

# GEPHE SUMMARY

|   |                |            |              |
|---|----------------|------------|--------------|
| AEP2 ( <a href="https://www.gephebase.org/search-criteria/?and+Gene">https://www.gephebase.org/search-criteria/?and+Gene</a><br>Gephebase=AEP2">#gephebase-summary-title) | Gephebase Gene | GP00000051 | GepheID      |
|   | Entry Status   | Martin     | Main curator |
| Published   |                |            |              |

## PHENOTYPIC CHANGE

|  | Trait Category         |  |                  |
|--|------------------------|--|------------------|
| Physiology ( <a href="https://www.gephebase.org/search-criteria/?and+Trait">https://www.gephebase.org/search-criteria/?and+Trait</a><br>Category=^Physiology^#gephebase-summary-title)   | Trait                  |  |                  |
| Hybrid Incompatibility (F2 sterility) ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=^Hybrid+Incompatibility+(F2+sterility)^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=^Hybrid+Incompatibility+(F2+sterility)^#gephebase-summary-title</a> )  | Trait State in Taxon A |  |                  |
| Saccharomyces cerevisiae   | Trait State in Taxon B |  |                  |
| Saccharomyces bayanus  | Ancestral State        |  |                  |
| Data not curated   | Taxonomic Status       |  |                  |
| Domesticated ( <a href="https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=^Domesticated^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=^Domesticated^#gephebase-summary-title</a> )   |                        |  |                  |
| Taxon A  |                        | Taxon B  |                  |
| Saccharomyces cerevisiae<br>( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Saccharomyces+cerevisiae^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Saccharomyces+cerevisiae^#gephebase-summary-title</a> )  | Latin Name             | Saccharomyces bayanus<br>( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Saccharomyces+bayanus^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Saccharomyces+bayanus^#gephebase-summary-title</a> )                 | Latin Name       |
| baker's yeast  | Common Name            | -  | Common Name      |
| Synonyms   |                        | 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; Saccharomyces cerevisiae; Sccharomyces cerevisiae |                        | Saccharomyces bayanus var. bayanus; BCRC:21960; CBS 380; CBS:380; CCRC 21960; CCRC:21960; CLIB 181; CLIB:181; DBVPG 6171; DBVPG:6171; DSM 70412; DSM:70412; IFO 11022; IFO 1127; IFO:11022; IFO:1127; IGC 4456; IGC:4456; JCM 7258; JCM:7258; NCYC 2578; NCYC:2578; NRRL Y-12624; NRRL:Y:12624 |                  |
| Rank   |                        | Rank   |                  |
| species  | Lineage                | species  | Lineage          |
| cellular organisms; Eukaryota; Opistokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces  |                        | cellular organisms; Eukaryota; Opistokonta; Fungi; Dikarya; Ascomycota; saccharomyceta; Saccharomycotina; Saccharomycetes; Saccharomycetales; Saccharomycetaceae; Saccharomyces  |                  |
| Parent   |                        | Parent   |                  |
| Saccharomyces () - (Rank: genus)<br>( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930</a> )  | NCBI Taxonomy ID       | Saccharomyces () - (Rank: genus)<br>( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4930</a> )  | NCBI Taxonomy ID |
| 4932<br>( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4932">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4932</a> )  |                        | 4931<br>( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4931">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4931</a> )  |                  |
| is Taxon A an Infraspecies?  |                        | is Taxon B an Infraspecies?  |                  |
| No   |                        | No   |                  |

## GENOTYPIC CHANGE

|   |                         |   |                         |
|---|-------------------------|---|-------------------------|
| AEP2  | Generic Gene Name       | UniProtKB Saccharomyces cerevisiae (strain ATCC 204508 / S288c)<br>P22136 ( <a href="http://www.uniprot.org/uniprot/P22136">http://www.uniprot.org/uniprot/P22136</a> ) | GenebankID or UniProtKB |
| ATP13; YMR282C; YM8021.08C  | Synonyms                | AAA34412 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AAA34412">https://www.ncbi.nlm.nih.gov/nuccore/AAA34412</a> )  |                         |
| 4932.YMR282C<br>( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 4932.YMR282C">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 4932.YMR282C</a> ) | String                  |   |                         |
| Belongs to the AEP2 family.   | Sequence Similarities   |   |                         |
|   | GO - Molecular Function |   |                         |
| GO:0003723 : RNA binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003723">https://www.ebi.ac.uk/QuickGO/term/GO:0003723</a> )  |                         |   |                         |
| GO:0006417 : regulation of translation<br>( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0006417">https://www.ebi.ac.uk/QuickGO/term/GO:0006417</a> )   | GO - Biological Process |   |                         |
| GO:0070124 : mitochondrial translational initiation<br>( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0070124">https://www.ebi.ac.uk/QuickGO/term/GO:0070124</a> )                                      |                         |   |                         |

## GO - Cellular Component

GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%22No%22#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular+Type=%22Coding%22#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%22SNP%22#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

The region between aa 348 and aa 496 plays a critical role. When this region was further dissected in the constructs H-AEP2-bcb and H-AEP2-m3; both failed to restore respiration in the Chromosome 13 line. This result suggests that multiple critical mutations have occurred during the functional diversification of Sc-AEP2 and Sb-AEP2.

Exact causing mutation(s) not determined

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%22Linkage+Mapping%22#gephebase-summary-title>)

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

Main Reference

Incompatibility of nuclear and mitochondrial genomes causes hybrid sterility between two yeast species. (2008) (<https://pubmed.ncbi.nlm.nih.gov/19070577>)

Authors

Lee HY; Chou JY; Cheong L; Chang NH; Yang SY; Leu JY

Abstract

Hybrids between species are usually inviable or sterile. One possible mechanism causing reproductive isolation is incompatibility between genes from different species. These "speciation" genes are interacting components that cannot function properly when mixed with alleles from other species. To test whether such genes exist in two closely related yeast species, we constructed hybrid lines in which one or two chromosomes were derived from *Saccharomyces bayanus*, and the rest were from *Saccharomyces cerevisiae*. We found that the hybrid line with Chromosome 13 substitution was completely sterile and identified Aep2, a mitochondrial protein encoded on Chromosome 13, to cause the sporulation defect as *S. bayanus* AEP2 is incompatible with *S. cerevisiae* mitochondria. This is caused by the inability of *S. bayanus* Aep2 protein to regulate the translation of the *S. cerevisiae* OLI1 mRNA. We speculate that AEP2 and OLI1 have evolved during the adaptation of *S. bayanus* to nonfermentable carbon sources, thereby driving speciation.

Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS