



MOLECULAR PARASITOLOGY

CU characterization:

CU name:

Molecular Parasitology

Scientific area acronym:

BM

Duration:

Semiannual

Working hours:

168

Contact hours:

44

ECTS:

6

Observations:

Mandatory CU

Teacher in charge and respective teaching load in the CU:

Henrique Silveira – 17 hours

Other teachers and respective teaching load in the CU:

Ana Paula Arez - 10 hours

Carla Maia - 16 hours

Carla Sousa - 15 hours

Fátima Nogueira - 16 hours

Isabel Mauricio - 16 hours

João Pinto - 11 hours

Sofia Cortes - 16 hours

Olga Matos - 13 hours

Pedro Ferreira - 12 hours



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Intended learning outcomes (knowledge, skills and competences to be developed by the students):

After this unit, students should be able to:

1. Recognise the importance of molecular biology for the study of the major parasites of medical importance and its application on research;
2. Recognise and explain the molecular mechanisms associated with the life cycle of various parasites of medical importance;
3. Evaluate the use of molecular techniques applied to diagnosis, epidemiology, taxonomy, vaccines and chemoresistance, as well as apply them in new situations;
4. Understand diversity in the context of epidemiology, evolution and population genetics;
5. Plan and carry out different molecular techniques applied to parasitology;
6. Revise critically, communicate and discuss material published in the medical field of medical molecular parasitology

Syllabus:

- I. Brief Introduction to UC and molecular parasitology
- II. Gene Editing
- III. Gene transformation of malaria vectors
- IV. Molecular mechanisms of cell invasion and locomotion: Trypanosomatids
- V. Molecular mechanisms of cell invasion and locomotion: Apicomplexa
- VI. Host-parasite interactions in helminths
- VII. Resistance mechanisms in *Leishmania*
- VIII. Mechanisms of resistance to antimalarials
- IX. Molecular basis of insecticide resistance
- X. Detection of *Schistosoma mansoni* in *Biomphalaria glabrata* (Laboratory Practice)
- XI. Gene expression (Laboratory Practice)
- XII. Molecular techniques applied to the study of intestinal parasites
- XIII. Antigenic variation in *Trypanosoma brucei*
- XIV. Antigenic variation in *Plasmodium*
- XV. Phylogeny, population biology and vector control
- XVI. Molecular typing in *Leishmania* (Laboratory Practice)
- XVII. Biochemical assays of enzyme activity applied to insecticide resistance (Laboratory Practice)
- XVIII. Seminars - Functional genomics



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Teaching methodologies (including assessment):

The CU contains a total of 44 classroom hours organized into: Theoretical classes (16 hours); Laboratory teaching classes (8 hours), tutorial guidance (8 hours) and seminars (12 hours).

The learning assessment will have 2 components:

1-Seminars: Students will be divided into groups. Each group will have 10 minutes for an oral presentation of an article, followed by 5-10 minutes of discussion. At the beginning of the Curricular Unit, articles using cutting-edge methodologies will be distributed. Studies will be selected that use different approaches of the technique in different microorganisms.

2-Reports of practical and theoretical-practical classes: Students will have to prepare a report per practical class.

The final classification of the Molecular Parasitology Curricular Unit, expressed on a scale of 0-20 values, should reflect the relative contribution of the partial grades:

Seminars-50% (20% presentation; 20% discussion performance; and 10% discussion of articles presented by colleagues).

Reports of practical classes-50%.

References for consultation / mandatory existence:

- Malaria: Methods and Protocols, Series: Methods in Molecular Biology, vol 923, 2013. 2ª ed. Ménard R (Ed), Springer Science, Londres.
- Manson's Tropical Diseases. 2009. 22ª edição, Cook GC, Zumla AI (Ed.), WB Saunders, Londres.
- Molecular Medical Parasitology. 2002. 1ª ed. Marr J, Nilsen T, Komuniecki R (Ed) Academic Press.
- Molecular Parasitology: Protozoan Parasites and their Molecules. 2016. 1ª ed. Walochnik J, Duchêne M (Ed) Springer-Verlag Wien.
- Trends in Parasitology - <https://www.cell.com/trends/parasitology/home>