condition of passing the classes is the teacher's approval of the individual laboratory notes prepared by the student during laboratory class.
Seminar exercises	Each student is required to prepare and deliver a presentation during the seminar classess. The seminars are concerning topic of chosen scientific publication. Seminar topics are proposed by the teacher in the form of the list of newest scientific publication to be analysed. Students select one publication from the proposed pool according to their interests or propose their own seminar topic, that need to approve by the teacher. Students work on the one publication individually or in the small group (2-3 persons). Positive evaluation of the seminar is one of the conditions for passing the semester. The seminar is scored on a scale of 0-5 points (explanation of the scientific topic of the publication, appropriate description of scientific background, discussion of results, manner of presentation, formulation of opinions, conducting discussions, appropriate answers to questions).

Literature

Obligatory

1. Day Michael J. Veterinary Immunology. Principles and Practice 2014 by CRC Press
2. Callahan Gerald N. Basic Veterinary Immunology, University Press of Colorado, 2014
3. the National Center for Biotechnology Information database - www.pubmed.com

Calculation of ECTS points

Activity form	Activity hours*
Lecture	6
Laboratory exercises	3
Seminar exercises	6
Preparation of a multimedia presentation	10
Preparation for the test	5
Student workload	**Hours** 30
Number of ECTS points	**ECTS** 1

* hour means 45 minutes

Effects

Code	Content
KS.4	label.effect.prefix.competenceAbsolwent jest gotów do korzystania z obiektywnych źródeł informacji
KS.5	label.effect.prefix.competenceAbsolwent jest gotów do formułowania wniosków z własnych pomiarów lub obserwacji
KS.7	label.effect.prefix.competenceAbsolwent jest gotów do rzetelnej samooceny, formułowania konstruktywnej krytyki w zakresie praktyki weterynaryjnej, przyjmowania krytyki prezentowanych przez siebie rozwiązań, ustosunkowywania się do niej w sposób jasny i rzeczowy, także przy użyciu argumentów odwołujących się do dostępnego dorobku naukowego w dyscyplinie
KS.8	label.effect.prefix.competenceAbsolwent jest gotów do pogłębiania wiedzy i doskonalenia umiejętności
KS.9	label.effect.prefix.competenceAbsolwent jest gotów do komunikowania się ze współpracownikami i dzielenia się wiedzą
B.U6	label.effect.prefix.skillAbsolwent potrafi pobierać i zabezpieczać próbki do badań oraz wykonywać standardowe testy laboratoryjne, a także prawidłowo analizować i interpretować wyniki badań laboratoryjnych
B.W1	label.effect.prefix.knowledgeAbsolwent zna i rozumie zaburzenia na poziomie komórki, tkanki, narządu, układu i organizmu w przebiegu choroby
B.W6	label.effect.prefix.knowledgeAbsolwent zna i rozumie sposób postępowania z danymi klinicznymi i wynikami badań laboratoryjnych i dodatkowych