LUXEMBOURG INSTITUTE OF HEALTH
RESEARCH DEDICATED TO LIFE

UNIVERSITÉ DU LUXEMBOURG

LECTURE SERIES & WORKSHOPS

TRANSLATIONAL BIOINFORMATICS AND SYSTEMS BIOMEDICINE

29
JAN. 2019
Tuesday

LECTURE
Maison des Sciences Humaines
"Blackbox" room
(11, Porte des Sciences L-4366 Esch-sur-Alzette)
4.00 - 5.00 pm

MEET THE SPEAKER*
Light snacks provided
Maison des Sciences Humaines
Room N°0.205
5.00 - 6.00 pm

1 2 3 4 5 6 7 8

*Please register by sending a mail to florence.henry@lih.lu

SPEAKER
Asst. Prof Yonatan SAVIR
Dept. of Physiology, Biophysics and Systems Biology
Rappaport Faculty of Medicine,
Technion, Israel

HOSTS:
LIH/University of Luxembourg
RESPONSIBLE SCIENTISTS:
Philippe Lucarelli (philippe.lucarelli@uni.lu)
Jens Schwamborn (jens.schwamborn@uni.lu)

UNDERSTANDING COMBINATORIAL SIGNAL PROCESSING AND ITS FAILURE DUE TO AGE AND DISEASE

ABSTRACT

While the ability of biological systems to integrate multiple cues from the environment and coordinate their metabolism and regulatory networks accordingly is a major determinant of their fitness, our understanding of combinatorial integration of multiple inputs is still limited. In this talk, I will first discuss the challenges of deciphering combinatorial response and its failure in aged cells using our current work on T-cells and the preimplantation mammalian embryos as examples. I will then focus on the ability of yeast to sense and utilize multiple carbon sources as a model system. We study how yeast responds to hundreds of mixtures of preferred carbon source, glucose, and a less preferred one, galactose. Many of the components of this response, known as catabolite repression, are conserved from yeast to human. We found that, in contrast to the textbook view, instead of merely 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. The decision of when to switch from a preferred to a less-preferred carbon source is akin to a general switching problem between resources, which has long been of interest in biology, management science and operations research. We investigate the optimal switching strategies that can result in a ratio sensing and how they provide a fitness advantage which could have shaped the evolution of this property.
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