



University of Stuttgart

Stuttgart Research Center Systems Biology (SRC SB)

Systems Biology Seminar Talk

„Modeling Immunogenic cell
death using a stochastic
Boolean approach “

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Abstract:

Immunogenic cell death (ICD) has raised some interest over the past years for its role in triggering an antitumor immune response following cytotoxic interventions, such as chemotherapies. However, many uncertainties remain about the succession of events that are involved in ICD, the components that favor it or not, and how to intervene throughout the process to improve the immune response.

The experimental models needed for studying ICD are based on in vivo mouse models that are complicated and costly. We propose here a mathematical approach to better characterize these events and suggest ways to boost ICD. For that purpose, we have constructed a mathematical model using a software, UPMaBoSS, that simulates interactions between the key cell types of ICD, namely tumor cells, dendritic cells, CD4+ and CD8+ T cells. With this model, we were not only able to reproduce the timing of ICD events, but also to suggest two possible interventions: one that completely switches off ICD and another one that enhances it. These candidates will then be evaluated in breast cancer mice models.

CV:

Dr. Laurence Calzone is a research scientist at Institut Curie. She has published mathematical models using several formalisms including nonlinear ordinary differential equations and Boolean formalism to address specific biological questions related to cancer (cell fate decision processes in response to cell death signals, interplays between MAPK pathways, metastasis process, etc.) with the aim to provide personalized treatments.

She has experience in constructing these models based on published articles and in analyzing patient data using these models. She has participated in developing methods and tools to improve the simulations of the mathematical models she builds.

Thursday
November 5, 2020
4 p.m. – 5 p.m.

Over Webex