GEPHE SUMMARY

Gephebase Gene
LEU2 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^LEU2^#gephebase-summary-title)

GepheID
GP00000542

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Xenobiotic resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance^#gephebase-summary-title)

Trait State in Taxon A
Saccharomyces cerevisiae - S288c strain

Trait State in Taxon B
Saccharomyces cerevisiae - RM strain

Ancestral State
Data not curated

Taxonomic Status
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name
Saccharomyces cerevisiae (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Saccharomyces cerevisiae^#gephebase-summary-title)

Common Name
baker's yeast

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; Saccaromyces cerevisiae; Saccharomyce cerevisiae; Saccharomyes cerevisiae; Sccharomyces cerevisiae

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces

Parent
Saccharomyces () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930)

NCBI Taxonomy ID
4932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4932)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Saccharomyces cerevisiae - S288c strain

Taxon B

Latin Name
Saccharomyces cerevisiae (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Saccharomyces cerevisiae^#gephebase-summary-title)

Common Name
baker's yeast

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; Saccaromyces cerevisiae; Saccharomyce cerevisiae; Saccharomyes cerevisiae; Sccharomyces cerevisiae

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces

Parent
Saccharomyces () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930)

NCBI Taxonomy ID
4932 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4932)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Saccharomyces cerevisiae - RM strain

GENOTYPIC CHANGE

Generic Gene Name
LEU2

Synonyms
YCL018W; YCL18W

String
4932.YCL018W (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 4932.YCL018W)

Sequence Similarities
Belongs to the isocitrate and isopropylmalate dehydrogenases family.

GO - Molecular Function
GO:0000287 : magnesium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000287)
GO:0051287 : NAD binding (https://www.ebi.ac.uk/QuickGO/term/GO:0051287)
GO:0003862 : 3-isopropylmalate dehydrogenase activity

UniProtKB Saccharomyces cerevisiae (strain ATCC 204508 / S288c)
P04173 (http://www.uniprot.org/uniprot/P04173)

GenebankID or UniProtKB
X59720 (https://www.ncbi.nlm.nih.gov/nuccore/X59720)

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Deletion

Experimental Evidence

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

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#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS