

Predisposició Genètica al Càncer**2014/2015**

Code: 42929

ECTS Credits: 6

Degree	Type	Year	Semester
4313802 Genètica avançada/Advanced Genetics	OT	0	1

Contact

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Use of languages

Principal working language: anglès (eng)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Teachers

Massimo Bogliolo

Gonzalo Hernandez Viedma

Objectives and Contextualisation

The aim of this module is to dissect the genetic basis of cancer predisposition. We will discuss and perform laboratory experiments to explore the molecular basis of syndromes such as hereditary breast cancer, familiar colon cancer or rare DNA repair syndromes characterized by cancer predisposition such as Xeroderma pigmentosum, Fanconi anemia or Lynch syndromes. We will also discuss and experimentally check how DNA repair can be targeted for specific anticancer therapies.

Skills

- Analyse the research results to obtain new products or processes valuing their industrial and commercial viability for transfer to society.
- Demonstrate a mastery of genetic analysis as a transversal tool applicable to any field of genetics.
- Demonstrate responsibility in management of information and knowledge.
- Design and apply scientific methodology in resolving problems.
- Develop critical reasoning in the area of study and in relation to the scientific and business environments.
- Integrate knowledge of the possible alterations in DNA with their consequences for living beings.
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Student should possess an ability to learn that enables them to continue studying in a manner which is largely self-supervised or independent
- Students should be capable of integrating knowledge and facing the complexity of making judgements using information that may be incomplete or limited, including reflections on the social and ethical responsibilities linked to that knowledge and those judgements
- Students should know how to apply the knowledge they acquire and be capable of solving problems in new or little-known areas within broader contexts (or multidisciplinary contexts) related to their area of study
- Use and manage bibliographical information and other resources related to genetics and related fields.
- Use scientific terminology to argue the results of the research and show how to communicate in spoken and written English in an international setting.

Learning outcomes

1. Analyse the molecular mechanisms operating in genetic pathologies.
2. Analyse the molecular mechanisms operating in tumour processes and in the genetic predisposition to suffer them.
3. Analyse the research results to obtain new products or processes valuing their industrial and commercial viability for transfer to society.
4. Demonstrate responsibility in the management of information and knowledge and in the direction of groups and/or projects in multidisciplinary teams.
5. Develop critical reasoning in the area of study and in relation to the scientific and business environment.
6. Preparation and presentation of seminars
7. Preparation of work related to the module content
8. Students should be capable of integrating knowledge and facing the complexity of making judgements using information that may be incomplete or limited, including reflections on the social and ethical responsibilities linked to that knowledge and those judgements
9. Use and manage bibliographical information and other resources related to genetics and related fields.
10. Use scientific terminology to argue the results of the research and show how to communicate in spoken and written English in an international setting.
11. Write a report that considers the use of the methodology used in the module to resolve a specific problem
12. Write critical summaries about the taught seminars
13. Write reports on the genetic bases of different illnesses

Content

Theoretical lectures and seminars:

- Molecular basis of cancer predisposition: DNA repair and DNA damage response mechanisms.
- BRCAness and genetic predisposition to breast/ovarian cancer
- Rare DNA repair syndromes of cancer predisposition
- Targeting DNA repair in cancer treatment: chemosensitizing tumors by inhibiting DNA repair.

Synthetic lethality: Chemotherapy of BRCA tumours with PARP inhibitors

Laboratory experiments:

- Sensitivity of cells from Xeroderma pigmentosum to UV light
- Repair kinetics of UV-light induced pyrimidine dimers
- Sensitivity of BRCA negative cells to PARP inhibitors
- Homologous recombination assay

These experiments will require the following techniques:

- culturing of human cells from cancer predisposition syndromes
- cytotoxicity and cell cycle assays
- subnuclear local irradiation of fibroblast
- Plasmid transfection
- RNA interference by siRNA

-flow cytometry

-Western blot

-flow cytometry