

STUDY OF MECHANISMS INVOLVED IN HEAT SLOPE-INDUCED THERMAL RESISTANCE OF *SACCHAROMYCES CEREVISIAE*

A 12 months post-doctoral position is available in the team « Procédés Alimentaires et Biotechnologiques » (team PMB ; Food and Biotechnological Processes) headed by Pr Laurent Beney and part of the « Unité Mixte de Recherche A 02.102 Procédés Alimentaires et Microbiologiques » (UMR PAM ; Food and Microbiological Processes) headed by Pr Patrick Gervais. The PMB team is located at AgroSup Dijon / Université de Bourgogne, Dijon, France (<http://www.umn-pam.fr/>).

Dr Stéphane Guyot (lecturer) and Pr Patrick Gervais will co-manage the post doc.

Mission:

The team works on the response of different type of cells (bacteria, yeasts, plant cells, ...) to physical and/or chemical stresses in order to improve conservation of desired organisms (as probiotics and ferments) or to destroy undesired ones (as pathogens).

The post doc will focus on the effects of the heat kinetics on the behavior of the yeast *Saccharomyces cerevisiae* in order to better understand cellular mechanisms involved in thermal resistance induced by a slow heating (heat slope applied at the rate of 0.5 °C.min⁻¹) and in cell death induced by a rapid heating (heat shock applied within 10 s – 1 min). We have recently showed that the plasma membrane, and more specifically its structural properties (as permeability but not fluidity), is a key factor in this type of resistance and death (Guyot *et al.*, 2015*). This study was performed at the single cell level and at the whole population level. We are investigating the role of specific proteins (such as those involved in oxidative response, formation of stress granules ...) and of specific components of the plasma membrane (e.g. sphingolipids). We are conducting experiments using fluorescent methods (flow cytometry, confocal fluorescence microscopy) and appropriate yeast deletion strains from the EUROSCARF mutant collection (http://web.uni-frankfurt.de/fb15/mikro/euroscarf/col_index.html).

The post doc will have to (i) complete these physiological investigations, (ii) develop a strategy to sort live and dead yeasts exposed to a heat slope or a heat shock in order to determine whether the mechanisms involved in heat-slope induced thermal resistance and in survival during the shock are similar or not and in the same way if mechanisms involved in death during the slope and the shock are similar. [Such an approach will help us to subsequently compare the phenotype of live yeasts which develop a certain degree of thermal resistance during the slope with those which survived a shock. In the same way, the phenotype of dead yeasts collected after a slope and a shock will be studied.] (iii) study the evolution of molecular mobility during the slope and the shock to appreciate changes in molecular structure/activity at a high temperature. Concerning the last point, the post doc will have an opportunity to help us to respond to a call for projects using (or by?) the SOLEIL synchrotron (France).

The proposed working program will be performed in collaboration with Dr Hazel Davey (Institute of Biological, Environmental and Rural Sciences, Aberystwyth University, Wales). The post doc will perform this work with the help of trainees subsequently recruited (as Master 1 trainees). The position is funded on PARI program (provided by the region of Burgundy) and it will start on 21st September 2015. Net monthly salary will be 1976 €.

*Guyot, S., Gervais, P., Young, M., Winckler, P., Dumont, J. and Davey, H. 2015. Surviving the heat: heterogeneity of response in *Saccharomyces cerevisiae* provides insight into thermal damage to the membrane. *Environmental Microbiology*, in press.

Candidate's profile:

The candidate will hold a PhD and present a strong research record in stress response of yeasts. Experience in fluorescence techniques and more particularly in flow cytometry and in confocal microscopy, as well as in cell culture will be a great advantage. The applicant should demonstrate collaborative and communication skills, be fluent in English, be highly motivated and able to acquire new technical skills to take charge of the project. Interested applicants should email a cover letter outlining your motivation for applying for the post doc, two letters of reference and names and email of the two referees.

Contacts

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