University of Gdańsk

Subject card

Subject name and code	Genetic modification olf animals, PG_00192256		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Patrycja Koszałka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	15	5.0	30.0	50

Subject objectives

Providing in-depth contemporary knowledge of (1) theoretical foundations of the molecular basis for introducing genetic changes into the animal genome, with knowledge of the advantages and disadvantages of each method and problems related to the phenotypic analysis of modifications, (2) methodology necessary in working with animals and their tissues in the process of genetic modification of animals, (3) applications of transgenic animals in science and economy, (4) specialized terminology and conceptual framework related to the acquisition, analysis and use of genetically modified animals.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology, is able to analyze them in an interdisciplinary approach and assess their ethical, social and environmental implications.	The student knows and understands the molecular basis for introducing genetic changes into the animal genome, as well as the advantages and disadvantages of individual methods, along with possible problems related to the phenotypic analysis of modifications.	[SW4] test/exam - oral or written
[BIOTECHMU2_W02] The graduate has in-depth knowledge of the application of laboratory techniques and methods of genetic modification of cells and organisms and their use in biotechnology.	The student knows and understands the basics of working with animals and their tissues in the process of genetic modification of animals and their application in science and economy.	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>1. Animal transgenesis - definitions.

2. Methodology related to working with laboratory animals and their tissues, e.g.

- elements of embryology and breeding and surgical procedures necessary for transgenesis

- obtaining and culturing embryonic stem cells.

3. Biological phenomena that should be taken into account when targeting genome modification and analysis of phenotypic changes, e.g. karyotype disorders, parental imprinting, inheritance of phenotypic traits.

4. Germline mutagenesis - the broadest section (approx. half of the program content) including an extended discussion of genome modification techniques using e.g. defective viruses, transposons, artificial chromosomes, DNA recombination (including methods using DSBs such as CRISPR/Cas9) and system of specific recombinases/integrases.

5. The most common methods of obtaining transgenic animals - theoretical, practical, advantages, disadvantages and applications.

6. Use of transgenic animals.

This course includes CGT-related training content, contributing to the Talent-CGT project under the EIT HEI initiative. It is supported by the European Institute of Innovation & Technology (EIT), a body of the European Union.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>It is required to obtain knowledge, skills and competences related to molecular and cellular biology and genetic engineering.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>BIOTECHMU2_W02</td><td>51.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Variable literature sources provided in lecture materials.</td></tr>
<tr><td>Supplementary literature</td><td>For those interested, a script "Basics of animal transgenesis" prepared as part of the project "PWP: University of Tomorrow: Internationalization of education at the University of Gdańsk through cooperation with the University of Houston-Downtown". It is now outdated but contains interesting, basic literature sources and specific exercises.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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