IDENTIFICATION OF STRESS SIGNALING PATHWAYS ACTING IN THE YEAST CELL RESPONSE TO MILD AND HIGH HYDROSTATIC PRESSURE

Fernandes, C.M.[1], Domitrovic, T.[1], Kurtenbach, E[2].

[1]Instituto de Bioquímica Médica, [2]Instituto de Biofísica Carlos Chagas Filho, UFRJ, Rio de Janeiro, Brazil

We have shown that high hydrostatic pressure (HHP) activate gene expression through Msn2/4 stress transcription factors in *Saccharomyces cerevisiae*. However, this activation occurs mainly at 50 MPa, suggesting that other factors might be involved in gene regulation at higher pressures. Therefore, in this work, we investigate the contribution of the Heat shock factor, Hsf1 to HHP stress response. Once *HSF1* is an essential gene, we used a strain genetically modified to allow tetracycline repression of *HSF1*. When Hsf1 is repressed, yeast cells are more sensitive to HHP of 200 MPa. Furthermore, Real-Time-PCR showed that *HSP12* induction at 100 MPa is dependent on *HSF1*, indicating that HHP leads to Hsf1 activation. We also tested BYyap1 and BYhog1 strains, which are defective in the stress pathway triggered by high oxidative and osmotic conditions, respectively. While BYyap1 mutant showed no increased sensitivity to HHP, the *hog1* mutant was slightly more sensitive to 200 MPa. The activation of MAPK-Hog1 pathway by HHP can be confirmed by Western-blotting of the phosphorylated form of Hog1. The investigation of the signaling pathways activated in different ranges of pressure may bring new insights, not only to the understanding of the stress response in yeast, but also to the comprehension of the physiological adaptations of piezophiles and piezotolerants organisms.
Support: CNPq