PROPOSITION DE STAGE

Laboratoire : IGBMC
Adresse : 1 Rue Laurent Fries, 67400 Illkirch
Équipe de recherche (si pertinent) : Stress response and aging signalling
Responsable de l'équipe : Gilles Charvin
Responsable de stage : Sophie Quintin/ Théo Aspert
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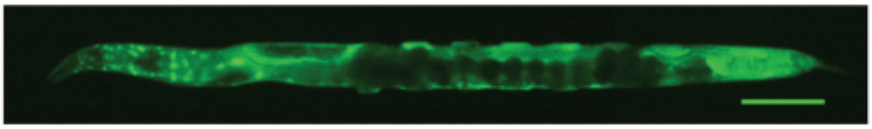
Profil recherché : Geneticist // Biophysicist // Cell biologist

Titre du stage: Microfluidic analysis of the oxidative stress response in the nematode *C. elegans*

Background

Living organisms have evolved exquisite defense mechanisms to buffer against variations in internal physiological parameters or to counteract unpredictable environmental changes. The response of oxidative stress (e.g. hydrogen peroxide) is a fundamental and highly conserved regulatory system that allows cells and organisms to ensure a precise redox balance, which is essential for proper physiological function. Yet, although the molecular players involved in the response are well characterized at the biochemical level, how these components integrate into a functional homeostatic system remains quite obscure.



Aims

In this context, we have developed a microfluidic platform to monitor the physiological response of individual budding yeast cells to various temporal stress patterns (i.e. steps, ramps, etc.) and we have unravelled the functional properties of the redox homeostatic system in this model organism. Now, based on this expertise, we would like to investigate to which extent what is observed in yeast can be transposed to a multicellular organism, such as *C. elegans*. Specifically, how is oxidative stress perceived by the different tissues, and integrated at the level of an entire organism?

To this end, we have developed a new methodology that allows us to monitor the response to hydrogen peroxide in worms trapped in a custom microfluidic device. We think this approach will shed light on oxidative stress signals are sensed and signal throughout the organs of the animal

Internship specific objectives

Specifically, the student's role will be to monitor hydrogen peroxide sensing in two specific neurons in the head and the tail of adult worms using real-time calcium imaging and fluorescence microscopy. In addition, specific CRISPR-based knock-in lines and mutants will be used to perturb and to measure stress signal sensing and processing.

Our lab provides an excellent scientific environment to develop this project. The student who will embark on this project will become gifted with an expertise in various domains including microfluidics technology development, *C. elegans* handling, confocal microscopy and image processing. The student will be supervised by Sophie Quintin, a *C. elegans* embryologist.
Please contact Gilles Charvin (charvin@igbmc.fr) or visit our website for further information:
http://charvin.igbmc.science