

Màj 16/04/2020

UE 2.2. Current concepts in Oncology

12 ECTS

Parcours *Basic and clinical oncology, towards precision medicine*

ST1: Cancer stem cells

Contact : ariane.sharif@inserm.fr

This thematic seminar will introduce the concept of normal and cancer stem cell (discovery, isolation, characterization, molecular control, heterogeneity, the concept of the niche) as well as the therapeutic issues that have emerged from this new model of cancer growth, from the hopes to the obstacles current research has to overcome to eventually eradicate this population of cells (resistance to treatments, phenotypic plasticity, role of the microenvironment).

Duration: 1 day

Program

Context: The discovery within tumors of a small population of cancer stem cells endowed with the self-renewal properties of stem cells and able to (re)generate the whole tumor, has revolutionized our view of cancer biology, leading to propose a new model of cancer growth and to rethink therapeutic strategies.

Content: The day includes courses by local speakers and a scientific conference by a guest scientist. Students participate by presenting articles and leading the following scientific discussion.

- Morning: courses and conference by local and guest speakers
 - 9h-9h45: Introduction of the concept of normal and tumoral stem cell, resistance to treatments, therapeutic issues (Ariane Sharif, U1172 LiNCog).
 - 10h-10h45: Radiotherapy and phenotypic plasticity of breast cancer cells (Chann Lagadec, INSERM U908).
 - 11h-12h: Scientific conference (to be determined)
- Afternoon: analysis of articles by students
 - Each student chooses one article to present (alone or in pairs) and one article to discuss from the proposed list (contact ariane.sharif@inserm.fr). A total of 6 articles will be presented (plan 15 min for the presentation + 15 min for the discussion).
- General reviews on the topic:
 - The molecular repertoire of the 'almighty' stem cell. Eckfeldt CE, Mendenhall EM, Verfaillie CM. *Nat Rev Mol Cell Biol.* 2005 Sep;6(9):726-37.
 - Metabolic plasticity in stem cell homeostasis and differentiation. Folmes CD, Dzeja PP, Nelson TJ, Terzic A. *Cell Stem Cell.* 2012 Nov 2;11(5):596-606.
 - Molecular regulation of stem cell quiescence. Cheung TH, Rando TA. *Nat Rev Mol Cell Biol.* 2013;14(6):329-40.
 - Asymmetric cell division: recent developments and their implications for tumour biology. Knoblich JA. *Nat Rev Mol Cell Biol.* 2010;11(12):849-60.
 - The cancer stem cell: premises, promises and challenges. Clevers H. *Nat Med.* 2011;17(3):313-9.
 - Evolution of the cancer stem cell model. Kreso A, Dick JE. *Cell Stem Cell.* 2014 Mar 6;14(3):275-91.
 - Cancer stem cell niche: the place to be. Borovski T, De Sousa E Melo F, Vermeulen L, Medema JP. *Cancer Res.* 2011;71(3):634-9.
 - Cancer drug pan-resistance: pumps, cancer stem cells, quiescence, epithelial to mesenchymal transition, blocked cell death pathways, persists or what? Borst P. *Open Biol.* 2012;2(5):120066.
 - An evolving paradigm of cancer stem cell hierarchies: therapeutic implications. Cole AJ, Fayomi AP, Anyaeche VI, Bai S, Buckanovich RJ. *Theranostics.* 2020 Feb 10;10(7):3083-3098.
 - Clinical and Therapeutic Implications of Cancer Stem Cells. Clarke MF. *N Engl J Med.* 2019 Jun 6;380(23):2237-2245.
 - Cancer stem cells and their unique role in metastatic spread. Steinbichler TB, Savic D, Dudás J, Kvitsaridze I, Skvortsov S, Riechelmann H, Skvortsova II. *Semin Cancer Biol.* 2020 Feb;60:148-156.
 - Identifying some theories in developmental biology: the case of the cancer stem cell theory. Lucie Laplane. In Minelli A and Pradeu T (2014) *Toward a Theory of Development.* Oxford University Press.

Educational team

Ariane Sharif, Xuefen Le Bourhis, Roland Bourette, Chann Lagadec