BIO-392 **Introduction to oncology**

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Cursus	Sem.	Type
Life Sciences Engineering	BA6	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

This course provides a comprehensive overview of the biology of cancer, illustrating the mechanisms that cancer cells use to grow and disseminate at the expense of normal tissues and organs. The â##hallmarks of cancerâ## categorization proposed by Hanahan and Weinberg (2001; 2011) provides a referen

Content

Topics of the course:

- The hallmarks of cancer.
- Normal organs and tumours: notions of histopathology.
- The molecular biology of the cancer cells: sustained proliferative signals and evasion of growth suppression.
- Resistance to apoptosis and replicative immortality
- The causes and consequences of cancer: mutations and multi-step tumour progression.
- DNA repair and genetic instability.
- The tumour microenvironment: heterotypic interactions among cancer cells and the tumour-associated stroma.
- Tumour angiogenesis: biology and therapeutic targeting.
- Inflammation and cancer.
- The role of the immune system in cancer evolution.
- The biology of metastasis and metastasis-associated organ microenvironments.
- Cancer biomarkers and classificators.
- Druggable and non-druggable mutations, darwinian selection, and mechanisms of resistance.
- Cancer therapies: an overview.
- Targeted therapies: mechanisms and applications.
- Immunotherapies.

Keywords

cancer; hallmark of cancer; oncogene; tumor suppressor; tumor microenvironment; tumor immunology; tumor angiogenesis; invasion; metastasis; targeted therapy; resistance mechanism

Learning Prerequisites

Required courses

Biology

Important concepts to start the course

The biology of the cell, including: transcription; cell signaling; cell cycle.

Learning Outcomes

By the end of the course, the student must be able to:

- Conduct a study to identify the mechanism(s) of tumorigenesis
- Assess / Evaluate the molecular and cellular mechanisms of tumorigenesis
- Design mechanism-targeted treatments to inhibit tumorigenesis

Transversal skills

- Summarize an article or a technical report.
- Give feedback (critique) in an appropriate fashion.
- Access and evaluate appropriate sources of information.
- Take feedback (critique) and respond in an appropriate manner.

Teaching methods

Lectures, during which the feedback of the students is requested.
Exercises (can vary in style, but are important to reach the learning objectives)

Expected student activities

Attending lectures and exercises.

Assessment methods

Written exam

Supervision

Office hours	Yes
Assistants	Yes

Resources

Bibliography

The biology of cancer, Ed. Garland Science (by R. A. Weinberg).
Hallmarks of Cancer: The next generation. In Cell, 2011 (by D. Hanahan and R. A. Weineberg)

Ressources en bibliothèque

- Hallmarks of Cancer / Hanahan
- The biology of cancer / Weinberg