

68458 - Medicinal Chemistry

Syllabus Information

Academic year: 2023/24

Subject: 68458 - Medicinal Chemistry

Faculty / School: 100 - Facultad de Ciencias

Degree: 626 - Máster Universitario en Biofísica y Biotecnología Cuantitativa / Master in Biophysics and Quantitative Biotechnology

ECTS: 6.0

Year: 01

Semester: Second semester

Subject type: Optional

Module:

1. General information

One of the main objectives of this subject is to provide students with an overview of medicinal chemistry at the intersection between synthetic organic chemistry, pharmacology and medicine. Students will be able to understand the use of synthetic organic chemistry and computational chemistry as tools closely related to biological chemistry, enzymology and structural biology, with the aim of discovering and developing new therapeutic agents.

Goal 3: *Health and wellness* and Goal 4: *Quality education*

These approaches and objectives agree with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning objectives of this subject provides training and competence to contribute to a certain extent to its achievement.

2. Learning results

1. To know the main therapeutic targets for which drugs exist.
2. To know the main design tools used in Medical Chemistry.
3. To know the main principles for the characterization of a drug or lead compound based on its pharmacodynamics and pharmacokinetics.
4. To know the strategies of Medical Chemistry to improve the pharmacodynamics and pharmacokinetic properties of a lead compound.
5. To understand the pathway that a preclinically evaluated compound follows before it becomes a commercial drug.

3. Syllabus

MODULE I. Drug targets and drugs

Enzymes and receptors as pharmacological targets

Nucleic acids

Antimicrobial agents

Anticancer agents

Drugs for the central nervous system

MODULE II. Basic tools in Medical Chemistry

Find lead compounds

Combinatorial synthesis

Chiral drugs and their synthesis

MODULE III. Drug characterization: pharmacokinetics and pharmacodynamics

Chemical characterization of the lead compounds

Pharmacokinetics

Pharmacodynamics and toxicology

MODULE IV. Chemical strategies to improve drugs

Optimizing drug-target interactions

Optimizing access to the target and toxicity

MODULE V. From the drug to the patient

Intellectual property and patents in drug discovery

Bringing the drug to the market and illustrative examples

4. Academic activities

Master class

Master classes and participative lectures given by the professor, where external experts may also intervene.

Problem solving and case studies

Problems and practical cases to be solved individually or in groups. The possible solutions to the problems will be solved and discussed in class, fostering student participation.

Laboratory practices

Students will perform computer practices corresponding to the internship program. These activities will instruct the student on how to approach experimental techniques or computational methods.

Finally, the results will be shared and discussed with the other students. This part of the course requires individual work by the student.

5. Assessment system

Continuous Evaluation

1. Problem solving classes and case studies (20% of FG)

The students must submit a report at the end of each session following the guidelines. These types of controls are framed within the concept of continuous evaluation, which will allow monitoring of the learning process.

2. Theoretical Exam (50% of FG)

It will consist of questions that require either short answers (limited response tests) or a broad development of the topic (essay tests or free and open answer).

The student will be able to consult the bibliography that he/she considers appropriate (web pages or similar cannot be consulted).

3. Evaluation tests of the practical computer sessions (30% of FG)

The student must demonstrate that he/she is making good use of the practical sessions.

FG = 0.20 MProblem solving + **0.5 M**Theoretical Exam+ **0.30 N**Computer Sessions

Global Evaluation (100% of FG)

1. Theoretical Exam (100% of FG)

The theoretical exam will consist of questions that require short answers (limited response tests) or that require a broad development of the topic (essay tests or free and open answer).

In the global evaluation, the student will not be able to consult the bibliography.

FG = 1 MTheoretical Exam