

New platform for predictive modelling of cancer signalling: European Consortium “CanPathPro” started

An international group of scientists from 6 countries bring together their expertise to develop a combined experimental and systems biology platform for predictive modelling of cancer signalling. The EU Horizon 2020 funded project, co-ordinated by Alacris Theranostics GmbH, Berlin, will run for 5 years with a budget of almost 11 million euros.

Only a few decades ago cancer was invariably a fatal disease. Nowadays, cancer screening and ever-emerging new therapies have significantly decreased the mortality rate, despite the higher incidence of cancer in the ageing European population. However, the great molecular complexity and heterogeneity exhibited by most cancers, is – still – a huge challenge in cancer treatment.

Recent technological developments have enabled the generation of molecular datasets that are exponentially increasing the knowledge base on cancer. Yet, a systems biology-based approach is required to understand the cross-talk between pathways as well as the underlying molecular basis of cancer development and progression. New solutions to optimally exploit this wealth of data for basic research, better treatment and stratification of patients, as well as more efficient targeted drug development are required. The European Research Consortium **CanPathPro** now takes a unique approach and brings together classic cancer research with omics data and systems biology tools, to develop and validate a new biotechnological application: a combined systems and experimental biology platform for generating and testing cancer signalling hypotheses in biomedical research.

Previous bioinformatic attempts in this direction have been confined to pattern recognition or, at best, modelling of single pathways. Such approaches often cannot take into account the complexity of living organisms, comprising numerous pathways and their cross-talk. These features are of paramount significance in cancer, where signalling complexity is the major determinant of disease progression and drug response.

To achieve its objective, **CanPathPro** will develop and refine bioinformatic and experimental tools for the evaluation of systems biology modelling predictions. Components comprise highly defined mouse and organotypic experimental systems, next generation sequencing, quantitative proteomics and a systems biology computational model for data integration, visualisation and predictive modelling.

The **CanPathPro**-generated platform will enable *in silico* (computer-based) identification of cancer signalling networks critical for tumour development and will allow users to predict activation status of individual pathways, following integration of user (or public) data sets in the pathway models.

The *in silico* modelling and high-performance computing tools will provide completely new solutions for researchers, SMEs and industry for interpretation and analysis of omics data as well as for deriving and testing new hypotheses. Thus, prediction of cancer progression and drug efficacy shall be maximised in order to, in the long run, significantly improve outcomes for the majority of cancer patients.

Project Information:

CanPathPro ("Generation of the CanPath prototype - a platform for predictive cancer pathway modelling") has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 686282 (10 million euros) and 0.85 million euros from the Swiss State Secretariat for Education, Research and Innovation (SERI). The 5-year project started on 1st March 2016.

The project is coordinated by Alacris Theranostics GmbH (Germany) and carried out by leading European research institutions and SMEs: PHENOMIN-ICS (France); Netherlands Cancer Institute (Netherlands); Leibniz Institute on Aging - Fritz-Lipmann Institute (Germany); Helmholtz Zentrum München GmbH (Germany); Spanish National Research Council (CSIC, Spain); Biognosys AG (Switzerland); Simula Research Laboratory AS (Norway); Finovatis SAS (France).

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