

Academic Year/course: 2021/22

68408 - Clinical and pharmacological-genetic biochemistry

Syllabus Information

Academic Year: 2021/22

Subject: 68408 - Bioquímica clínica y farmacogenética

Faculty / School: 104 - Facultad de Medicina

Degree: 530 - Master's in Introduction to Medical Research

ECTS: 5.0

Year: 1

Semester: Second semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The health professional needs to know:

The role played by the regulatory elements in the vital phenomenon, in a unified way, encompassing of an adequate diet, the deficiencies that inadequacy can represent and the diseases generate deficiency. As well as the ergotropic possibilities (ergogenic in athletes) that supplements can provide. That the efficacy and toxicity of drugs depend on the genetic baggage of the individual that is, on the doctor must know and consider in his therapeutic decision, the pharmacogenetic traits that exist and the individual risks of a treatment for a specific patient.

These approaches and objectives, are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda of Nations United (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results provides training and competence to contribute to a certain extent to the achievement of competences 3 and 4.

- Objective 3: Health.
- Objective 4: Education.

1.2. Context and importance of this course in the degree

In medical training only some isolated contents are studied from very different points of the world. Regulatory elements, trace, such as: anemia, Wilson's disease, hypothyroidism, etc. that are supported in different core subjects. The meaning of this subject is to provide a more generic, comprehensive

and integrated vision of this great chapter of Medicine, as well as to highlight what is unknown and

discover the defining characteristics of the toxic elements.

Pharmacogenetics gathers a series of knowledge that the doctor of today must possess to explain the answers to the drugs that until now were called rare or not explained and that resulted in loss of effectiveness and increased toxicity.

The weapons offered by pharmacogenetics are available to optimize the pharmacological response as well as to have more effective and safe new drugs.

1.3. Recommendations to take this course

Part of the learning of this subject is based on the problem-based learning system (PBL).

To make a good PBL, you need an active participation of the students, who communicate their

information found etc ... that is to say that they work the transversal competences.

The learning process with active participation is less boring and allows you to get better and faster

competences.

In order to carry out a good search of information and solve cases, it is recommended that they

use computers, tablets, books, etc.

2. Learning goals

2.1. Competences

By passing the course, the student will be more competent to ...

Diagnose the alterations that the deficit and excess trace elements produce.

Diagnose the pathology and poisoning pathways of toxic elements.

Identify the roles of metals, regulatory elements and trace elements from a more global and integrated

view of Medicine.

Identify the pharmacogenetic traits involved in the variability of the response to drugs, differentiating

genetic polymorphisms that affect target molecules, metabolic enzymes and transport proteins, and

actions and disposition of drugs.

Differentiate between polymorphisms with relevance in the pharmacological response and those that are

not

relevant.

Recognize inter-ethnic differences based on pharmacogenetics.

2.2. Learning goals

The student, to pass this subject, must demonstrate the following results ...

1. Know the chemical bases, classification, nutritional aspects and "physiology" (content in food intake-recommendations-, absorption, of the different compounds, blood transport, distribution, and functions) of the essential trace elements.
2. Differentiate from other tables the alterations produced by excess and deficit of metallic elements regulators and trace elements.
3. Know the pharmacogenetic bases that support the inter-individual differences in the pharmacology, whether therapeutic or toxic.
4. Apply knowledge of pharmacogenetics to the individualization of pharmacological therapy, with optimization

2.3. Importance of learning goals

The knowledge and application of Pharmacogenetics should result in greater efficacy and, at the same time, a lower toxicity of the drugs. It offers the possibility of reducing an important problem faced by clinical medicine, which is the lack of response, as well as the appearance of adverse effects produced by a large number of treatments to a large number of patients. The knowledge of how the imbalance of regulatory elements can generate pathology.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he has achieved the expected learning outcomes through the following assessment activities

1. Attendance at scheduled activities, value (40%).
2. Realization of works, value (30%).
3. Examination and exercises, value (30%).

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as

- Lectures
- Seminars
- Case studies and problem-solving using the Problem-based learning (PBL)

methodology

- Literature review
- Assignment

4.2. Learning tasks

The course includes the following learning tasks:

- Lectures
- Seminars
- Case studies and problem-solving using the Problem-based learning (PBL) methodology
- Literature review. In addition to the literature on paper, students should bring computers/tablet/Smartphone to have access to online resources too
- Assignment

4.3. Syllabus

The course will address the following topics:

1. Pharmacogenetic bases that support applied knowledge of pharmacogenetics in the clinic for the individualization of drug therapy, with subsequent application.
2. Differences in drug responses, whether therapeutic or toxic.
3. Applied knowledge of pharmacogenetics to the clinic for the individualization of drug therapy, with subsequent application.
4. Nutrition.
5. Concept of nutrient classification, biochemical and functional nutrients.
6. Deficit in nutrient intake, nutritional effects, pharmacological effects and toxic pathologies caused by nutrients and mineral micronutrients produced by excess deficits, intakes of toxic elements or genetic cause.

4.4. Course planning and calendar

Timetable

The subject will be taught in the second semester on the following dates:

Tuesday: 11, 18, 25 January and 1, 8, 15, 22 February

The schedule and classroom will be determined by the Center.

(In the previous courses the schedule has been from 16 to 20 hours).

Between one week and 15 days after the end of the classes the exam of the subject will be carried out.

Students can and should take the exam the notes and work done in the subject, in case you need it.

Further information concerning the timetable, classroom, assessment dates, and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Medicine <https://medicina.unizar.es/>.

4.5. Bibliography and recommended resources

- **Magnesio, el electrolito olvidado/** Marisol Soria Aznar y cols. Zaragoza: Prensas de la Universidad de Zaragoza, 2013.
- **Contribución actual de los elementos traza y minerales en medicina: su papel clínico/** Silvia Izquierdo Álvarez y cols. Zaragoza: Prensas de la Universidad de Zaragoza, 2013.