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# Real time analysis of gene expression in living yeast cells: Novel approach for accurate cell damage detection

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Microorganisms respond to environmental stress by the activation of gene expression programs in order to adapt and survive. Fine tuned transcriptional activation in response to stress is the result of dynamic interactions of transcription factors with specific promoter binding sites. A time resolved luciferase reporter assay in living yeast cells to gain insights into how osmotic, oxidative and nutritional stress signals modulate gene expression in a dose sensitive manner was used. Specifically, the dose response behavior of four different natural promoters (*GRE2, CTT1, SOD2* and *CCP1*) reveals differences in their sensitivity and dynamics to salt and oxidative stimuli. Characteristic dose response profiles are also obtained for artificial promoters driven by only one type of stress regulated consensus element, such as CRE, STRE or AP-1 sites. It has been shown that the stress tolerance of the cell critically modulates the dynamics of its transcriptional response in the case of oxidative stress. Moreover, it was identified different regulatory elements in the promoters of oxidative and osmotic stress response genes that are highly specific for the cell damage. In fact we use this technology to distinguish the cause of oxidative harm of different molecules such as toxins or oxidative compounds, in order to understand the biological target of injury, and therefore infer the molecular mechanisms of cellular defense. Real time analysis of gene expression in living yeast cells is extremely sensitive and requires low concentrations of the chemical species studied, thus this technology allows the study of cell damage at physiological levels.

## Biography

Amparo Pascual-Ahuir Gineris associate professor at the Polytechnic University of Valencia (UPV) department of Biochemistry and Molecular Biology, and researcher at the Institute of Plant Molecular and Cellular Biology (IBMCP), department of abiotic stress. She has completed his PhD at the UPV in 2001 in the field of transcriptional regulation of genes under stress response. She spent three years as post-doc at Harvard University, Department of Genetics, granted by a Human Frontiers Science Program Long term Fellowship. She is Faculty member of the UPV since 2007, and in collaboration with Dr. Proft, she is leading a research group interested in the study of molecular circuits involved in stress response.

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