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Regulation of yeast fatty acid desaturase in response to iron deficiency

April 2018 · Biochimica et Biophysica Acta (BBA) - Molecular and Cell Biology of Lipids 1863(6)
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Antonia M Romero · Tania Jordá · Nicolas Rozès · Show all 5 authors · Sergi Puig

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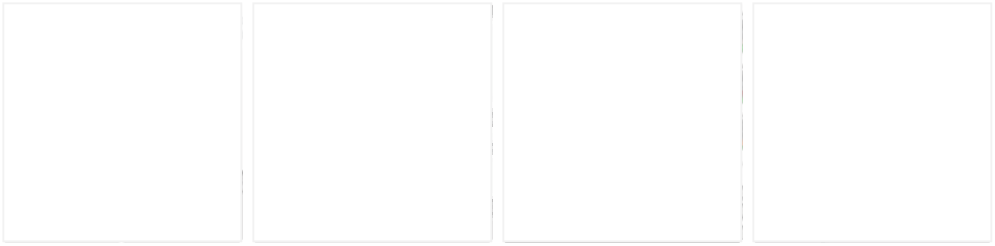

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Article Full-text available Oct 2016 · Biological Chemistry

Stephanie Ballweg · Robert Ernst

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Roberto Covino · Stephanie Ballweg · Claudius Stordeur · [...] · Robert Ernst

Maintaining a fluid bilayer is essential for cell signaling and survival. Lipid saturation is a key factor determining lipid packing and membrane fluidity, and it must be tightly controlled to guarantee organelle function and identity. A dedicated eukaryotic mechanism of lipid saturation sensing,…

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Causes and consequences of nutritional iron deficiency in living organisms

Article Jan 2011

N. Sanvisens · Sergi Puig

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Article Jun 2015 · Food Microbiology

Anna Borrull Riera · Montse Poblet · Nicolas Rozès

During the production of sparkling wine, wine yeasts are subjected to many stress factors apart from ethanol, which lead to the need to achieve their acclimation in line with various industrial protocols. In the present work, 44 commercial wine Saccharomyces cerevisiae strains and one…

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Dissection of the Elements of Osmotic-Stress Response Transcription Factor Hot1 Involved in the Interaction with MAPK Hog1 and in the Activation of Transcription.

Article Aug 2013 · Biochimica et Biophysica Acta (BBA) - Gene Regulatory Mechanisms

Mercè Gomar · Paula Alepuz · Marcel·lí del Olmo

The response to hyperosmotic stress is mediated by the HOG pathway. The MAP kinase Hog1 activates several transcription factors, regulates chromatin-modifying enzymes and, through its interaction with RNA polymerase II, it directs this enzyme to osmotic stress-controlled genes. For…

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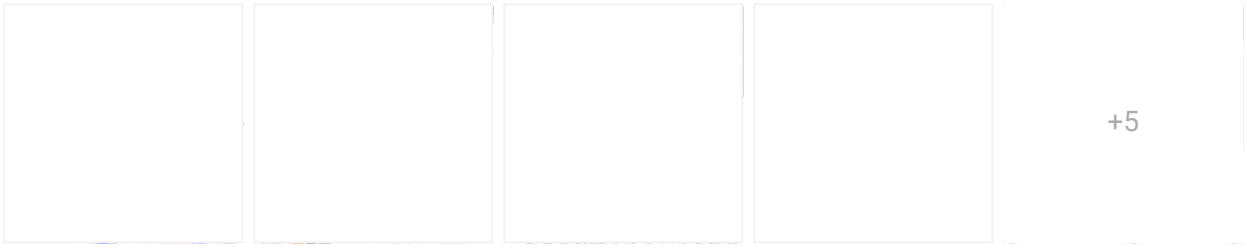

A Lipid E-MAP Identifies Ubx2 as a Critical Regulator of Lipid Saturation and Lipid Bilayer Stress

Article Full-text available Jul 2013 · Molecular Cell

Michal Surma · Christian Klose · Debby Peng · [...] · Robert Ernst

Biological membranes are complex, and the mechanisms underlying their homeostasis are incompletely understood. Here, we present a quantitative genetic interaction map (E-MAP) focused on various aspects of lipid biology, including lipid metabolism, sorting, and trafficking. This E-MAP…

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Article Dec 2011 · Molecular cell

Nerea Sanvisens · María Carmen Bañó · Mingxia Huang · Sergi Puig

Ribonucleotide reductase (RNR) is an essential enzyme required for DNA synthesis and repair. Although iron is necessary for class Ia RNR activity, little is known about the mechanisms that control RNR in response to iron deficiency. In this work, we demonstrate that yeast cells control R…

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Metabolic Response to Iron Deficiency in Saccharomyces cerevisiae

Article Full-text available Mar 2010 · Journal of Biological Chemistry

Minoo Shakoury-Elizeh · Olga Protchenko · Alvin Berger · [...] · Caroline C Philpott

Iron is an essential cofactor for enzymes involved in numerous cellular processes, yet little is known about the impact of iron deficiency on cellular metabolism or iron proteins. Previous studies have focused on changes in transcript and proteins levels in iron-deficient cells, yet these changes may…

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Iron Acquisition and Transcriptional Regulation

Article Sep 2009 · Chemical Reviews

Craig D Kaplan · Jerry Kaplan

The processes involved in iron acquisition, storage, and dispersal in eukaryotes and their regulation at many levels, focusing most on transcriptional control has been reported. Iron is an essential element for all eukaryotes. The facile ability of iron to gain and lose electrons permits its…

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Genome-Wide Fitness and Expression Profiling Implicate Mga2 in Adaptation to Hydrogen Peroxide

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Ryan Kelley · Trey Ideker

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The Cth2 ARE-binding Protein Recruits the Dhh1 Helicase to Promote the Decay of Succinate Dehydrogenase SDH4 mRNA in Response to Iron Deficiency

Article Sep 2008 · Journal of Biological Chemistry

Elisa Pedro-Segura · Sandra Vergara · Susana Rodriguez-Navarro · [...] · Sergi Puig

Iron is an essential nutrient that participates as a redox co-factor in a broad range of cellular processes. In response to iron deficiency, the budding yeast Saccharomyces cerevisiae induces the expression of the Cth1 and Cth2 mRNA-binding proteins to promote a genome-wide remodeling o…

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Additional modules for versatile and economical PCR-based gene deletion and modification in Saccharomyces cerevisiae

Article Full-text available Dec 1998 · Yeast

Mark S. Longtine · Ar McKenzie · Douglas J. Demarini · [...] · John R. Pringle

An important recent advance in the functional analysis of Saccharomyces cerevisiae genes is the development of the one-step PCR-mediated technique for deletion and modification of chromosomal genes. This method allows very rapid gene manipulations without requiring plasmi…

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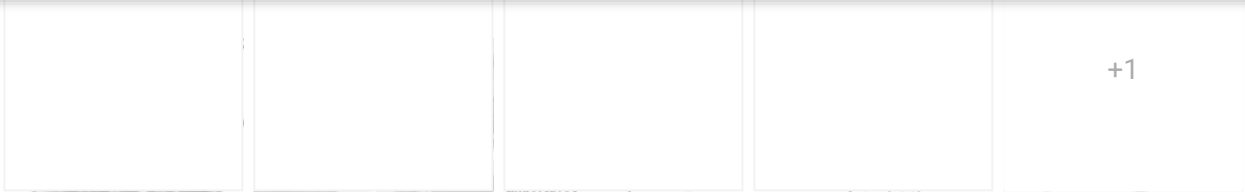

MGA2 or SPT23 Is Required for Transcription of the Δ9 Fatty Acid Desaturase Gene, OLE1, and Nuclear Membrane Integrity in Saccharomyces cerevisiae

Article Full-text available Mar 1999 · Genetics

Shirong Zhang · Yitzchak Skalsky · David J. Garfinkel

MGA2 and SPT23 are functionally and genetically redundant homologs in Saccharomyces cerevisiae. Both genes are implicated in the transcription of a subset of genes, including Ty retrotransposons and Ty-induced mutations. Neither gene is essential for growth, but mga2 spt23…

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Oxygen Sensing in Yeast: Evidence for the Involvement of the Respiratory Chain in Regulating the Transcription of a Subset of Hypoxic Genes

Article Full-text available Jun 1999 · Proceedings of the National Academy of Sciences

Kurt E Kwast · Patricia V. Burke · Brett T Staahl · Robert O. Poyton

Oxygen availability affects the transcription of a number of genes in nearly all organisms. Although the molecular mechanisms for sensing oxygen are not precisely known, heme is thought to play a pivotal role. Here, we address the possibility that oxygen sensing in yeast, as in mammals, involve…

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Activation of a Membrane-Bound Transcription Factor by Regulated Ubiquitin/Proteasome-Dependent Processing

Article Full-text available Oct 2000 · Cell

Thorsten Hoppe · Kai Matuschewski · Michael Rape · [...] · Stefan Jentsch

Processing of integral membrane proteins in order to liberate active proteins is of exquisite cellular

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Identification and characterization of a low oxygen response element involved in the hypoxic induction of a family of Saccharomyces cerevisiae genes. Implications for the conservation of oxygen sensing in eukaryotes

Article May 2001 · Journal of Biological Chemistry

M J Vasconcelles · YD Jiang · K McDaid · [...] · MA Goldberg

An organism's ability to respond to changes in oxygen tension depends in large part on alterations in gene expression. The oxygen sensing and signaling mechanisms in eukaryotic cells are not fully understood. To further define these processes, we have studied the Delta9 fatty acid desaturase…

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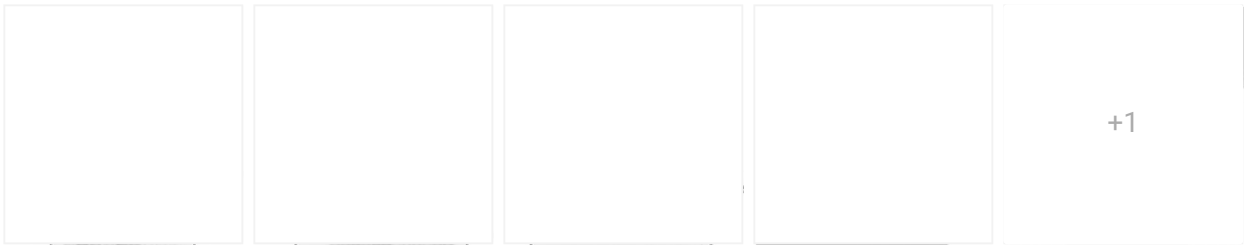

MGA2 Is Involved in the Low-Oxygen Response Element-Dependent Hypoxic Induction of Genes in Saccharomyces cerevisiae

Article Full-text available Oct 2001 · Molecular and Cellular Biology

Y.D. Jiang · Michael J. Vasconcelles · Sharon Wretzel · [...] · Mark A. Goldberg

Eukaryotes have the ability to respond to changes in oxygen tension by alterations in gene expression. For example,OLE1 expression in Saccharomyces cerevisiae is upregulated under hypoxic conditions. Previous studies have suggested that the pathway regulating OLE1expression…

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The Conserved Npl4 Protein Complex Mediates Proteasome-dependent Membrane-bound Transcription Factor Activation

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regulated in this manner are the Saccharomyces cerevisiae proteins Mga2p and Spt23p, which…

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Rape M, Hoppe T, Gorr I, Kalocay M, Richly H and Jentsch SMobilization of processed, membrane-tethered SPT23 transcription factor by CDC48(UFD1/NPL4), a ubiquitin-selective chaperone. Cell 107: 667-677

Article Full-text available Dec 2001 · Cell

Michael Rape · Thorsten Hoppe · Ingo Gorr · [...] · Stefan Jentsch

The OLE pathway of yeast regulates the level of the ER-bound enzyme Delta9-fatty acid desaturase OLE1, thereby controlling membrane fluidity. A central component of this regulon is the transcription factor SPT23, a homolog of mammalian NF-kappaB. SPT23 is synthesized as an inactive, ER…

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Genomic Analyses of Anaerobically Induced Genes in Saccharomyces cerevisiae: Functional Roles of Rox1 and Other Factors in Mediating the Anoxic Response

Article Full-text available Jan 2002 · Journal of Bacteriology

Kurt E Kwast · Liang-Chuan Lai · Nina Menda · [...] · Patricia V Burke

DNA arrays were used to investigate the functional role of Rox1 in mediating acclimatization to anaerobic conditions in Saccharomyces cerevisiae. Multiple growth conditions for wild-type and rox1 null strains were used to identify open reading frames with a statistically robust response to…

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Saccharomyces cerevisiae

Article Apr 2002 · Biochemical and Biophysical Research Communications

Youji Nakagawa · Naoko Sakumoto · Yoshinobu Kaneko · Satoshi Harashima

Various low-temperature-inducible genes such as fatty acid desaturase genes are essential for all living organisms to acclimate to low temperature. However, a low-temperature signal transduction pathway has not been identified in eukaryotes. In yeast Saccharomyces cerevisiae, the Delta9 fatt…

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A microarray-assisted screen for potential Hap1 and Rox1 target genes in Saccharomyces cerevisiae

Article Aug 2002 · Yeast

José J M Ter Linde · H Yde Steensma

Saccharomyces cerevisiae adapts to altered oxygen availability by differentially expressing a number of genes. Under aerobic conditions oxygen control of gene expression is exerted through the activator Hap1 and the repressor Rox1. The Hap1 transcription factor senses cellular heme…

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The Yeast Iron Regulon Is Induced upon Cobalt Stress and Crucial for Cobalt Tolerance

Article Nov 2002 · Journal of Biological Chemistry

Jochen A Stadler · Rudolf J Schweyen

To identify yeast genes involved in cobalt detoxification, we performed RNA expression profiling experiments and followed changes in gene activity upon cobalt stress on a genome-wide scale. We found that cobalt stress specifically results in an immediate and dramatic induction of genes…

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In Saccharomyces cerevisiae, OLE1 encodes a Δ9 fatty acid desaturase, an enzyme that plays a critical role in maintaining the correct ratio of saturated to monounsaturated fatty acids in the cell membrane. Previous studies have demonstrated that (i) OLE1 expression is repressed by…

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Rsp5p Is Required for ER Bound Mga2p120 Polyubiquitination and Release of the Processed/Tethered Transactivator Mga2p90

Article Aug 2003 · Current Biology

Natalia Shcherbik · Teresa Zoladek · Joseph T Nickels · Dale S Haines

A number of eukaryotic transcription factors are held in a latent state by being embedded in, or tethered to, cellular membranes. Mga2p of Saccharomyces cerevisiae is an endoplasmic reticulum (ER)-localized transcription factor that plays an overlapping role with homologous Spt23p in…

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Saccharomyces cerevisiae Glutaredoxin 5-deficient Cells Subjected to Continuous Oxidizing Conditions Are Affected in the Expression of Specific Sets of Genes

Article Full-text available Apr 2004 · Journal of Biological Chemistry

Gemma Bellí · María Micaela Molina · José García-Martínez · [...] · Enrique Herrero

The Saccharomyces cerevisiae GRX5 gene codes for a mitochondrial glutaredoxin involved in the synthesis of iron/sulfur clusters. Its absence prevents respiratory growth and causes the accumulation of iron inside cells and constitutive oxidation of proteins. Null Deltagrx5 mutants w…

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Metalloregulation of yeast membrane steroid receptor homologs

Article Full-text available May 2004 · Proceedings of the National Academy of Sciences

Thomas J Lyons · Nancy Villa · Lisa M Regalla · [...] · David J Eide

Zinc is an essential micronutrient that can also be toxic. An intricate mechanism exists in yeast that maintains cellular zinc within an optimal range. The centerpiece of this mechanism is the Zap1p protein, a transcription factor that senses zinc deficiency and responds by up-regulating genes…

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Cti6 Is an Rpd3-Sin3 Histone Deacetylase-associated Protein Required for Growth under Iron-limiting Conditions in Saccharomyces cerevisiae

Article Aug 2004 · Journal of Biological Chemistry

Sergi Puig · Miranda Lau · Dennis J Thiele

Iron and copper are redox active metals essential for life. In the budding yeast Saccharomyces cerevisiae, expression of iron and copper genes involved in metal acquisition and utilization is tightly regulated at the transcriptional level. In addition iron and copper metabolism are inextricabl…

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Regulation of unsaturated fatty acid biosynthesis in Saccharomyces - The endoplasmic reticulum membrane protein, Mga2p, a transcription activator of the OLE1 gene, regulates the stability of the OLE1 mRNA through exosome-mediated mechanisms

Article Full-text available Sep 2004 · Journal of Biological Chemistry

Pitchaimani Kandasamy · Muralikrishna Vemula · Chan-Seok Oh · [...] · Charles E Martin

The Saccharomyces cerevisiae OLE1 gene encodes a membrane-bound Δ9 fatty-acid desaturase, whose expression is regulated through transcriptional and mRNA stability controls. In wild type cells grown on fatty acid-free medium, OLE1 mRNA has a half-life of 10 ± 1.5 min (basal stability) that…

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Article Aug 2004 · Molecular Cell

José García-Martínez · Agustín Aranda · Jose E Perez-Ortin

Most studies of eukaryotic gene regulation have been done looking at mature mRNA levels. Nevertheless, the steady-state mRNA level is the result of two opposing factors: transcription rate (TR) and mRNA degradation. Both can be important points to regulate gene expression. Here we

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Coordinated Remodeling of Cellular Metabolism during Iron Deficiency through Targeted mRNA Degradation

Article Feb 2005 · Cell

Sergi Puig · Eric J Askeland · Dennis J Thiele

Iron (Fe) is an essential micronutrient for virtually all organisms and serves as a cofactor for a wide variety of vital cellular processes. Although Fe deficiency is the primary nutritional disorder in the world, cellular responses to Fe deprivation are poorly understood. We have discovered a…

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