In silico prediction of drugs and causal genes in Cancer

IBISC lab. Institut CURIE

Subject Overview

Network medicine is the application of Network Science for the understanding of complex diseases and the prediction of their treatments. One of the major challenges is the discovery of genes driving tumorigenesis and molecular drug targets. To address this issue, we propose to study perturbations induced by drugs and mutations as structural modifications of cell signalling networks and to assess their effect on cell fate using network dynamics.

The objective of this internship will be oriented towards the understanding of the effects of network modifications on some known processes deregulated in cancer. In a Boolean model of cell fate decision process, we propose to explore all possible combinations of alterations that switch the dynamics from one cell fate to another and relate them to the literature (e.g., reported mutations and/or effects of drugs in cancer patients). The intern will
1) propose some extensions of an existing model of cell fate decision (developed in CURIE Institute) to account for frequently altered genes in published pan cancer analyses and 2) formulate predictions of the effects of some genetic interactions and of drugs on cell fate using an algorithm developed in IBISC Lab. The internship can be further extended to the modelling of the mechanisms underpinning resistance to treatments.

The intern is expected to have a good background in biology or biomedicine and a real interest in modelling. Complementary skills in computer sciences will be valued. The internship will be co-supervised by researchers of IBISC laboratory and CURIE Institute.

Contact

Laurence Calzone  laurence.calzone@curie.fr  INSTITUT CURIE
+33 (0)1 56 24 69 24

Franck Delaplace  franck.delaplace@ibisc.univ-evry.fr  IBISC laboratory
+33 (0)1.64.85.35.10