Universidad Zaragoza

Academic Year/course: 2024/25

29231 - Molecular Biology and Human Nutrition

Syllabus Information

Academic year: 2024/25
Subject: 29231 - Molecular Biology and Human Nutrition
Faculty / School: 229 - Facultad de Ciencias de la Salud y del Deporte
Degree: 441 - Degree in Human Nutrition and Dietetics
ECTS: 6.0
Year: 4
Semester: First semester
Subject type: Optional
Module:

1. General information

Molecular Biology and Human Nutrition is an elective that aims to provide students with the basic knowledge related to the characteristics of hereditary material and research techniques related to its study, in order to deepen and understand its direct relationship with nutrients. In this way, it seeks that the student perceives the advances, controversies and challenges that the progress of research in Molecular Biology provides to the field of Human Nutrition.

These approaches and goals are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/): 3 and 12, so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to its achievement.

2. Learning results

- Demonstrate that some nutrient-modulated gene expression and regulation relationships are known.
- Demonstrate recognition of the influence of genetic background on nutritional needs and responses to nutrients
- Demonstrate the ability to maintain and update professional competence, with special emphasis on learning, autonomously and continuously, new knowledge, products and techniques in the field of nutrition and food, as well as motivation for quality.
- Demonstrate knowledge, use and critical appraisal of sources of scientific information related to nutrition, food, lifestyles and health issues.
- Demonstrate the ability to broaden the training for research activity, being able to formulate hypotheses, collect and interpret information for problem solving following the scientific method, and understanding the importance and limitations of scientific thinking in health and nutrition.

3. Syllabus

THEORETICAL PROGRAM

Presentation and objectives. Molecular biology and nutrition connections.

Gen. DNA structure and gene organization.

Basic mechanisms of gene expression and its regulation.

Transmission of genetic information. Genetic basis of variability.

Genes and disease.

Molecular techniques in nutritional genomics.

Genetic activity and nutrition. Epigenetics.

Microbiome, nutrition and health.

Genetic variation and nutrition.

Personalized nutrition.

Ethical and legal aspects in nutritional genomics.

Carbohydrates, lipids, amino acids, micronutrients and gene expression.

Nutritional genomics in longevity and caloric restriction.

Nutritional genomics of cardiovascular disease.

Nutritional genomics of obesity.

Nutritional genomics in cancer.

Topics 12-16 are worked with written reports/presentation made by students

LABORATORY/BIOINFORMATICS SESSIONS

1.DNA extraction.

2.Amplification of a gene. Polymerase chain reaction (PCR).

3.Electrophoretic analysis.

4.Study of polymorphisms relevant to human nutrition (APoE)

5 and 6. Management of various protein and gene databases.

4. Academic activities

The theoretical sessions are participatory lectures covering the scientific program. They provide the essential concepts , the scientific lexicon and the molecular and genetic view of gene-nutrient interactions that the student should assimilate. In addition, the following activities are included:

a) Laboratory and bioinformatics practices: They are carried out in small groups in four laboratory sessions and two sessions of bioinformatics (2 hours/session).

b) Seminars: Preparation and presentation of a report on a specific topic that addresses aspects related to the subject(which are part of the syllabus but are not seen in the lectures).

5. Assessment system

CONTINUOUS ASSESSMENT

A. Exam: the assimilation of the specific competencies will be evaluated with a final exam with multiple-choice questions and short questions. It will be evaluated according to the adequacy of the student's answers to the questions formulated. It contributes 40% to the final grade, if it is not passed the written exam constitutes 100% of the grade of the subject.

B. Laboratory and bioinformatics practices: six practical sessions will be carried out (4 lab. And 2 bioinformatics). Absence (unexcused) will result in failure of the continuous evaluation of the subject. The practice contributes 20% to the final grade, provided that the written exam has been passed.

C. Seminars: preparation and presentation of a paper dealing with aspects related to the subject. Absence (unexcused) will result in failure of the continuous evaluation of the subject. The seminar contributes 40% to the final grade , provided that the written exam has been passed. It is necessary to pass the 3 parts to pass the subject in this modality

GLOBAL ASSESSMENT

The student will have the possibility of being evaluated in a global test, which will judge the achievement of the learning results outlined above . It will include multiple choice questions, short questions and exercises or developmental questions.

6. Sustainable Development Goals

3 - Good Health & Well-Being
12 - Responsible Production and Consumption