

Syllabus

Subject

Subject / Group	10269 - Molecular Nutrition / 1
Degree	Master's in Nutrigenomics and Personalised Nutrition
Credits	3
Period	1st semester
Language of instruction	Spanish

Professors

Lecturers	Office hours for students					
	Starting time	Finishing time	Day	Start date	End date	Office / Building
Paula Oliver Vara paula.oliver@uib.es						You need to book a date with the professor in order to attend a tutoring session.

Context

The subject is aimed to complement the knowledge of 'classic' nutrition, looking at nutrients as regulators of gene expression, involved in metabolic control, and able to affect the whole organism.

Requirements

For a proper understanding of the subject, students must have previous knowledge on Molecular Biology.

Essential

Knowledge of Molecular Biology, applicable to gene expression regulation.

Skills

Specific

- * E1 - To be aware of the molecular bases of the interactions between nutrients with genome and its expression
- * E2 - To be aware of the relation between nutrition, health and pathologies
- * E3 - To apply the knowledge of the discipline to health promotion
- * E10 - To be aware of the advances in the field of Nutrigenomics, Personalized Nutrition and Molecular Nutrition, and obtain the skills necessary to be constantly updated

Generic

- * G1 - Ability to apply logical and creative thinking in the work



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- * G4 - Ability to formulate hypothesis and to design proper studies to verify them
- * G6 - Ability to work inter-disciplinary
- * G9 - Ability to collect, organize and critically analyze research and professional bibliography of the discipline
- * G10 - Ability to articulate knowledge in oral and written presentations
- * CB9 - To know how to communicate conclusions and knowledge and reason which support them to specialized and non-specialized audience clearly and without ambiguity
- * CB10 - To possess learning skills that allow to continue studying mainly in an autodirected or autonomous manner

Basic

- * You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: http://estudis.uib.cat/master/comp_basiques/

Content

The subject is divided in three topics, their contents are detailed below.

Range of topics

Topic 1. Introduction to Molecular Nutrition

- * Concept of Molecular Nutrition opposed to 'classic' concept of Nutrition
- * Gene regulation and nutrient-gene interaction
- * Types of regulation by nutrient
- * Problems in the study of regulation by nutrients
- * Research methods in Molecular Nutrition: application of genomic and post-genomic technologies

Topic 2. Effects of nutrients on proliferation, differentiation and apoptosis

- * Nutritional regulation of cell proliferation and differentiation
- * Nutrients and apoptosis
- * Specific example: nutritional regulation of gene expression in the intestinal epithelium and the physiological importance of this regulation

Topic 3. Role of nutrients and derivatives on gene expression and signal transduction

- * Regulation of gene expression by carbohydrates: effects on rate of transcription, processing and stability of mRNA in glucolytic and lipogenic metabolism
- * Regulation of gene expression by fats: effects on lipogenic enzymes and other proteins
- * Regulation of gene expression by amino acids: inhibition of growth by protein malnutrition
- * Regulation of gene expression by vitamins: vitamins A and D
- * Regulation of gene expression by minerals: post-transcriptional regulation by iron
- * Use of microarray to analyse the effect of diet on global gene expression: identification of action mechanisms and health effects-
- * Other effects of diet and its compounds on cellular metabolism: effects on signal transduction

Teaching methodology

The teaching methodology that will be followed in the subject is listed below.

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Workload

The workload estimate in the subject is listed below.

In-class work activities (0.72 credits, 18 hours)

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Theoretical presentational classes	Large group (G)	The list of topics will be developed in expositive and participative classes.	10
ECTS tutorials	Tutorials for the control and follow up of the research project	Small group (P)	Tutorials will be carried out out to assess to the groups of students in the choice of a topic for the development of a hypothetical research project related with the subject, and also for the correct design of the written project. Tutorials will be also developed to solve any doubt related with the theoretical classes or with any other content of the subject.	3
Other	Presentation of research projects	Large group (G)	The students will present and defend a hypothetical research project on Molecular Nutrition.	5

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Aula Digital platform.

Distance education tasks (2.28 credits, 57 hours)

Modality	Name	Description	Hours
Individual self-study	Solution of a questionnaire	The student will work individually to answer a questionnaire on the contents explained in the theoretical classes.	15
Group or individual self-study	Preparation and delivery of a hypothetical research project on Molecular Nutrition	The student, working in groups or individually, only in exceptional cases, will identify a topic related with the subject and will prepare a proposal for a hypothetical request of research project. The proposal will be based on a bibliographic research and will be delivered for its evaluation. The final document will consist of the following parts: * Title of the project. * Responsible researchers (enclosing the Curriculum vitae of the participants according to the format of the CICYT. * Background (specifying: the problematic of the selected topic and its relevance, state of the art (activities previously developed till and obtained results) * Specific objectives * Proposed activities * Methodology	42

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Modality	Name	Description	Hours
		<p>* Recapitulation (with the expected results and their expected impact)</p> <p>* Calendar</p> <p>* Budget (optional, it can include: equipments, laboratory materials and reagents, personnel expenses, travels and diets)</p> <p>The delivery of the project (written version) will be together to its presentation and defence to the teachers.</p> <p>This work will be a joint and coordinated activity with other three courses of the master in Nutrigenomics and Personalized Nutrition: "Financial Resources for R+D in Food Sciences", "Research Techniques in the Laboratory" and "Methods and Techniques in Nutrigenomics and Personalised Nutrition".</p>	

Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

Student learning assessment

Assessment will take into account students' learning, relating this to subject-specific skills, and students' ability to develop, communicate and use this knowledge.

The evaluation will be as follows:

- * Delivery of a questionnaire on concepts acquired in class (20%).
- * Delivery and defence of a hypothetical project on Molecular Nutrition (70% written work and 10% la presentation).

Frau en elements d'avaluació

In accordance with article 33 of Regulation of academic studies, "regardless of the disciplinary procedure that may be followed against the offending student, the demonstrably fraudulent performance of any of the evaluation elements included in the teaching guides of the subjects will lead, at the discretion of the teacher, a undervaluation in the qualification that may involve the qualification of "suspense 0" in the annual evaluation of the subject".

Tutorials for the control and follow up of the research project

Modality	ECTS tutorials
Technique	Attitude scales (retrievable)
Description	Tutorials will be carried out out to assess to the groups of students in the choice of a topic for the development of a hypothetical research project related with the subject, and also for the correct design of the

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	written project. Tutorials will be also developed to solve any doubt related with the theoretical classes or with any other content of the subject.
Assessment criteria	Tutorial classes constitute an important part of the subject, and they are necessary to develop a good research project. Even they have no specific value on the final mark, the attitude and interest showed by the students in the tutorials will be taken into account when defining the final mark of the subject.
Final grade percentage:	0%

Presentation of research projects

Modality	Other
Technique	Papers and projects (retrievable)
Description	The students will present and defend a hypothetical research project on Molecular Nutrition.
Assessment criteria	The oral presentation of the project will be evaluated, as well as its defence and the answers to the questions made by the teacher and by the rest of the students. Each group will evaluate to the other groups in order to establish a ranking showing the interest of the projects (this will not affect to the final mark).
Final grade percentage:	10%

Solution of a questionnaire

Modality	Individual self-study
Technique	Extended-response, discursive examinations (retrievable)
Description	The student will work individually to answer a questionnaire on the contents explained in the theoretical classes.
Assessment criteria	In the solution of the questionnaire it will be taken into account the assimilation of the knowledge explained in class, as well as the capacity of the students to look for additional information if they consider that it is necessary to answer to the questionnaire. The questionnaire should have a minimum mark of 4.5.
Final grade percentage:	20%with a minimum grade of 4.5

Preparation and delivery of a hypothetical research project on Molecular Nutrition

Modality	Group or individual self-study
Technique	Papers and projects (retrievable)
Description	The student, working in groups or individually, only in exceptional cases, will identify a topic related with the subject and will prepare a proposal for a hypothetical request of research project. The proposal will be based on a bibliographic research and will be delivered for its evaluation. The final document will consist of the following parts: *Title of the project.*Responsible researchers (enclosing the Curriculum vitae of the participants according to the format of the CICYT.*Background (specifying: the problematic of the selected topic and its relevance, state of the art (activities previously developed till and obtained results)*Specific objectives*Proposed activities*Methodology*Recapitulation (with the expected results and their expected impact)*Calendar*Budget (optional, it can include: equipments, laboratory materials and reagents, personnel expenses, travels and diets) The delivery of the project (written version) will be together to its presentation and defence to the teachers. This work will be a joint and coordinated activity with other three courses of the master in Nutrigenomics and Personalized Nutrition: "Financial Resources for R+D in Food Sciences", "Research Techniques in the Laboratory" and "Methods and Techniques in Nutrigenomics and Personalised Nutrition".
Assessment criteria	The following aspects will be positively valued: <ul style="list-style-type: none"> * The work of compilation, organization and the presentation of the project. * The viability of the project and the relevance of the proposed objectives. * The adjustment of the proposed activities to the duration of the project.



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* The scientific profitability and the applicability of the expected results.
This work will be evaluated by the teacher and should have a minimum mark of 4.5. The mark will be weighed for each student with the mark given by his/her group partners (because of the team work).

Final grade percentage: 70%with a minimum grade of 4.5

Resources, bibliography and additional documentation

Basic bibliography

Bibliography will consist basically in research articles available through general bibliography data bases, mainly *PubMed*.

Other resources

PubMed (<http://www.ncbi.nlm.nih.gov/sites/entrez>)

