

## MEMBRANE FLUIDITY REGULATION IN YEASTS

Learmonth, Robert P. (1) and Butcher, Brett A. (2)

(1) Centre for Systems Biology, University of Southern Queensland, Toowoomba, 4350, Australia; (2) Contract Manufacturing, Progen Industries, Darra, 4076 Australia.

Membrane fluidity modulation appears to be an important mechanism facilitating yeast environmental adaptation. To elucidate underlying processes that may contribute to fluidity modulation we compared responses in yeasts mutants lacking the lipid desaturase *ole1* or membrane-associated *hsp30*, to response of the parent strain. We assessed membrane fluidity, composition and cell physiological parameters during aerobic and anaerobic batch culture, as well as in response to glucose, a metabolite that stimulates marked change in cell physiology. Fluidity modulation was assessed by determination of Generalized Polarization of the membrane probe laurdan, via steady state fluorescence spectroscopy.

During batch growth the parent strain showed characteristic patterns of membrane fluidity, membrane phospholipid and fatty acyl composition, growth rate, glucose or ethanol consumption and viability. However the *ole* and *hsp30* deletants appeared to be out of balance with less efficient metabolism, lower cell division rates and lower viability. The *ole* defect could be ameliorated by addition of unsaturated fatty acids. The *hsp30* defect could not be ameliorated externally and had particular impact over the transition at glucose exhaustion. The *hsp30* and *ole* deletants both showed abnormal changes in fluidity on exposure to glucose. In summary the fluidity regulation responses in the mutants were different to the parent strain, being unbalanced by ablation of the activities of either membrane-associated protein.