Universitat de Lleida

DEGREE CURRICULUM

NUTRACEUTICS AND AGING

Coordination: JOVE FONT, MARIONA

Academic year 2023-24

NUTRACEUTICS AND AGING 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>NUTRACEUTICS AND AGING</td></tr>
<tr><td>Code</td><td>100629</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Human Nutrition and Dietetics</td><td>4</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><th>Number of credits</th><td>3</td><td>3</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>JOVE FONT, MARIONA</td></tr>
<tr><td>Department</td><td>EXPERIMENTAL MEDICINE</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>English</td></tr>
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NUTRACEUTICS AND AGING 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
JOVE FONT, MARIONA	mariona.jove@udl.cat	4,4	
OBIS MONNE, ELIA	elia.obis@udl.cat	1,6	

Learning objectives

Knowledge goals:

1. Understanding the social dimension of the aging population.
2. Demonstrate that the biological elements involved in the aging process are knowed.
3. Understanding the close relationship between the structure and function at all levels of organization of living as a determinant of longevity beings.
4. Discerning and understanding how the different nutritional interventions can modify the aging process.

Capability goals: Students who pass the subject must be able to:

1. Use oral and written communication skills in the most appropriate and effective way.
2. Think clearly and critically, fusing experience, knowledge and reasoning.
3. Identify, interpret and solve problems effectively.

Competences

CE1. To know the chemical, biochemical and biological fundamentals of application in human nutrition and dietetics.

CE2. Apply the mathematical and physical concepts learned in biomedical experiments and research.

CE34. Describe the main types of poisons, toxins and their actions.

CG3. Recognize one's own limitations and the need to maintain and update one's professional competence, with special recognize one's own limitations and the need to maintain and update professional competence, giving special importance to learning, in an autonomous and continuous way, new knowledge, products and techniques in nutrition and food, as well as motivation for quality.

CG4. Respect the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values.

CG5. Apply the gender perspective to the tasks of the professional field

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the development and defence of arguments and problem solving within their area of study.

CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature.

CB4. That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.

CB5. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

CT1. Have a correct oral and written expression.

CT2. Master a foreign language.

CT5. Acquire essential notions of scientific thought.

Subject contents

Topic 1. Aging (part 1)

Historical perspective. Social dimension of population aging. Definition of aging.

Topic 2. Aging (part 2)

Theories of aging. Natural history of oxygen. Oxygen toxicity. The origin of the theory of free radicals.

Topic 3. Biological mechanisms of aging

Genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, disabled macroautophagy, deregulated nutrient-sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion, altered intercellular communication, chronic inflammation, and dysbiosis.

Topic 4. Biomarkers of aging

Definition of Biomarkers. Biomarkers of healthy aging. Biomarkers to monitor age-associated diseases.

Topic 5. Functional properties of food

Definition of nutraceutical. Classification. Properties, structure and function. Bioaccessibility and bioavailability. Influence of food in determining the aging process and longevity.

Topic 6. Nutritional restrictions and exercise.

Know the bases of nutritional restrictions. Know the mechanisms through which nutritional restrictions can modulate the aging process. Molecular effects of physical activity. Physical activity and healthy aging.

Topic 7. Resveratrol

Resveratrol molecule. Know the foods that contain resveratrol. Know the molecular mechanisms through which resveratrol can modulate the aging process.

Topic 8. Isoflavones

Know the structure of isoflavones. Know the foods that contain isoflavones. Know the molecular mechanisms through which isoflavones can modulate the aging process.

Topic 9. Senolytics

Know the concept of cellular senescence. Know what senolytics are. Know how the use of senolytics can modulate the aging process. Know the current state of clinical trials with senolytics.

Topic 10. Other anti-aging interventions

Heterochronic parabiosis: Know the concept of heterochronic parabiosis and the studies carried out so far. To analyze the scientific evidence that relates heterochronic parabiosis to the promotion of healthy aging.

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Methodology

To achieve the objectives and acquire the attributed skills, the following activities are scheduled:

Lectures: will be held with all students. Their purpose is to give an overview of the thematic content of the subject, highlighting those aspects that will be useful in their training.

Seminars: will be held with all students and are compulsory. The purpose of the seminars is for the students to apply theoretical concepts and to delve deeper into the most important and complex aspects of the subjects. An oral presentation will be made of each seminar with the aim that the students know how to transmit and express the knowledge acquired correctly.

Development plan

A total of 6 hours will be devoted to each subject. The first two hours will be dedicated to explaining the theory (lectures) and later the students will work in groups on the scientific articles chosen from each topic and make an oral presentation of the work done.

Evaluation

Master classes: 50%

The content taught in the master classes will be evaluated with two exams that will have a weight of 25% each in the final grade. It will be necessary to have a minimum of 5 in this section to pass the subject.

Seminars: 50%

The content worked on in the seminars will be evaluated as follows.

25% work and class participation

25% oral presentation of the work done in the seminars.

Due to the fact that the seminars will be held in groups, attendance at these is mandatory, both the hours of preparation and the hours of exposure of the work done.

Bibliography

Halliwell, B. **Free radicals in biology and medicine**. Publicació Oxford; New York: Oxford University Press, 2007 Edición 4th ed

Masoro, Edward J **Caloric restriction: a key to understanding and modulating aging**. [Recurs electrònic] : a key to understanding and modulating aging / Edward J. Masoro Publicació Amsterdam ; Boston : Elsevier, 2002 Edición 1st ed

Antioxidant and redox regulation of genes [Recurs electrònic] / edited by Chandan K. Sen, Helmut Sies, Patrick A. Baeuerle Publicació San Diego : Academic Press, 2000

Handbook of the biology of aging [Recurs electrònic] / editors, Edward J. Masoro and Steven N. Austad Publicació Amsterdam ; Boston : Elsevier Academic Press, 2006 Edición 6th ed.

McDonald, RB. **Biology of Aging**. Edited by Garland Science, Taylor & Francis Group, LLC., 2014.

Enlazes de interés

www.freemedicaljournals.com

www.scopus.com

www.ncbi.nlm.nih.gov

www.nutricion.org

www.nal.usda.gov/fnic

Revistas

Age

Ageing research review

Aging cell

Biogerontology

Rejuvenation research

Experimental Gerontology

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Journal gerontology B physiological sciences

Neurobiology of Aging

Journal of nutritional Health and aging

Experimental aging research

Molecular Nutrition and Food Research

Journal of Biological Chemistry

Current Biology

Mechanisms of Ageing and Development

Free radical Biology and Medicine

Food and Chemical Toxicology

American Journal of Clinical Nutrition

Proceedings of the NationalAcademy of Sciences USA

Revista Española de Geriatría y Gerontología (REGG)

Etc...