

GEPHE SUMMARY

LEU2 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~LEU2~#gephebase-summary-title)	Gephebase Gene	GP00000542	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title)	Trait Category		
Xenobiotic resistance (https://www.gephebase.org/search-criteria?/and+Trait=~Xenobiotic+resistance~#gephebase-summary-title)	Trait		
Saccharomyces cerevisiae - S288c strain	Trait State in Taxon A		
Saccharomyces cerevisiae - RM strain	Trait State in Taxon B		
Data not curated	Ancestral State		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Domesticated~#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Saccharomyces cerevisiae (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Saccharomyces+cerevisiae~#gephebase-summary-title)	Latin Name	Saccharomyces cerevisiae (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Saccharomyces+cerevisiae~#gephebase-summary-title)	Latin Name
baker's yeast	Common Name	baker's yeast	Common Name
Saccharomyces capensis; Saccharomyces italicus; Saccharomyces oviformis; Saccharomyces uvarum var. melibiosus; baker's yeast; S. cerevisiae; brewer's yeast; ATCC 18824; ATCC:18824; CBS 1171; CBS:1171; NRRL Y-12632; NRRL:Y:12632; Saccharomyces cerevisiae; Saccharomyce cerevisiae; Saccharomyes cerevisiae; Sccharomyces cerevisiae	Synonyms	Saccharomyces capensis; Saccharomyces italicus; Saccharomyces oviformis; Saccharomyces uvarum var. melibiosus; baker's yeast; S. cerevisiae; brewer's yeast; ATCC 18824; ATCC:18824; CBS 1171; CBS:1171; NRRL Y-12632; NRRL:Y:12632; Saccharomyces cerevisiae; Saccharomyce cerevisiae; Saccharomyes cerevisiae; Sccharomyces cerevisiae	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces	Lineage	cellular organisms; Eukaryota; Opisthokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces	Lineage
Saccharomyces () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4930)	Parent	Saccharomyces () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4930)	Parent
4932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4932)	NCBI Taxonomy ID	4932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4932)	NCBI Taxonomy ID
Yes	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?
Saccharomyces cerevisiae - S288c strain	Taxon A Description	Saccharomyces cerevisiae - RM strain	Taxon B Description

GENOTYPIC CHANGE

LEU2	Generic Gene Name	UniProtKB Saccharomyces cerevisiae (strain ATCC 204508 / S288c) P04173 (http://www.uniprot.org/uniprot/P04173)
YCL018W; YCL18W	Synonyms	GenebankID or UniProtKB X59720 (https://www.ncbi.nlm.nih.gov/nuccore/X59720)
4932.YCL018W (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4932.YCL018W)	String	
Belongs to the isocitrate and isopropylmalate dehydrogenases family.	Sequence Similarities	
GO:0000287 : magnesium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000287)	GO - Molecular Function	
GO:0051287 : NAD binding (https://www.ebi.ac.uk/QuickGO/term/GO:0051287)		
GO:0003862 : 3-isopropylmalate dehydrogenase activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0003862>)

GO - Biological Process

GO:0006097 : glyoxylate cycle (<https://www.ebi.ac.uk/QuickGO/term/GO:0006097>)

GO:0009098 : leucine biosynthetic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009098>)

GO - Cellular Component

GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)

Presumptive Null

Yes ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~Yes))

Molecular Type

Gene Loss ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Gene+Loss))

Aberration Type

Complex Change ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=~Complex+Change))

Molecular Details of the Mutation

Deletion

Experimental Evidence

Linkage Mapping ([#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Linkage+Mapping))

Main Reference

Genetic basis of individual differences in the response to small-molecule drugs in yeast. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17334364>)

Authors

Perlstein EO; Ruderfer DM; Roberts DC; Schreiber SL; Kruglyak L

Abstract

Individual response to small-molecule drugs is variable; a drug that provides a cure for some may confer no therapeutic benefit or trigger an adverse reaction in others. To begin to understand such differences systematically, we treated 104 genotyped segregants from a cross between two yeast strains with a collection of 100 diverse small molecules. We used linkage analysis to identify 124 distinct linkages between genetic markers and response to 83 compounds. The linked markers clustered at eight genomic locations, or quantitative-trait locus 'hotspots', that contain one or more polymorphisms that affect response to multiple small molecules. We also experimentally verified that a deficiency in leucine biosynthesis caused by a deletion of LEU2 underlies sensitivity to niguldipine, which is structurally related to therapeutic calcium channel blockers, and that a natural coding-region polymorphism in the inorganic phosphate transporter PHO84 underlies sensitivity to two polychlorinated phenols that uncouple oxidative phosphorylation. Our results provide a step toward a systematic understanding of small-molecule drug action in genetically distinct individuals.

Additional References

RELATED GEPHE

Related Genes

15 (APJ1, ERG3, ERG5, ERG6, ERG7, PHO84, RAD5, SWS2, TSA2, CIS1, FRM2, GPX2, RTA1, cytochrome b, MKT1) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~4932#/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gpepbase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4932#/and+Trait=Xenobiotic+resistance/and+groupHaplotypes=true#gpepbase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS