Course for Ph.D. students
XLI Cycle (1 Nov 2024 – 31 Oct 2027)

Curriculum
INNOVAZIONE NEL CAMPO DELLE SCIENZE FARMACEUTICHE

Title
Milestones in Cancer Research
(2 ECTS)

Prof. Eleonora Dondossola
University os Texas MD Anderson Cancer Center, Houston, TX, USA

Course language: **English**

Scheduling:
March 11, 3:00 PM (Room B – Farmacia)
March 18,25 and April 1st, 3:30 PM (Room E – Farmacia)
April 8, 3:00 PM (Room E – Farmacia)

*The course will be held **online**. Participants can join via Microsoft Teams using the following link:*
https://teams.microsoft.com/meet/34649301434090?p=ZQT71gEm0C6uZisMq7.

To attend the course please contact:
EDondossola@mdanderson.org

Course description

The purpose of the course is to introduce the main achievements in cancer research over the past century from a historical perspective, and how certain concepts have evolved over time. In this regard, each "milestone" will be contextualized with the knowledge available at the time of the discovery, but also compared with the state of the art. The course will focus on the basic biological mechanisms that support tumor growth.

Lecture 1, 1890-1930

- The "Seed and Soil" hypothesis
- Cancer as a genetic disease
- The role of the immune system in tumor development
- Viruses & cancer
- The role of hormones in tumor development

Lecture 2, 1930-1960

- Cancer stem cells
- Angiogenesis
- Chemotherapy in the war against cancer
- Smoking and cancer
- "Two-hit hypothesis"
- Chromosome translocation

Lecture 3, 1960-1980

- Tumor suppressor genes
- Cancer and apoptosis
- The tumor microenvironment
- "Multi-step hypothesis"
- Cellular homologs of viral oncogenes

Lecture 4, 1980-1990

- Oncogenes code for proteins involved in cell growth
- The first human oncogene
- Cooperation between oncogenes
- Cell cycle and DNA damage
- Genetic bases for cancer predisposition

Lecture 5, 1990-2020

- Genetic instability and tumor development
- Gene expression profiling in tumors
- Targeted anti-cancer therapies
- Escape from the immune system!
- Deregulation of tumor cell metabolism
- Future perspectives

Evaluation: NO formal evaluation is required, however I like to have a short discussion with students about their favorite "milestone in cancer research" during the last class.