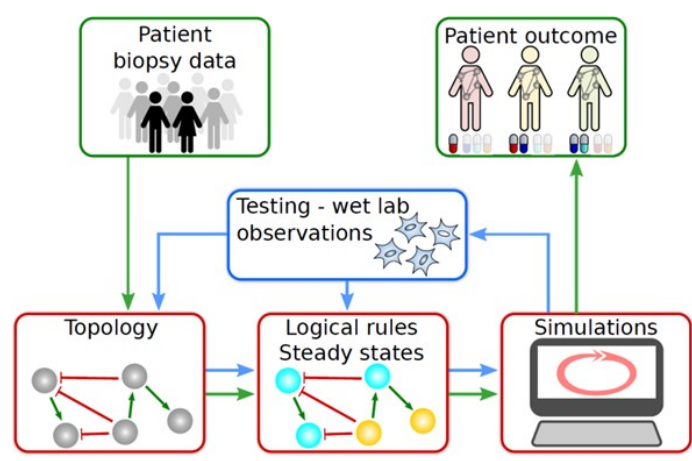# Colosys

COLOSYS " A systems approach to preventing drug resistance in colon cancer"

Currently, patients with Colon Cancer have multiple treatments available, but not all respond in a durable way to a given therapy. In the COLOSYS project, the central aim is to find tumour specific biomolecules and their interactions, that reliable predict whether that tumour will respond to a given treatment.

Molecular profiling, screening and a model system are the tools used to identify and better understand how biomolecules within cells interact with each other in molecular 'networks' that collectively control the processes in that cell. In cancer cells these processes behave abnormally due to, for example, mutations that cause the proteins to escape normal control. In order to predict how a cancer cell will react to treatment we need to understand how these networks are structured and how they operate.


The main goal in this project is to develop, via computer simulation (ie. the COLOSYS Boolean modelling pipeline), therapy response predictors that allow individualised treatment based on patient-specific driver and resistance mechanisms, thus significantly increasing response and cure rates in Colon Cancer.

This approach has different steps, starting with the identification of known and novel genes by integration of multiple data types from public tumour data repositories. This information will be used to perform computer simulations of drug treatments on digital patients, followed by validation of promising treatments on individual patient's tumor cells grown in the lab. The combination of computational, experimental and clinical testing will provide a better understanding of drug resistance mechanisms and allow personalised treatment of colon cancer.

The COLOSYS Boolean modelling pipeline will help physicians to choose the most appropriated therapy. In addition, but of equal importance, clinicians receive key information to interpret tumour molecular profiles and convert them into clinical decisions. Patients will be spared unnecessary side-effects, receive shorter treatments, and benefit from improved therapies

The COLOSYS Boolean modelling pipeline
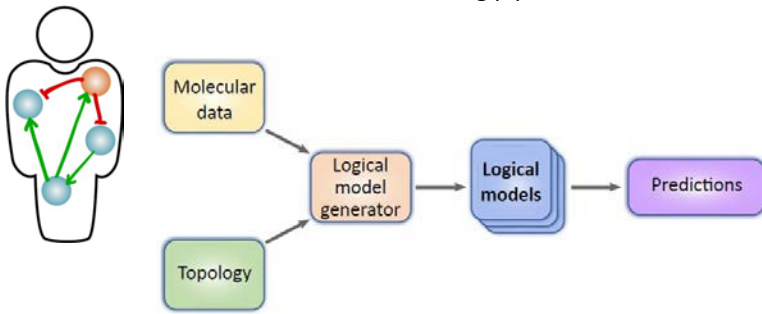
The primary indication addressed in this project is Colon Cancer but nevertheless it is feasible to imagine extending the research to many other cancers. The aim is to decrease the ineffective therapies and to increase the survival rates.

The access to technology based on the use of logical models for therapy prediction involves a more extensive analysis of biopsies than currently performed, meaning an increase of the costs to design a therapy. However, in the long term, an optimal treatment decision will produce important economic benefits with less side-effects, less costs of drugs and less hospitalisation costs.
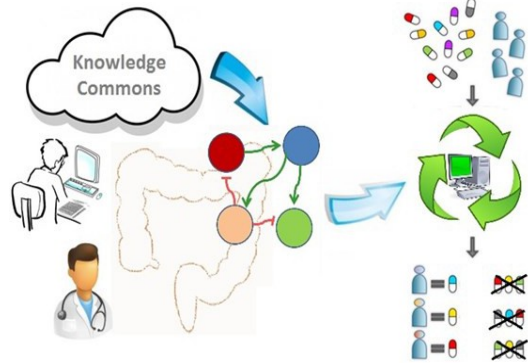
PROJECT DURATION > 36 Months

Onset project: May 2016

Project ends: November 2019

Molecular profiling is a form of testing that classifies tumors based on their genetic make-up to help diagnose and treat cancer. Using a blood test or biopsy, this testing examines the DNA of cancer cells, looking for genetic mutations that have been acquired by these cells.

Screening is the process of examining people for the presence of a disease.

Model system is a representation of an idea, an object or even a process or a system that is used to describe and explain phenomena that cannot be experienced directly. Models are central to what scientists do, both in their research as well as when communicating their explanations.

[Click here to watch the COLOSYS movie](#)