

**COURSE RECORD**

Code	<b>BENG 623</b>
Name	<b>Transgenic mice</b>
Hour per week	3 (3 + 0)
Credit	3
ECTS	10
Level/Year	Graduate
Semester	-
Type	Elective
Location	AGU
Prerequisites	None
Special Conditions	-
Coordinator(s)	Assistant Prof. Mona El Khatib
Webpage	
Content	Transgenic mice are a valuable model in order to study various human pathologies. This course provides a theoretical overview about the generation of transgenic mice. Moreover, different gene alteration techniques and transgenic mouse models will be discussed throughout the course. By the end of the course, students will be able to design and choose the best transgenic mouse model that best serve their experimental design.
Objectives	<ul style="list-style-type: none"> <li>- Overview about embryonic stem cells and embryo transfer</li> <li>- Overview about gene alteration techniques</li> <li>- Explain the theory behind the generation of transgenic mice and its process</li> <li>- Usage of transgenic mice in basic and translational research</li> <li>- Discuss the best mouse models available to study various human pathologies</li> </ul>
Learning Outcomes	<p>L01: Understand the theory behind the generation of transgenic mice</p> <p>L02: Be able to explain how genetic alterations are made and which techniques are used in the process of the generation of the desired mouse model.</p> <p>L03: Be able to model human diseases in mice and be able to choose the right transgenic mouse model for that</p> <p>L04: Understand the importance and limitations of transgenic mice in translational research.</p>
Requirements	None.
Reading List	Research articles.
Ethical Rules and Course Policy	

**LEARNING ACTIVITIES** *Please, use this one as a reference for your course*

Activities	Number	Weight (%)
Lecture	7	30%
Group Works	2	35%
Presentations	7	35%
Site Visits	0	0%
	Total	100

**ASSESSMENT**

Evaluation Criteria	Weight (%)
Quizzes	20%
Weekly Assignments	15%
Group Project Assignments & Presentations	30%

Attendance/Participation	05%
Final Exam/Submission	40%
<b>Total</b>	<b>100%</b>

For a detailed description of grading policy and scale, please refer to the website <https://goo.gl/HbPM2y> section 28.

**COURSE LOAD** *Please, use this one as a reference for your course*

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	2	14	28
Lab	0	0	0
Group work	2	12	24
Research (web, library)	6	14	84
Required Readings	3	14	42
Pre-work for Presentation	5	14	70
Lab reports	0	0	0
<b>General Sum</b>			<b>248</b>

**ECTS: 10** (Work Load/25-30)

**CONTRIBUTION TO PROGRAMME OUTCOMES\***

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	P013	P014
L01	3	5	3	4	5	5	5	4						
L02	3	5	3	4	5	5	4	4						
L03	3	5	5	5	5	4	4	5						
L04	3	5	5	5	5	5	5	5						

\* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

**WEEKLY SCHEDULE**

W	Topic	Outcomes
1	Introduction to the concept of transgenic animals and the different methods of genetic alterations Activity: None	L01, L02
2	Embryonic stem cell transfer and the injection of nucleic acids into the pronucleus and cytoplasm of fertilized mouse oocyte Activity: Research article discussion	L01, L02
3	Usage of transgenic mice Activity: Research article discussion	L01, L02, L03
4	Homologous Recombination and the Cre/lox system Activity: Research article discussion	L01, L02
5	How to generate mutant mouse models? Activity: Research article discussion	L01, L02
6	CRISPR/Cas9 gene editing technology in mice Activity: Research article discussion	L01, L02, L03, L04
7	Cancer Mouse Models Activity: Research article discussion	L01, L02, L03, L04
8	Mouse Models of Cardiovascular diseases Activity: Research article discussion	L01, L02, L03, L04
9	Mouse Models of Cardiovascular diseases Activity: Research article discussion	L01, L02, L03, L04
10	Mouse Models in Metabolic Disorders Activity: Research article discussion	L01, L02, L03, L04
11	Mouse Models in Neurodegenerative diseases Activity: Research article discussion	L01, L02, L03, L04
12	Humanized Mouse Models Activity: Research article discussion	L01, L02, L03, L04

13	Alternative methods Activity: Research article discussion	L01, L02, L03, L04
14	Ethical Aspects in Using Transgenic Mice Activity: Research article discussion	L01, L02, L03, L04

Prepared by Mona El Khatib  
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