COMPARATIVE IMMUNOLOGY AND ANIMAL MODELS

MODULE DESCRIPTION/OVERVIEW

The course is compulsory, hybrid, and blended learning module in the Diploma programme of Immune Modulation Certificate (IMCert) For Postgraduate Students Enabled by Blended Learning. It is provided with English Language and included in semester 1.

In the course, the students enhance their knowledge and skills of handling of laboratory animals with respect to immunological, hematological, histological and biological methods of experimental animal models. Furthermore, general laboratory animal science training is provided in ethical standpoints, which include knowledge of laws and regulatory frameworks. Training on practical skills and special tests are offered to students who want to obtain a permit to work with different animal models, concern the animal model diseases. The course will highlight multidisciplinary approaches of comparative biology that is integrate zoology and immunology, including types of animal models, ethical principles and legislation, animal welfare, different designs, aspects and assays of experimental animal models and species, vaccination and translational aspects.

The course will relate to other curricula including, immunopathology, biotechnology, molecular genetics, flow-cytometry, and public health.

MODULE LEARNING OBJECTIVE

The course aims to provide postgraduate students with the required comparative immunological knowledge, skills and attitudes for using different experimental animal models.

MODULE INTENDED LEARNING OUTCOMES

Upon successful completion of this module, students will be able to:

A. KNOWLEDGE AND UNDERSTANDING: (REMEMBERING AND UNDERSTANDING)

A1- Identify the anatomical features of different animal models.
A2- Describe the impact of disease on the host.
A3- Identify the ethical guidelines and requirements for using animals as models of disease.

B. INTELLECTUAL SKILLS: (APPLICATION, ANALYSIS, SYNTHESIS, EVALUATION)

B1- Explain suitable animal models used in immunological research.
B2- Design of an experimental animal model.
B3- Differentiate between serum and plasma.

C. PROFESSIONAL SKILLS: (PRACTICAL SKILLS)

C 1- Practice how to deal with different animal models.
C2- Handle different simulation programs for *in-vitro/ex-vivo* techniques and experimental *in-vivo* animals.
C3- Prepare serum, plasma and different biological samples.
C4- Handle different animal models in biomedical research and vaccine development.
C5- Prepare the requirements for laboratory animal welfare, husbandry and legislation.
C6- Apply different anesthetic and immunization methods

D. GENERAL SKILLS: (ATTITUDES AND COMMUNICATION SKILLS)

D1- Adopt the 3Rs principle.
D2- Conform self confidence in handling animals.
D3- Adopt animals ethically (according to ethics guidelines of OECD and ARRIVE) for using in research and health.
D4- Express proper Euthanasia techniques.
D5- Show concern with the animal waste in an environment-friendly manner.
D6- Adopt safety measures to manage biological risks.
D7- Communicate cooperatively under stress of handling animal.
D8- Creative thinking using animal immunological models.

MODULE RESOURCES

Required Module Textbooks and Materials

1. Vogel G.H. (Ed.). Drug Discovery and Evaluation: Pharmacological Assays (Second Edition). Springer-Verlag Berlin Heidelberg New York.
2. Handbook of Experimental Pharmacology. 2019, Edition: 1, Publisher: Studium Press (India) Pvt. Ltd., ISBN: ISBN 93-85046-63-2.
3. Duncan & Prasse's Veterinary Laboratory Medicine : clinical pathology / [edited by] Kenneth S. Latimer. – 5th ed. 2011.
4. International Guiding Principles for Biomedical Research Involving Animals. CIOMS- ICLAS, 2012.

Optional Module Textbooks and Materials

Periodicals, Web sites, etc

1. *https://www.oecd.org/chemicalsafety/testing/animal-welfare.htm*
2. *http://pubmed.com*
3. *http://www.biology-online.org/*
4. *https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html*
5. Systemic bee venom exerts anti-arthritic and anti-inflammatory properties in a rat model of arthritis. El-tedawy DM, Abd-alhaseeb MM, Helmy MW, Ghoneim AI. Biomed. Rep. 13(4):1-9,20. https://doi.org/10.3892/br.2020.1327.
6. Student perceptions of a modified flipped classroom model for accreditation in a pharmacotherapeutics course. Ghoneim A, El-Lakany A. Journal of Applied Pharmaceutical Science. 2017 Nov; 7 (11), 15-20. http://dx.doi.org/10.7324/JAPS.2017.71103.
7. Phytochemicals and Amino Acids: Inducers or Inhibitors of Cell Death? Ghoneim A. In: Diederich M and Noworyta K (eds.) Natural Compounds as Inducers of Cell

Death. Volume 1, Part 1, pp. 3-32. Springer Netherlands, 2012. Print ISBN: 978-94-007-4574-2. http://dx.doi.org/10.1007/978-94-007-4575-9_1.

8. Potential value of pharmacological agents acting on toll-like receptor (TLR) 7 and/or TLR8 in COVID-19. Khalifa AE, Ghoneim AI. ***Current Research in Pharmacology and Drug Discovery***. 2021;2C:100068. Epub 2021 Nov 2: 100068. Available at: https://doi.org/10.1016/j.crphar.2021.100068.

ASSIGNMENTS AND GRADING SCHEME

GRADING SYSTEM

Course evaluation consists of as followings:

Diagnostic Pre-evaluation: before starting the course

Formative : periodically during the course

- Lab participation.
- Course portfolio comprising article discussion, collegial feedback and application for ethical approval of animal testing.
- Assignments.
- Hands-on exam.
- Seminars.

Summative: at the end of the course duration.

- Practical examination.
- Written/Oral examination.

GRADING POLICY

Grades can be based on the following:

Practical presentations and assignments	15%
Exams	65%
Class attendance/participation	20%
Total Points *Students must have a final grade of 60% or higher to pass*	**100%**

MODULE POLICIES

LATE ASSIGNMENTS

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CLASSROOM PROTOCOL

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DISSABILITY

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