

Academic year	2015-16
Subject	10287 - Circadian Control of Energy Intake
	Intake
Group	Group 1, 1S
Teaching guide	A
Language	English

## Subject identification

<b>Subject</b>	10287 - Circadian Control of Energy Intake
<b>Credits</b>	0.4 de presencials (10 hours) 1.6 de no presencials (40 hours) 2 de totals (50 hours).
<b>Group</b>	Group 1, 1S (Campus Extens)
<b>Teaching period</b>	First semester
<b>Teaching language</b>	English

## Professors

Lecturers	Horari d'atenció als alumnes					
	Starting time	Finishing time	Day	Start date	Finish date	Office
Juana Sánchez Roig <a href="mailto:joana.sanchez@uib.es">joana.sanchez@uib.es</a>	12:00	13:00	Monday	01/09/2015	31/07/2016	Q14

## Contextualisation

### Professor

Dr. Juana Sánchez Roig, is currently Ramón y Cajal Researcher at the Laboratory of Molecular Biology, Nutrition and Biotechnology, University of the Balearic Islands. She has published regularly since 2002 a total of 50 international articles in prestigious journals such as J Clin Metab Endocrin, Endocrinology, Molecular Nutrition and Food Research, Plos One, Obesity Research, British Journal of Nutrition, Pflügers Archiv European Journal of Physiology, BBA-Molecular Basis of Disease, International Journal of Obesity, the Journal of Nutritional.

### 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

## Skills

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### Specific

- \* E3 - Apply knowledge of the discipline for health promotion.

### Generic

- \* G10 - Ability to articulate knowledge in oral and written presentations.
- \* G11 - Advanced comprehension of the global context in which the specialty area develops.
- \* G12 - Ability to develop their work in English (language internationally recognized scientific discipline).
- \* CB8 - 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.
- \* CB6 - Possess knowledge and understanding to provide a basis or opportunity for originality in developing and / or implementing ideas, often within a research context.
- \* G9 - 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/](http://estudis.uib.cat/master/comp_basiques/)

## Content

### Theme content

#### Subject 1. Introduction to Chronobiology

##### Subject 1.- Introduction to Chronobiology

##### 1.1.- Chronobiology

##### 1.2.- The Biological Clock

##### A) The location of the mammalian biological clock

##### B) Hierarchical organization of circadian clocks

##### 1.3.- The synchronization mechanisms of the circadian timing system

##### 1.4.- The molecular mechanism of the circadian clock

##### 1.5.- Bibliography

#### Subject 2. Chronobiology in Nutrition

##### Subject 2.- Chronobiology in Nutrition

##### 2.1.- Relationships between Metabolism and Circadian Rhythms

##### 2.2.- Neural Pathways Linking Circadian and Metabolic Systems

##### 2.3.- The Food-Entrainable Oscillator

##### 2.4.- Nutrient Signaling and Circadian Components

##### 2.5.- Chronobiological aspects of obesity

##### A) Background

##### B) Epidemiological evidence

##### C) Genetic evidences

##### D) Summarizing

##### 2.6.- Bibliography

#### Subject 3. Specific examples hormones or condition involved in the circadian control of food intake

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## Teaching methodology

### In-class work activities

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 orgaven by the professor on a topic of special interest Seminars given by the students. In groups,the students will presentand defen in a public session a work.	10

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 Campus Extens platform.

### Distance education work activities

Modality	Name	Description	Hours
Individual self-study		Studying the material of the lectures Reading the RecommendedBibliography	20
Group self-study	Preparation of a seminar	Reading the literature related to the work to be prepared. Preparation of the oral presentation of the topic in group	20

### 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

The activities will be graded with a score of 0-10. Theaverage of the marks obtained in the different sections must be at least 5 to pass the course.

We propose two routes: A and B.

The route A is the continuous assessment and the student requires assistance to classroom activities. The itinerary B, for students who have and can demonstrate their incompatibility to attend classroom activities.

The final mark of the course is the sum of scores:

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### Itinerary A

1. Objective test. 45% of the final mark corresponds to the final exam
- 2.-Jobs and projects.55% of the final mark corresponds to the mark obtained in the oral presentation group work and the assist other students's seminars

### Itinerary B

1. Objective test.45 % of the final mark corresponds to the final exam
2. Jobs and projects (30% of the final mark). Bibliographic revision of a work proposed by the professor
3. Test of real or simulated tasks (problem solving or case). 25 % of the final mark. Q uestionnaire regarding the seminars prepared by other students

### Lectures in the presence of Professor

Modality	Theory classes
Technique	Objective tests ( <b>non-retrievable</b> )
Description	Explanation of the contents in lectures Monographic sessions supervised orgaven by the professor on a topic of special interest Seminars given by the students. In groups,the students will presentand defen in a public session a work.
Assessment criteria	Evaluation of the acquired knowledge
Final grade percentage: 45%	

### Individual self-study

Modality	Individual self-study
Technique	Objective tests ( <b>non-retrievable</b> )
Description	Studying the material of the lectures Reading the RecommendedBibliography
Assessment criteria	
Final grade percentage: 0%	

### Preparation of a seminar

Modality	Group self-study
Technique	Papers and projects ( <b>non-retrievable</b> )
Description	Reading the literature related to the work to be prepared. Preparation of the oral presentation of the topic in group
Assessment criteria	Evaluation of acquired attitudes
Final grade percentage: 55%	

## Resources, bibliography and additional documentation

### Basic bibliography

- 1.Froy O. Metabolism and Circadian Rythms –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.Garautet M., et al., The chronobiology, etiology and pathophysiology of obesity. International Journal of Obesity 34, 1667–1683, 2010

## Teaching guide

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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

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- 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
- 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

