

Syllabus

Subject

Subject / Group	10287 - Circadian Control of Energy Intake / 1
Degree	Master's in Nutrigenomics and Personalised Nutrition
Credits	2
Period	1st semester
Language of instruction	Spanish

Professors

Lecturers	Office hours for students					
	Starting time	Finishing time	Day	Start date	End date	Office / Building
Catalina Amadora Pomar Oliver c.pomar@uib.es						You need to book a date with the professor in order to attend a tutoring session.

Context

Professor

Dr. Mariona Palou March is currently Assistant Professor in the Department of Fundamental Biology and Health Sciences of the University of the Balearic Islands (UIB). For 3 years, she was part of the research team of ALIMENTOMICA, a technology-based company and spin-off of the UIB, as a researcher Torres-Quevedo, which allowed her to acquire experience in the field of transfer and applicability of research. She has published numerous international articles in prestigious journals such as Endocrinology, Molecular Nutrition and Food Research, European Journal of Nutrition, Scientific Reports, Plos One, British Journal of Nutrition, Pflügers Archiv European Journal of Physiology, International Journal of Obesity, The Journal of Nutritional Biochemistry, etc. She has participated continuously, as a member of the research team of the Laboratory of Molecular Biology, Nutrition and Biotechnology, on research projects funded by the Spanish government and the European Union and in contracts with companies.

Subject

Most organisms on Earth are capable of predicting the light–dark phases and restricting their activity to certain hours throughout the 24-h cycle. By developing an endogenous circadian (circa – about and dies – day) clock, which is entrained to external stimuli, animals ensure that physiological processes are performed at the optimal time (Froy O. The circadian Clock and metabolism. Clinical Science 120:65-72, 2011). Emerging evidence suggests that circadian clock function is closely linked to metabolic homeostasis and that rhythm disruption can contribute to the development of metabolic disease

Requirements

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Skills

Specific

- * Apply knowledge of the discipline for health promotion

Generic

- * Ability to articulate knowledge in oral and written presentations
- * Advanced comprehension of the global context in which the specialty area develops
- * Ability to develop their work in English (language internationally recognized scientific discipline)
- * Students should be able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments
- * Ability to collect, organize and critically analyze the research literature and professional discipline

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

Range of topics

- Subject 1. Introduction to Chronobiology
 - * Chronobiology
 - * The Biological Clock
 - * The synchronization mechanisms of the circadian timing system
 - * The molecular mechanism of the circadian clock
- Subject 2. Chronobiology in Nutrition
 - * Relationships between Metabolism and Circadian Rhythms
 - * The Food-Entrainable Oscillator
 - * Nutrient Signaling and Circadian Components
 - * Chronobiological aspects of obesity
- Subject 3. Specific examples hormones or condition involved in the circadian control of food intake
 - * Circadian control of food intake. Leptin and Ghrelin
 - * Effects of sleep restriction on Insulin signaling

Teaching methodology

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In-class work activities (0.48 credits, 12 hours)

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Lectures in the presence of Professor	Large group (G)	Explanation of the contents in lectures Monographic sessions supervised or given by the professor on a topic of special interest	10
Practical classes	Exercises	Large group (G)	Resolution of practical exercises proposed by the teacher	2

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 (1.52 credits, 38 hours)

Modality	Name	Description	Hours
Individual self-study	Study	Studying the material of the lectures Reading the Recommended Bibliography	38

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

We propose two Pathway: A and B. Pathway A is the continuous assessment and the student requires attend to classroom activities. Pathway B, for students who have and can demonstrate their incompatibility to attend classroom activities.

Pathway A

- Final exam. 40 % of the final mark.
 - * An objective text will be performed for the student in which the content of masterclass lessons will be evaluated. The date and place for the exam is set up on the Master's official calendar.
 - * The non-attendance to the final exam will be calcified by a 0 mark.
 - * *Retrieve* . The student will be offered a re-take, to be held in the extraordinary assessment period set up on the Master's official calendar for this purpose
- Resolution of proposed tasks (problem solving or cases). 40% of the final mark.

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- * The work must be delivered/completed on the date and at the time established by the lecturer. The different tasks have to be uploaded in the space that will be available in the intranet of the subject. Other ways for delivery of the work will not be considered
 - * *Retrieve*. The student will be offered a re-take, to be held in the extraordinary assessment period set up on the Master's official calendar for this purpose
- 3.-Attendance and participation to classes and activities. 20% of the final mark. 80% minimum attendance.

Pathway B

1.- Final exam. (50 % of the final mark).

- * An objective text will be performed for the student in which the content of masterclass lessons will be evaluated. The date and place for the exam is set up on the Master's official calendar.
- * The non-attendance to the final exam will be calcified by a 0 mark.
- * *Retrieve*. The student will be offered a re-take, to be held in the extraordinary assessment period set up on the Master's official calendar for this purpose

2. Resolution of proposed tasks (problem solving or cases). 50% of the final mark.

- * The work must be delivered/completed on the date and at the time established by the lecturer. The different tasks have to be uploaded in the space that will be available in the intranet of the subject. Other ways for delivery of the work will not be considered
- * *Retrieve*. The student will be offered a re-take, to be held in the extraordinary assessment period set up on the Master's official calendar for this purpose

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".

Lectures in the presence of Professor

Modality	Theory classes
Technique	Objective tests (non-retrievable)
Description	Explanation of the contents in lectures Monographic sessions supervised or given by the professor on a topic of special interest
Assessment criteria	Attendance and participation to classes and activities
	Those students of path A which do not arrive to the minimum assistance requested (80%) will be considered following path B

Final grade percentage: 20% for pathway A with a minimum grade of 8

Final grade percentage: 0% for pathway B

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Exercises

Modality	Practical classes
Technique	Objective tests (retrievable)
Description	Resolution of practical exercises proposed by the teacher
Assessment criteria	Resolution of proposed tasks (problem solving or cases)

Final grade percentage: 40% for pathway A

Final grade percentage: 50% for pathway B

Study

Modality	Individual self-study
Technique	Objective tests (retrievable)
Description	Studying the material of the lectures Reading the Recommended Bibliography
Assessment criteria	Final exam

Final grade percentage: 40% for pathway A

Final grade percentage: 50% for pathway B with a minimum grade of 4.5

Resources, bibliography and additional documentation

Basic bibliography

- 1 Froy O. Metabolism and Circadian Rhythms –Implications for Obesity. *Endocrine Reviews* 31(1):1-24, 2010
- 2 Froy O. The circadian Clock and metabolism. *Clinical Science* 120:65-72, 2011
- 3 Garaulet M., et al., The chronobiology, etiology and pathophysiology of obesity. *International Journal of Obesity* 34, 1667–1683, 2010
- 4 Gómez-Abellán P., et al. Chronobiological aspects of obesity and metabolic syndrome. *Endocrinología y Nutrición* 59(1):50-61, 2012
- 5 Mendoza J. et al. Circadian Clocks: Setting Time by Food. *Journal of Neuroendocrinology* 19: 127-137, 2006
- 6 Kovac J., et al. A Time to Fast, a Time to Feast: The Crosstalk between Metabolism and the Circadian Clock. *Mol Cells* 28: 75-80, 2009
- 7 Green CB., et al. The Meter of Metabolism. *Cell* 134:728-742, 2008

Complementary bibliography

- 1 A Preprandial Rise in Plasma Ghrelin Levels Suggests a Role in Meal Initiation in Humans. Cummings et al., *Diabetes* 50:1714–1719, 2001
- 2 Circadian rhythm of plasma leptin levels in upper and lower body obese women: influence of body fat distribution and weight loss. Langendonk et al. *J Clin Endocrinol Metab* 83(5):1706-12, 1998
- 3 Clock genes are implicated in the human metabolic syndrome. Gómez Abellán et al. *International Journal of obesity* 32, 121–128, 2008
- 4 Daily Changes in Hypothalamic Gene Expression of Neuropeptide Y, Galanin, Proopiomelanocortin, and Adipocyte Leptin Gene Expression and Secretion: Effects of Food Restriction. Xu et al. *Endocrinology* 140: 2868–2875, 1999)
- 5 Diurnal rhythms of leptin and ghrelin in the systemic circulation and in the gastric mucosa are related to food intake in rats. Sánchez et al. *Pflugers Arch - Eur J Physiol* 448: 500–506, 2004
- 6 Time-Restricted Feeding without Reducing Caloric Intake Prevents Metabolic Diseases in Mice Fed a High-Fat Diet. Hatori et al., *Cell Metabolism* 15: 1–13, 2012





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- 7 Impaired Insulin Signaling in Human Adipocytes After Experimental Sleep Restriction: A Randomized, Crossover Study. Broussard et al. Ann Intern Med 157(8):549-557, 2012

