

GEPHE SUMMARY

Gephebase Gene
BUL2

Entry Status
Published

GepheID
GP00000166

Main curator
Martin

PHENOTYPIC CHANGE

Trait #1

Trait Category
Physiology

Trait
Telomere length

Trait State in Taxon A
Saccharomyces cerevisiae - lab strain

Trait State in Taxon B
Saccharomyces cerevisiae - vineyard strain

Trait #2

Trait Category
Physiology

Trait
Aging

Trait State in Taxon A
-

Trait State in Taxon B
-

Ancestral State
Data not curated

Taxonomic Status
Domesticated

Taxon A

Latin Name

Saccharomyces cerevisiae

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; Saccharomyces cerevisiae; Saccharomyces cerevisiae; Saccharomyces cerevisiae; Sccharomyces cerevisiae

Rank

species

Lineage

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

Parent

Saccharomyces () - (Rank: genus)

NCBI Taxonomy ID

4932

is Taxon A an Intraspecies?

Yes

Taxon A Description

Saccharomyces cerevisiae - lab strain

Taxon B

Latin Name

Saccharomyces cerevisiae

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; Saccharomyces cerevisiae; Saccharomyces cerevisiae; Saccharomyces cerevisiae; Sccharomyces cerevisiae

Rank

species

Lineage

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

Parent

Saccharomyces () - (Rank: genus)

NCBI Taxonomy ID

4932

is Taxon B an Intraspecies?

Yes

Taxon B Description

Saccharomyces cerevisiae - vineyard strain

GENOTYPIC CHANGE

Generic Gene Name**BUL2**UniProtKB *Saccharomyces cerevisiae* (strain ATCC 204508 / S288c)**Q03758****Synonyms**

YML111W; YM8339.08

GenebankID or UniProtKB**Z49210****String**

4932.YML111W

Sequence Similarities

Belongs to the BUL1 family.

GO - Molecular Function

GO:0034450 : ubiquitin-ubiquitin ligase activity

GO - Biological Process

GO:0006513 : protein monoubiquitination

GO:0000209 : protein polyubiquitination

GO - Cellular Component

GO:0005737 : cytoplasm

GO:0000151 : ubiquitin ligase complex

Presumptive Null**No****Molecular Type****Coding****Aberration Type****SNP****SNP Coding Change****Nonsynonymous****Molecular Details of the Mutation****Leu883Phe****Experimental Evidence****Linkage Mapping**

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Natural polymorphism in BUL2 links cellular amino acid availability with chronological aging and telomere maintenance in yeast. (2011)

Authors

Kwan EX; Foss E; Kruglyak L; Bedalov A

Abstract

Aging and longevity are considered to be highly complex genetic traits. In order to gain insight into aging as a polygenic trait, we employed an outbred *Saccharomyces cerevisiae* model, generated by crossing a vineyard strain RM11 and a laboratory strain S288c, to identify quantitative trait loci that control chronological lifespan. Among the major loci that regulate chronological lifespan in this cross, one genetic linkage was found to be congruent with a previously mapped locus that controls telomere length variation. We found that a single nucleotide polymorphism in BUL2, encoding a component of an ubiquitin ligase complex involved in trafficking of amino acid permeases, controls chronological lifespan and telomere length as well as amino acid uptake. Cellular amino acid availability changes conferred by the BUL2 polymorphism alter telomere length by modulating activity of a transcription factor Gln3. Among the GLN3 transcriptional targets relevant to this phenotype, we identified Wtm1, whose upregulation promotes nuclear retention of ribonucleotide reductase (RNR) components and inhibits the assembly of the RNR enzyme complex during S-phase. Inhibition of RNR is one of the mechanisms by which Gln3 modulates telomere length. Identification of a polymorphism in BUL2 in this outbred yeast population revealed a link among cellular amino acid availability, chronological lifespan, and telomere length control.

Additional References**RELATED GEPHE****Related Genes**

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS**COMMENTS**

