Saccharomyces cerevisiae as a Model Organism to Study Hog1 and Mammalian Homologous P38 Pathway

Cami Bonet, Andrea (School: Escola Mare de Deu de la Salut)

Using Saccharomyces cerevisiae (baker's yeast) as a model organism, this research aims to study the Hog1 pathway in yeast and consequently mammalian homologous p38, which are SAPKs in control of the adapting response upon osmotic shock. In order to assess the importance of these proteins for cell survival under osmotic stress, various experiments were conducted; using strains in presence, absence, and mutation - affecting the phosporylative site and catalytic activity- of the pathway, cell behavior, in both normal and stress conditions, was studied through spotting assay, growth curves, and western blot techniques, with the addition of a published immunofluorescent microscopy. Noticing that only the wild-type strain was able to properly proliferate under stress conditions, and that phosphorylation and localization in the nucleus simultaneously occurred, it was concluded that Hog1 ensures cell survival and that its deletion or mutation affects the adapting response, not being able to get phosphorylated, enter the nucleus, and there, perform its catalytic activity, leading to fatal outcomes. Model organisms offer a new perspective to research, they allow scientists to work with greater agility and eliminate the added risks of experimenting with actual human cells, knowing what to look for and what to expect even before working with mammals. On this basis, they become notably useful to study protein pathways. This research is remarkably valuable because of the implications of the p38 protein in many diseases such as cardiovascular dysfunctions, Alzheimer or cancer, in which it holds a dual role, opening the door to new therapeutic approaches.

Awards Won: