Universitat Autònoma de Barcelona

2021/2022

Genes and Environment

Code: 101974
ECTS Credits: 3

Degree	Type	Year	Semester
2500890 Genetics	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Joan Francesc Barquinero Estruch
Email: Francesc.Barquinero@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Other comments on languages

If there is an exchange student who has problems understanding the Catalan language, the first weeks will be explained in Spanish

Prerequisites

There are no official prerequisites, but much of the literature is in the English language, which is also used in the figures projected in theory classes, and also for oral communication when needed.

Objectives and Contextualisation

The subject of Environmental genetics aims studying the different aspects of human variability in relation to the environment, and the implications of their interaction in human health. Furthermore, most of human diseasesand health problems result from a complex interaction of genetic and environmental factors. Because of variability these differences, subtle genetic differences provide different responses to same environmental exposure. Therefore, the contents of this subject are focused on various genetic factors influencing human health, both individually and at population level.

Competences

- Apply knowledge of theory to practice.
- Be able to analyse and synthesise.
- Be able to communicate effectively, orally and in writing.
- Be sensitive to environmental, health and social matters.
- Describe and interpret the principles of the transmission of genetic information across generations.
- Describe epigenetic mechanisms.
- Describe the diversity of living beings and interpret it evolutionally.
- Perceive the strategic, industrial and economic importance of genetics and genomics to life sciences, health and society.
- Take the initiative and demonstrate an entrepreneurial spirit.

Learning Outcomes

1. Apply knowledge of theory to practice.
2. Be able to analyse and synthesise.
3. Be able to communicate effectively, orally and in writing.
4. Be sensitive to environmental, health and social matters.
5. Describe the clinical consequences derived from epigenetic control mechanisms.
6. Determine the genetic basis and calculate the risk of recurrence of human illnesses.
7. Evolutionally describe and interpret the diversity of hominids.
8. Recognise the strategic importance of genetic progress in the field of human health, especially applications of the genomic to personalised medicine, pharmacogenomics and nutrigenomics.
9. Take the initiative and demonstrate an entrepreneurial spirit.

Content

Topic 1. Historical perspectives

Topic 2. Epidemiology in environmental genetics

Topic 3. Epigenetics (environmental factors)

Topic 4. Radiation and cancer

Topic 5. Farmacogenetics

Topic 6. Ecogenètics

Topic 7. Nutrigenomics

Unless the requirements enforced by the health authorities demand a priorization or reduction of these contents.

Methodology

The development of the educational activities of the course is based on lectures, practical classes in the computer room and seminars, each with its specific methodology. Theory classes: students acquire specific knowledge of the subject by attending the lectures. Students can access to on-line support material used in classes on moodle web

based site, respecting the rules of intellectual property. Practical lessons: the knowledge acquired in the lectures and work independently applied to the study of a case study. Students will work in small groups to develop key skills

specific to the field. The presence in each of the training activities is mandatory.

The course will be in-class unless the requirements enforced by the health authorities demand shifting to the online modality. In this case, the format will be adapted to the possibilities offered by the UAB's virtual tools.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes

Type: Directed			
Theory	13	0.52	1, 4, 7, 5, 6, 9, 8, 3, 2
practical lessons	10	0.4	1, 4, 7, 5, 6, 9, 8, 3, 2
seminars	2	0.08	1, 4, 7, 5, 6, 9, 8, 3, 2
Type: Supervised			
Tutorials	2	0.08	
Type: Autonomous			
Seminars Preparation	4	0.16	1, 4, 7, 5, 6, 9, 8, 3, 2
Study	32	1.28	1, 4, 7, 5, 6, 8, 2
Teamwork	12	0.48	1, 4, 7, 5, 6, 9, 8, 3, 2

Assessment

Being a continuous evaluation, the student participation, the preparation and presentation of group work and a grade control will be considered in the following proportions:

Attendance and participation of students in class: 15%. Attendance to all practical sessions is mandatory. Students missing more than 20% of programmed sessions will be graded as "No Avaluable".

Delivery of practical work: 10%

Group work: 30%

Control: 45%. To evaluate the course a control with questions from theoretical and practical sessions will be performed. Students must get a minimum score of 4.0.

The average of the different assessed parts attendance and participation, teamwork and control) must be equal or greater than five.

A retake process is considered. To be eligible for this retake process, the student should have been previously evaluated in a set of activities equalling at least two thirds of the final score of the course or module.

The student will be graded as "No Avaluable" if the weighting of all conducted evaluation activities is less than 67% of the final score.

The proposed evaluation may undergo some modification depending on the face-to-face restrictions imposed by the health authorities

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and active participation in scheduled activities	15%	0	0	4, 7, 6, 9, 8, 3, 2
Delivery of material developed during practical lessons	10%	0	0	1, 4, 9, 3, 2
Preparation, presentation and defense of planned activities	30%	0	0	1, 4, 7, 5, 6, 9, 8, 3, 2
grade control	45%	0	0	1, 4, 7, 5, 6, 9, 8, 3, 2

Bibliography

BIBLIOGRAPHY

- Boyd R, Silk JB. (2001). Como evolucionaron los humanos. Ariel Ciencia

- Costa L.G, Eaton D L. Gene-Environment interactions, Fundamentals of ecogenetics. Willey-Liss (2006)

- Chinnery, PF. Et al. (2012). Epigenetics, epidemiology and mitochondrial DNA diseases. International Journal of Epidemiology, 41:177-187. doi:10.1093/ije/dyr232

- Wallace, D.C. and Fan, W (2010). Energetics, epigenetics, mitochondrial genetics. Mitochondrion 10 (2010) 12-31

- Irala-Estévez, J.I. et al. (2004). Epidemiología Aplicada. Ariel Ciencias Médicas.

- Jorde LB et al. Medical Genetics . Elsevier 4th Ed, 2009

- Konopka, G. and Geschwind D.H. (2010). Human brain evolution: harnessing the genomics (r)evolution to link genes, cognition, and behavior. Neuron. October 21; 68(2): 231-244. doi: 10.1016/j.neuron.2010.10.012

- Muehlenbein MP. 2010. Human Evolutionay Biology. Cambridge University Press

- Nussbaum et al . Thompson & Tompson Genetics in Medicine. Saunders . Elsevier, 2007

- Preuss, TM. (2012). Human brain evolution: From gene discovery to phenotype discovery PNAS vol. 109 suppl. 1, 10709-10716

- Rietschel, M. and Treutlein, J. (2013). The genetics of alcohol dependence. Ann NY Acad Sci; Apr1282:39-70. Review

- Robert K. Naviaux, R.K. (2008) Mitochondrial control of epigenetics. Cancer Biology & Therapy 7:8, 1191-1193.

- Tobias ES et al. Essential Medical Genetics. Wilwy-Blackwell, 6th Ed, 2011

- Wells JCK. 2010. The Evolutionary Biology of Human Body Fatness. Cambridge University Press

- Allis C.D. (2015). Epigenetics, Second Edition. Cold Spring Harbor Laboratory Press

Software

There is no specipc sftware to be used