

27240 - Biological Activity of Chemical Compounds

Syllabus Information

Academic year: 2023/24

Subject: 27240 - Biological Activity of Chemical Compounds

Faculty / School: 100 - Facultad de Ciencias

Degree: 452 - Degree in Chemistry

ECTS: 5.0

Year: 4

Semester: Second semester

Subject type: Optional

Module:

1. General information

Knowledge of the action of chemical compounds on living beings is essential for the development of new drugs and also for managing the impact of chemical pollutants on the environment. The objective of this subject is to provide students with general knowledge about the biochemical basis of the biological effect of chemical compounds.

The acquisition of the subject learning results provides training and competence to contribute, to some extent, to the advancement of SDGs 3, 6, 7, 11, 12, 13, 14 and 15 of the 2030 Agenda for Sustainable Development (<https://www.un.org/sustainabledevelopment/es/>).

It is recommended to have passed the subjects Biology and Biochemistry and to review the essential concepts of both.

2. Learning results

In order to pass this subject, the students shall demonstrate they have acquired the following results:

1. Knows the mechanisms of transport through biological membranes and the phenomena of biotransformation of chemical compounds.
2. Describes and argues from the point of view of biochemistry, the mechanisms of toxicity of various chemical compounds and the mechanism of action of the main groups of drugs.
3. Experimentally evaluates the toxicity of chemical compounds.

3. Syllabus

Master Classes

Transport and biotransformations: Transport of xenobiotic compounds across biological membranes: types and biochemical mechanisms. Xenobiotic targets.

Biotransformations of xenobiotics. Activations and inactivations. Phase I and Phase II transformations. Response and adaptation to xenobiotics.

Molecular and cellular mechanisms of the toxicity of polluting compounds. Carcinogenesis.

Drug development: Pharmacological targets. Preclinical phase. Clinical trials.

Mechanism of action of drugs: General aspects of drugs. Antimicrobials. Antitumor.

Drugs acting on neurotransmitters. Other drugs.

Laboratory practices

Toxicity evaluation by cell proliferation test and by nuclear morphology analysis. Evaluation of mutagenic potential by Ames test. Study of the interaction of compounds with DNA.

4. Academic activities

The program offers the students help to achieve the expected results and comprises the following activities:

- Master class training activity (4 ECTS).
- Training activity involving the performance of laboratory practices corresponding to different aspects studied in the theoretical part (1 ECTS).

5. Assessment system

The evaluation of this subject will be continuous, according to the following evaluation activities:

1. Theoretical knowledge will be evaluated by means of 2 "eliminating" midterm tests (P). The tests will consist of a series of multiple-choice questions and each test will be graded between 0 and 10 points. To pass the subject by continuous

evaluation it will be necessary to take the 2 tests and obtain a grade higher than 3.5 in both of them. The average of the 2 tests will result in a theory grade (T).

2. Laboratory activities will be evaluated on the basis of the quality of the work done in the laboratory, the resolution of problems and questions related to the practices and the completion of a report. All this will result in a grade L (0-10 points).
3. The overall grade (F) of the subject for continuous evaluation will be calculated according to the following formula:
$$F = 0,8 * T + 0,2 * L$$

The subject will be passed when the grade F is greater than or equal to 5.
4. Students who have not passed the subject through the continuous assessment or who wish to improve their grade will be able to take a global test in which theoretical knowledge will be evaluated and on the basis of the practical activities. The final grade will be the best of the two grades.