BIOENGINEERING SEMINAR

“Signal Integration: the Response of Yeast to Mixed Carbon Environments”

Monday – May 11, 2015 – 4:00 p.m.
EPFL – room SV1717a

Prof. Michael Springer
Department of Systems Biology, Harvard Medical School
Boston, MA (USA)

host: Prof. Sebastian Maerkl

Abstract

The response of yeast to galactose is one of the best-studied Eukaryotic signaling pathways. Glucose, the preferred carbon source, inhibits the utilization of galactose. Surprisingly, we have found that instead of simply inhibiting galactose utilization when glucose is above a threshold concentration, individual cells respond to the ratio of glucose and galactose and based on this ratio determine whether to induce genes involved in galactose metabolism. This response appears to be the result of an extra layer of signal processing which is occurring at the hexose transporters.

Furthermore, we have uncovered natural variation in the threshold of this ratio sensing amongst different natural yeast strain. Competitive growth experiments, nutrient utilization experiments, and gene induction show that cells display two distinct behaviors - a preparation for galactose or an optimization for glucose. These results suggest that the interaction between multiple nutrient sources maybe more nuanced than previously believed with ratio sensing allowing cells to behave more optimally to both steady-state and dynamically changing environments.

See Bioengineering seminar calendar at http://bioengineering.epfl.ch/seminars