LAS-Learning

Trainees Instructions

EU Module 3.1 - Basic and appropriate biology - Species specific: Rat

Development of interactive e-learning modules on specific areas of the Education & Training framework facilitating implementation of DIR 2010/63/EU

Contract n. º 09200200.A092004/2021/862589/SER/ENV.B2

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12/02/2025

v2.0 Second document version

Suported by:

Partners:

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1. Module Description

1.1 Overview

This module - Basic and appropriate biology - Species specific: Rat - provides the minimum background information required for understanding the species-specific behaviour and biology of the laboratory rat. Emphasis is placed on relating the animal's biology to appropriate husbandry and relevant research practices - the essential factors for ethical, reproducible and externally valid research when using model organisms.

This module will cover four topics: Mice and rats are rodents, Rats and mice strains, Using rodent biology to inform research practice, and Rat biology and behaviour.

If you are visiting the site independently, you should consult the EC Training and Education framework guidance document, which provides an overview of training requirements for individuals with different responsibilities under their relevant national legislation. Additional education and training may be necessary to meet national or institutional requirements.

This document offers suggestions for supporting your training. Each module aligns with the learning outcomes specified by the EU Education & Training framework for laboratory animal science. This module was developed by Manuel Berdoy and Vootele Voikar, two renowned experts with extensive experience researching, publishing, and training in the behaviour and biology of rodents. In addition, an international Reflection Group panel has further refined the content, while Nuno H. Franco managed overall coordination.

Your collaboration and feedback are greatly appreciated, as the module is currently in the testing phase.

1.2 Topics Covered

- Mice and rats are rodents
- Rats and mice strains
- Using rodent biology to inform research practice
- Rat biology and behaviour

1.3 Learning Objectives

- Understand the taxonomic classification and shared biological characteristics of mice and rats within the rodent family.
- Identify and differentiate between various strains of rats and mice, recognising their unique genetic traits and their implications for research outcomes.
- Apply comprehensive knowledge of rodent anatomy, physiology, and genetics to enhance the design, implementation, and ethical considerations of research protocols.

- Explore the physiological and behavioral traits of rats to improve animal welfare and the validity of experimental results.

To support your ongoing learning, each module concludes with a curated list of recommended readings and cited references. Whenever possible, these references are linked to facilitate further exploration.

2. Prerequisites and Requirements

No specific prior knowledge is required. However, a basic understanding of searching bibliographic databases and a background in laboratory animal science and/or non-animal methods can be advantageous.

This module is designed to guide you step by step, eliminating the need for prior study.

2.1 Requirements

- Completion of lessons and understanding of learning objectives.
- Participation in knowledge checks and assessments to evaluate understanding.

3. Grading and Completion

Grading will be based on the successful completion of knowledge checks and assessments provided at the end of each module. Upon finishing all parts of the module, students will receive a certificate of completion. If proof of completion for a specific section is required, learners may be asked to take a screenshot of the screen, as each part's completion is indicated. This ensures transparency and verifiability of progress.

4. Textbooks and Reading Materials

The **"References and Further Reading"** lesson provides most references and readings. They comprise scientific articles, sections of books, websites, and videos. Clicking on any link will open a new window to download or visualise the additional material. Several links to further resources can also be found in the module contents to better guide the reader.

The additional materials provide more information on specific topics, tools, and resources.

5. Course Program

The module is organised into six chapters, with lessons and learning objectives as follows:

Chapter	Lesson	Learning objectives
Introduction: Rats and Mice	1	Get to know the learning objectives

Mice and rats are rodents	2-4	What are rodents? Rodents gnaw... Short life span - but why?
Rats and mice strains	5-7	Genetic Background matters Types of Strains The importance of nomenclature
Using rodent biology to inform research practice	8-15	Know your animal Being Active at Night Being a Prey Species Assessing Welfare: the score sheet Prioritising senses differently From a complex world to a simple cage Standardisation vs Reproducibility Rats vs Mice
Rat biology and behaviour	16-25	Wild Rats Laboratory Rats Handling Rats The Life of a Rat in Numbers Sensory Biology Reproduction Feeding Aggression Recognition of Pain and Stress Anatomy and Physiology
Summary and knowledge check	26-28	Summary References and Further reading Rat knowledge check

Table 1 - Learning objectives per parts and lessons.

5.1 Process Tracking

Once you begin working through a module, your progress is tracked, and you can break off and resume your studies at any point. Once the module is completed, the trainee can access any section to refresh their understanding of a topic.

5.2 Module Structure

The module is divided into several parts, and although they were designed to be followed sequentially, they can also be taken iteratively. Please note that a certificate of completion is only issued to learners who complete all module parts. If proof of completion for a specific part of the module is required, the trainee should provide a snapshot of the screen because the module indicates progress after each part is completed.

5.3 In-Depth Explanation Lesson by Lesson

Lesson	Title	LO	Explanation
1	Introduction		Image and tagline.
2	What are rodents?	3.1.1	Rodent taxonomy and characteristics represented with 3 photos and 1 diagram.
3	Rodents gnaw...	3.1.1	Rodents gnaw are represented in 1 collapsible of 2 windows with 2 images, and 2 more images outside.
4	Short life span - but why?	3.1.1	Why do rats and mice have a short life span represented with text.
5	Genetic Background matters	3.1.7 3.1.8	Genetic background represented with 1 diagram and 1 list.
6	Types of Strains	3.1.7 3.1.8	Types of strains represented in 1 line chart, 1 interactive labelled image, 1 collapsable and 1 bar chart.
7	The importance of nomenclature	3.1.7 3.1.8	Nomenclature description represented with 2 photos, 1 diagram and 1 collapsible with 2 windows.
8	Know your animal	3.1.3	"Happy Animals make good science" description represented with 1 collapsible.
9	Being Active at Night	3.1.1	Rodents' activity at night represented in 1 video and 1 tab with 2 windows with 2 line charts.
10	Being a Prey	3.1.2 3.1.3 3.1.4 3.1.6	Finding shelter represented with 4 photos and 1 video. How to handle rodents represented with 2 videos. Recognising pain represented with 3 photos and 1 collapsible.
11	Assessing Welfare: the score sheet	3.1.9	Score sheets description represented in 1 table and 4 matching quizzes. Score sheet example represented in a table.
12	Prioritising senses differently	3.1.1	Senses description with 1 video.
13	From a complex world to a simple cage	3.1.4 3.1.6	Environmental enrichment represented in 1 collapsible, a 4-window tab with 2 videos and 2 images. Life in cycles description with 1 interactive labelled image, 1 video and 4 photos.

14	Standardisation vs Reproducibility	3.1.3	Standardisation vs Reproducibility description with text.
15	Rats vs Mice	3.1.4	Differences between mice and rats represented with 1 photo and 6 videos.
16	Wild Rats	3.1.1 3.1.7	Description of the Norway rat with 1 photo.
17	Laboratory Rats	3.1.1 3.1.7	Aspects of rat biology represented in 1 photo, 1 list and 1 video.
18	Handling Rats	3.1.1 3.1.3	handling demonstrated in the 1 video
19	The Life of a Rat in Numbers	3.1.1	Relevant biological data presented in 1 photo and 2 tables.
20	Sensory Biology	3.1.1	Olfaction represented in 1 photo, 2 collapsibles and 1 video. Touch represented with 1 video. Hearing represented with 1 collapsible and 1 video. Vision with a twist description.
21	Reproduction	3.1.1	Description of reproduction with 1 collapsable, 1 photo and 1 figure.
22	Feeding	3.1.5	Description of feeding with 1 video and 1 collapsible.
23	Aggression	3.1.1	Description of aggression with 2 videos.
24	Recognition of Pain and Stress	3.1.2	Signs of stress represented in a collapsible. The rat grimace scale represented in 1 image. Diseases represented in a 3-window tab.
25	Anatomy	3.1.1	Rat skeleton represented in 1 interactive figure. External Genitalia represented in 1 interactive figure. Exercise with flip-cards to distinguish males and females. Digestive system represented in 1 interactive figure.
26	Summary		Module summary
27	References and Further Reading		References for additional materials
28	Rat Knowledge-check		Assesses progress and knowledge acquired about mouse during the module

Table 2 - Explanation lesson by lesson.

6. Target Audience

This module is intended for (bio)medical researchers, participants in laboratory animal science courses, university students, biology/medical teachers, animal welfare body members, regulators, and anyone interested in learning more about animal research ethics and the principles of Replacement, Reduction, and Refinement of animal use for scientific and educational purposes.

7. Notes

As this is a test run, we kindly request one feedback form for each tested module to ensure we gather thorough insights for every tested module. The majority of the modules are designed to complement other components of your training, and the content should be accessible even if you have relatively little experience working with laboratory animal science. Where appropriate, the introduction to the module suggests pre-reading and suggested training that should be completed before continuing with the module.

7.1 Prerequisites and Requirements

We would greatly appreciate your valuable insights and detailed feedback regarding the instructions provided. Your input will help us ensure clarity, accuracy, and overall effectiveness in conveying the necessary information.

https://forms.uu.nl/universiteitutrecht/TestReview_LASLearning_instructions