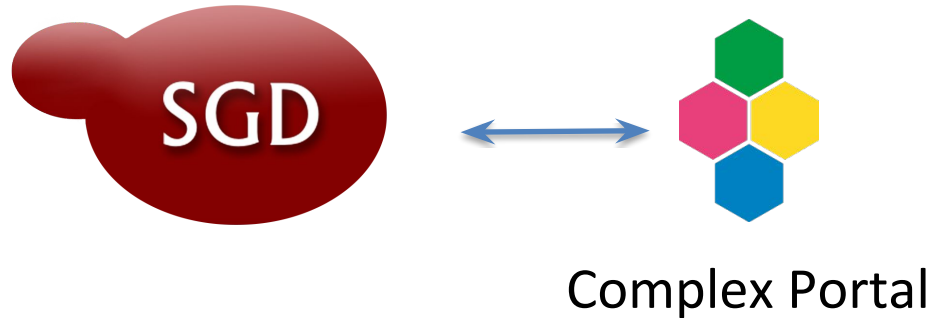


Macromolecular Complex and Chemical Pages

ICYGMB 2019, Gothenburg, Sweden

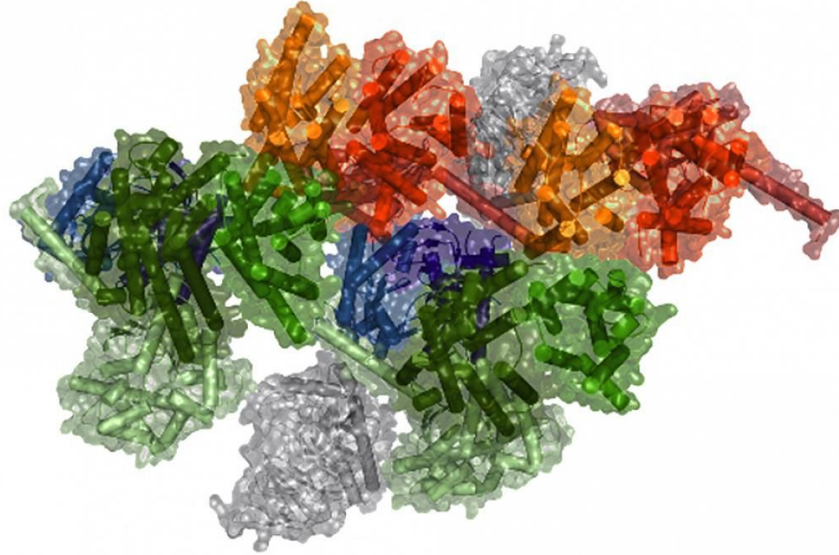
August 2019

Collaboration



Complete complexome of 589 curated complexes

What is a macromolecular complex?



From NIH Image Gallery

Finding curated complexes

SGD *Saccharomyces* GENOME DATABASE

MENU

Categories

References	100,416
Biological Processes	24,861
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181,416 results

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Results 25 Sort By Relevance

Jiang JC, et al. (2019) Dual roles of mitochondrial fusion gene FZO1 in yeast age asymmetry and in longevity mediated by a novel ATG32-dependent retrograde response. *Biogerontology* 20(1):93-107

The replicative lifespan of the yeast *Saccharomyces cerevisiae* models the aging of stem cells. Age asymmetry between the mother and daughter cells is established during each cell

Reference

589 results **Complex**

Page 1 of 24

Results 25 Sort By Relevance

No filters are available for this category.

Complexes

cAMP-dependent protein kinase complex variant 2 **Complex**

Inactive form of the cAMP-dependent protein kinase which assembles when cAMP concentrations are low. Exists as a tetramer composed of two catalytic subunits and two

cAMP-dependent protein kinase complex variant 4 **Complex**

Inactive form of the cAMP-dependent protein kinase which assembles when cAMP

Summary Sequence Protein Gene Ontology Phenotype Interactions Regulation

MAD1 / YGL086W Overview

MAD1 / YGL086W

Locus Overview

Sequence

Protein

Gene Ontology

Complex

Phenotype

Interaction

Regulation

Summary

Standard Name: MAD1¹

Systematic Name: YGL086W

SGD ID: SGD:S000003054

Feature Type: ORF, Verified

Description: Coiled-coil protein involved in spindle-assembly checkpoint Pse1p (aka Kap121p) upon spindle assembly checkpoint activation which leads to inhibition of anaphase promoting complex (APC) activity. APC is a ubiquitin ligase that targets mitotic cyclins for degradation. Dosage imbalance between MAD1 and MAD2 leads to chromosome segregation defects.

Name Description: Mitotic Arrest-Deficient^{1,2}

Comparative Info: Integrated model organism details available at the Alliance

Complex

- Mitotic checkpoint complex, MAD1-MAD2-BUB1-BUB3 subcomplex
- Mitotic spindle assembly checkpoint Mad1-Mad2 complex

Phenotype

Summary: Non-essential gene; null mutant has chromosome instability defect and shows reduced spore germination; in large scale studies null mutant is resistant to caffeine hydroxyurea and MMS, but sensitive to DMSO

https://www.yeastgenome.org/search?q=&is_quick=true

<https://www.yeastgenome.org/locus/S000003054>

Macromolecular complex pages

Complex: Mitotic checkpoint complex, MAD1-MAD2-BUB1-BUB3 subcomplex

Overview

Complex Diagram

Subunits

Gene Ontology

Shared Annotations

References

Complex: Mitotic checkpoint complex, MAD1-MAD2-BUB1-BUB3 subcomplex

Curated by: SGD

ComplexAc: CPX-3212

Systematic Name: MAD1:MAD2:BUB1:BUB3

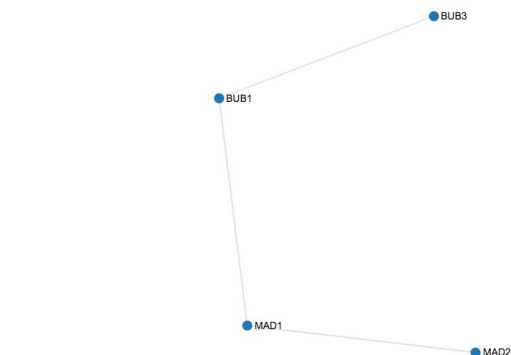
Aliases: Mad2p-Mad1p-Bub1p-Bub3p

This complex forms during mitosis, as a result of the activation of the spindle checkpoint. BUB3 and BUB1 are associated through the cell cycle, however, the addition of MAD1 is cell cycle dependent. The formation of a stable complex requires the functions of MAD2, BUB3, and MPS1. In addition, a highly conserved Arg-Leu-Lys motif at 653-655 of MAD1 is required for the formation of a complete complex.

Complex Diagram

● protein ● small molecule ● subcomplex ● other subunit

SGD 2019-03-18



Maximum Number of Nodes
50 150

Download (.png)

Subunits

Filter table

Subunit	Description	Stoichiometry
BUB1	Protein kinase involved in the cell cycle checkpoint into anaphase	1
BUB3	Kinetochore checkpoint WD40 repeat protein	1
MAD1	Coiled-coil protein involved in spindle-assembly checkpoint	1
MAD2	Component of the spindle-assembly checkpoint complex	1

Gene Ontology

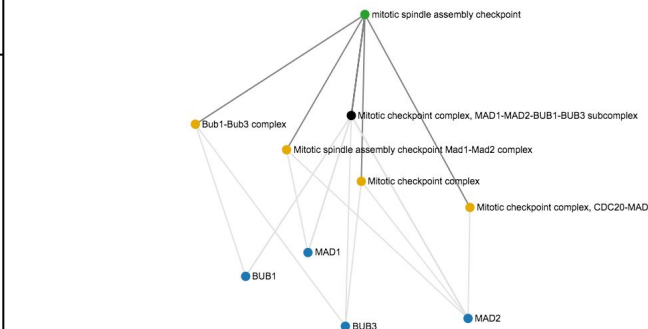
Biological Process: • mitotic spindle assembly checkpoint

Cellular Component: • kinetochore

Shared Annotations

● FOCUS ● GO ● subunit ● complex

SGD 2019-03-18



All GO Terms Subunits

Download (.png)

<https://www.yeastgenome.org/complex/CPX-3212>

Chemical Pages

Previous chemical page

SGD

Saccharomyces
GENOME DATABASE

Analyze ▾ Sequence ▾ Function ▾ Literature ▾ Community ▾

search: actin, kinase, glucose

Chemical: methyl
methanesulfonate

Overview

Phenotype
Annotations

Chemical: methyl methanesulfonate

Chemical Name: methyl methanesulfonate

Chebi ID: CHEBI:25255

Phenotype Annotations 1962 entries for 25 phenotypes

Gene	Phenotype	Experiment Type	Mutant Information	Strain Background	Chemical	Details	Reference
CHK1	apoptosis: decreased	heterozygous diploid	null	S288C	0.001% methyl methanesulfonate	Details: decreased apoptosis in response to MMS treatment	de Clare M and Oliver SG (2013) PMID:23531409
MAD1	apoptosis: decreased	heterozygous diploid	null	S288C	0.001% methyl methanesulfonate	Details: decreased apoptosis in response to MMS treatment	de Clare M and Oliver SG (2013) PMID:23531409

<https://www.yeastgenome.org/chemical/CHEBI:25255>

Expanded chemical pages

Chemical: methyl methanesulfonate

Overview

Phenotype Annotations

Gene Ontology Annotations

Resources

Chemical Name: methyl methanesulfonate

Chebi ID: CHEBI:25255

Definition: A methanesulfonate ester resulting from the formal condensation of methanesulfonic acid with methanol

Synonyms: as-Dimethyl sulfite; CB1540; Methanesulfonic acid methyl ester; Methyl mesylate; methyl methanesulfonate

Phenotype Annotations 1962 entries for 25 phenotypes

Gene Ontology Annotations 2 entries for 1 gene

Gene	Phenotype	Experiment	Mutant	Strain	Chemical	Details	Reference
CHK1	apoptosis decreased						

Filter table

Gene	Qualifier	Gene Ontology Term	Annotation Extension	Evidence	Source	Assigned On	Reference
SGE1		xenobiotic transmembrane transporter activity	has input methyl methanesulfonate	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:1483795
SGE1		transmembrane transport	has input methyl methanesulfonate	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:1483795

Showing 1 to 2 of 2 entries 10 records per page

Download (txt)

Analyze

Resources

RHEA | PubChem

Chemical: magnesium(2+)

Overview

Phenotype Annotations

Gene Ontology Annotations

Complexes

Resources

Chemical Name: magnesium(2+)

Chebi ID: CHEBI:18420

Synonyms: magnesium(2+); magnesium(2+) ion; magnesium cation; magnesium, doubly charged cation; MAGNESIUM ION; magnesium, ion (Mg(2+)); Mg(2+); Mg2+

Phenotype Annotations 10 entries for 3 phenotypes

Complexes 1

Resources

RHEA | PubChem

<https://www.yeastgenome.org/chemical/CHEBI:25255>

<https://www.yeastgenome.org/chemical/CHEBI:18420>

 ALLIANCE
of GENOME RESOURCES
FOUNDING MEMBER

 Saccharomyces
GENOME DATABASE

Phenotype to chemical connection

CHK1 / YBR274W

Phenotype Overview Annotations

CHK1 / YBR274W Phenotype [?]

Phenotype Help [?]

Summary:

Non-essential gene; null mutant shows abnormal cell cycle arrest following DNA damage and greatly increased rate of gross chromosomal rearrangements; null mutation confers sensitivity to selenomethionine, selenite and bleomycin; overexpression leads to slow growth

Annotations [?] 17 entries for 14 phenotypes

Phenotype	Experiment Type	Mutant Information	Strain Background	Chemical	Details	Reference
resistance to chemicals: decreased	classical genetics	null	S288C	4 ug/ml bleomycin		Omidi K, et al. (2014) PMID:24498054
resistance to chemicals: increased	classical genetics	null	S288C	200 ug/ml 4-aminofolic acid		Dornfeld K (2013) PMID:23645753
vacuolar morphology: abnormal	systematic mutation set [?]	null	S288C	0.4 M sodium chloride	Details: small defect in vacuolar fragmentation	Michailat L and Mayer A (2013) PMID:23383298
apoptosis: decreased	heterozygous diploid	null	S288C	0.001% methyl methanesulfonate	Details: decreased apoptosis in response to MMS treatment	de Clare M and Oliver SG (2013) PMID:23531409

<https://www.yeastgenome.org/locus/S000000478/phenotype>

Phenotype: apoptosis: decreased

Observable: apoptosis

Qualifier: decreased

Annotations

Reference: de Clare M and Oliver SG (2013)

Abstract

Phenotype Annotations

Reference: **de Clare M and Oliver SG (2013)** Copy-number variation of cancer-gene orthologs is sufficient to induce cancer-like symptoms in *Saccharomyces cerevisiae*. *BMC Biol* 11:24
Abstract Reference Help [?]

Annotations 40 entries for 34 genes

Gene	Phenotype	Experiment Type	Mutant Information	Strain Background	Chemical	Details	Reference
NUC1	apoptosis: decreased	classical genetics	null	S288C	40 mM acetic acid	Treatment: SC glycerol	Büttner S, et al. (2007) PMID:17244531
MCA1	apoptosis: decreased	classical genetics	null	S288C	30 uM cadmium nitrate	Media: glucose treated	Nargund AM, et al. (2008) PMID:18463984
CYC3	apoptosis: decreased	classical genetics	null	S288C	15 uM gefitinib	Details: gefitinib induced apoptosis is mitochondrial dependent	Wu J, et al. (2011) PMID:21468577
AIF1	apoptosis: decreased	classical genetics	null	S288C	0.4 mM hydrogen peroxide	Details: increased survival rate compared to H2O2 treated wild type cells; similar results after acetic acid treatment	Wissing S, et al. (2004) PMID:15381687

https://www.yeastgenome.org/phenotype/decreased_apoptosis

<https://www.yeastgenome.org/reference/S000153073>

Gene ontology annotations to chemicals

Summary Sequence Protein Gene Ontology Phenotype Interactions Regulation Expression Literature

SGE1 / YPR198W Gene Ontology Gene Ontology Help

Summary: Multidrug transporter of the plasma membrane; also localizes to endoplasmic reticulum

GO Slim Terms: membrane, transmembrane transporter activity, response to chemical

Manually Curated

Date Last Reviewed: 2007-02-05

Biological Process 3 entries for 1 Gene Ontology term

Qualifier	Gene Ontology Term	Annotation Extension	Evidence	Source	Assigned On	Reference
	transmembrane transport	has input crystal violet	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795
	transmembrane transport	has input ethidium bromide	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795
	transmembrane transport	has input methyl methanesulfonate	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795

Showing 1 to 3 of 3 entries 10 records per page

Download [txt]

Molecular Function 3 entries for 1 Gene Ontology term

Qualifier	Gene Ontology Term	Annotation Extension	Evidence	Source	Assigned On	Reference
	xenobiotic transmembrane transporter activity	has input crystal violet	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795
	xenobiotic transmembrane transporter activity	has input ethidium bromide	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795
	xenobiotic transmembrane transporter activity	has input methyl methanesulfonate	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795

Showing 1 to 3 of 3 entries 10 records per page

Gene Ontology Term: xenobiotic transmembrane transporter activity

GO ID: GO:0042910

Aspect: Molecular Function

Description: Enzyme is an

Synonyms: xenom

Reference: **Ehrenhofer-Murray AE, et al. (1998)** The Sge1 protein of *Saccharomyces cerevisiae* is a membrane-associated multidrug transporter. *Yeast* 14(1):49-65

Abstract

In this study, we report the further characterization of the *Saccharomyces cerevisiae* crystal violet-resistance protein Sge1. Sge1 is a highly hydrophobic 59 kDa protein with 14 predicted membrane-

Annotations

Manually Curated 10 entries for 4 genes

Gene	Qualifier	Gene Ontology Term	Annotation Extension	Evidence	Source	Assigned On	Reference
QDR2		xenobiotic transmembrane transporter activity	has input quinidine	IMP	SGD	2019-04-18	Vargas RC, et al. (2004) PMID:15215105
AQR1		xenobiotic transmembrane transporter activity	has input quinidine	IMP	SGD	2019-04-18	Tenreiro S, et al. (2002) PMID:11922628
SGE1		xenobiotic transmembrane transporter activity	has input methyl methanesulfonate	IMP	SGD	2019-04-18	Ehrenhofer-Murray AE, et al. (1998) PMID:9483795
AQR1		xenobiotic transmembrane transporter activity	has input ketoconazole	IMP	SGD	2019-04-18	Tenreiro S, et al. (2002) PMID:11922628

<https://www.yeastgenome.org/locus/S000006402/go>

<https://www.yeastgenome.org/go/GO:0042910>

<https://www.yeastgenome.org/reference/S000040717>

Thank you!

SGD Website

yeastgenome.org

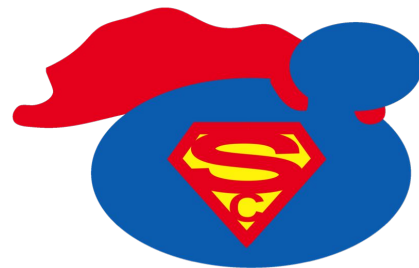
Questions/Comments

sgd-helpdesk@lists.stanford.edu

YouTube Channel

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