



Sveučilište u Rijeci
University of Rijeka



Syllabus:

DROSOPHILA AS A MODEL ORGANISM IN THE NEUROSCIENCE

Academic year: 2020/2021

Study program: Undergraduate program "Biotechnology and drug research" and Master program "Biotechnology for the Life Sciences"

Code: EBIL132

ECTS points: 3

Language: English

Contact hours: 27 hours (13 Lectures + 8 Seminars + 4 Lab Exercises)

Prerequisite: none

Course coordinator and contact:

Associate Professor Rozi Andretić Waldowski (13 L + 8 S)

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Room 213

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Consultation hours: Course coordinator is available at any time upon previously agreed date and time.

Lecturers and contact hours:

dr.sc. Ana Filošević – 2 hrs LE, 2 groups

ana.filosevic@uniri.hr

mr.sc. Franka Rigo – 2 hrs LE, 2 groups

franka.rigo@uniri.hr

Required reading:

1. Charles D. Nichols: "Drosophila melanogaster neurobiology, neuropharmacology, and how the fly can inform central nervous system drug discovery", Pharmacology & Therapeutics 112 (2006) 677 – 700.



2. J.J. Hagan (ed.), Molecular and Functional Models in Neuropsychiatry, Cahir J. OKane "Drosophila as a Model Organism for the Study of Neuropsychiatric Disorders", Springer Verlag Berlin Heidelberg 2011.
3. A. Prokop. "A rough guide to Drosophila mating schemes", (2013)

Recommended literature:

Web site: <https://droso4schools.wordpress.com/>

Web site: <https://musiceunastavi.wordpress.com/>

Course description :

This course will introduce the students to the importance of model organisms in the basic scientific research. The main focus of this course will be the research that uses laboratory invertebrate, the fruit fly, *Drosophila melanogaster*, in behavioral genetics.

Initially students will learn about the main characteristics of growing and maintaining *D. melanogaster* in the lab. That will be followed by lectures about genetics and genetic techniques that have made *D. melanogaster* a useful model organism. Two days students will spend in the Laboratory for behavioral genetics where they will perform experiments in the field of neurobiology of psychostimulant addiction.

Preparation for the lab exercises will consist of lectures about the neurobiology of addiction and how has the research done using *D. melanogaster* contributed to our understanding of the basic genetic mechanisms of addiction. This part of the course will be organised in the form of Journal club where students will present and discuss original research articles. Results that will be compiled after performing the lab exercises will be used to write a report structured as a short research article.

Study outcomes:

After completing the course students should be able to:

- Describe and understand the advantages of using *Drosophila* as a model organism
- Describe and understand main genetic characteristics that made *Drosophila* good model organism in basic science and translational medicine.
- Describe and understand the type of methodological approaches that are used in the neuroscience research using *Drosophila*
- Gain basic knowledge about different tests that are used to study behavioural phenotypes in *Drosophila*, which represent simple forms of more complex human behaviours
- Gain practical experience in basic *Drosophila* husbandry and observation and measurement of the locomotor behavior in *Drosophila*



- Apply acquired knowledge to discuss research papers about the use of *Drosophila* in translational medicine.

Basic knowledge:

- Basic understanding of *Drosophila*'s development, physiology and behavior
- Basic understanding of commonly used genetic approaches that are used to identify genes and their function using *Drosophila*
- Basic knowledge about different genetic techniques commonly used in *Drosophila* that contributed in identification of genes that influence behaviors such as addiction, circadian rhythms and sleep.

General skills:

- Analytical thinking about different approaches that are used to analyze complex behavior.
- Logical thinking in creating an overview and analysis of the literature related to a specific topic, and writing of a structured seminar or poster.
- Communication skills in presenting and discussing a research paper among peers.

Course content:

Lectures:

- L1. Model organisms in scientific research (1 hour)
- L2. Basic characteristics of *D.melanogaster* (2 hours)
- L3. Neurobiology of addiction and preparation for lab work (1 hour)
- L4. Genetics of *D. melanogaster* (2 hours)
- L5. Genetic techniques and approaches in *D.melanogaster* (2 hours)
- L6. Behaviors induced by ethanol in *D. melanogaster* (1 hour)
- L7. Behaviors induced by psychostimulants in *D. melanogaster* (1 hour)
- L8. Learning and memory (1 hour)
- L9. Neurodegeneration (2 hours)

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Seminars:

- S1. Journal Club 1 (4 hours)
- S2. Journal Club 2 (4 hours)

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Lab excersises (LE):

V1. Measuring of negative geotaxis after oral admininstration of cocaine and methamphetamine in *D. melanogaster* (2 hours)

V2. Measurement of the locomotor activity after oral admininstration of cocaine and methamphetamine in *D. melanogaster* (2 hours)

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Requirements, scoring and grading:

Student activities:

During regular class schedule a student can acquire maximum of 70 points. Of those, the maximum of 30 points can be assigned for the activities relating to the Journal club, another 30 points for writing of lab report and another 10 for the overall activity and interest. Depending on the number of students that participate in this course, Journal club and lab report will be assigned individually or to a small group of students. Each member of a group will be graded the same. The maximum number of points that a student can gain at the final exam is 30.

ACTIVITY	THE MAXIMUM RATIO IN THE TOTAL GRADE	THE MAXIMUM POINTS
Seminar presentation (Journal Club - JC)		
A) JC presentation - preparation	10%	10
B) JC presentation - comprehension	10%	10
C) JC presentation - activity	10%	10
Lab excersises report		
A) Following of the instructions for writing	10%	10
B) Writing and reporting	10%	10
C) Scientific content	10%	10
Overall activity and interest	10%	10
Final exam	30%	30
TOTAL	100%	100



Final exam dates:

1st exam date will be on 02.07.2021.

2nd exam date will be on 19.07.2021.

3rd exam date will be in September decided after consultation with students.

4th exam date will be in September decided after consultation with students.

Grading (according to Pravilnik o studijima Sveučilišta u Rijeci):

The maximum number of points that a student can acquire for activities during lecture, seminars and midterm is 70% of the final grade. On the final exam they can acquire the maximum of 30% of the final grade. If at the end of the course a student has acquired:

- from 0 do 34,9% they can not sign up for the final exam
- more than 35% they can sign up for the final exam

According to the total number of points that a student acquires during classes and final exam they will be graded as follows:

Percent of knowledge and competencies	ECTS grade	National grade
90% do 100%	A	Excellent (5)
75% do 89,9%	B	Very good (4)
60% do 74,9%	C	Good (3)
50% do 59,9%	D	Sufficient (2)
0% do 49,9%	F	Fail (1)

Final grade is the sum of points achieved during classes and on the final exam and the passing grades are: excellent(5), very good (4), good (3) and sufficient (2).

Lecture time table*:

The following time table and its content can be modified due to the epidemiological situation.

DATE	GROUP	TIME	PLACE		Izvođač
21.06.2021.	svi	09:00-12:30	269	L1, L2,L3	R.A.W.
22.06.2021.				HOLIDAY	



23.06.2021.	all	09:00-12:30	On-line	L4,L5	R.A.W.
24.06.2021.	1 2	09:00–11:00 11:15 – 13:15	234	LE 1 LE 1	A.F.
25.06.2021.	1 2	09:00–11:00 11:15 – 13:15	234	LE 2 LE 2	F.R.
28.06.2021.	all	09:00 – 11:30	On-line	L6, S1	R.A.W.
29.06.2021.	all	09:00 – 11:30	On-line	L7, S2	R.A.W.
30.06.2021.	all	09:00 – 11:30	On-line	L8, S3	R.A.W.
01.07.2021.	all	09:00 – 12:30	On-line	L9, S4	R.A.W.
02.07.2021.		09-10	O-30	Final exam	R.A.W.

Additional information:

Ethical code:

Students are expected to behave according to the ethical code as defined in the documents of the University of Rijeka: Etički kodeks Sveučilišta u Rijeci and Etički kodeks za studente.

Satisfaction questionnaire:

In the interest of improving this course we politely ask all students to complete the questionnaire about their satisfaction with the course and with teacher's performance. The questionnaire is anonymous, and the results are important for analysing the quality of the program and all teaching staff at the Department of biotechnology.