Supplemental Table 1

Genes that function in biofilm development				
Gene	Molecular function of gene product[a]	Mutant phenotype[b]	Filamentation	Reference
ACE2	Transcription factor	*ace2*-: severe biofilm defect; aberrant hyphae formation	Aberrant	[118]
ADH1	Alcohol dehydro-genase	*adh1*-: increased biofilm biomass	Normal	[30]
ADH5	Alcohol dehydro-genase	*ADH5*-oe: increased biofilm matrix	Normal	[127]
ALS1	Cell wall protein	*als1- als3*-: severe biofilm defect. *ALS1*-oe: restores defect in *bcr1*- biofilm	Normal	[22, 28]
ALS2	Cell wall protein	*als2+/-*: defect in biofilm formation and hyphae formation. *ALS2*-oe: partially restores *als1- als3*- biofilm defect	Aberrant	[22, 123]
ALS3	Cell wall protein	*als3*-: reduced biofilm formation. *als1- als3-:* severe biofilm defect in vitro. *ALS3*-oe: restores biofilm in *bcr1*- and in *efg1*-	Normal	[22, 28, 71]
ALS4	Cell wall protein	*ALS4*-oe: partially restores defects in *als1- als3*-biofilm	Normal	[22]
ALS5	Cell wall protein	*ALS5*-oe: partially restores defects in *als1- als3*-biofilm	Normal	[22]
ALS7	Cell wall protein	*ALS7*-oe: partially restores defects in *als1- als3*-biofilm	Normal	[22]

ALS9	Cell wall protein	*ALS9*-oe: partially restores defects in *als1- als3*-biofilm	Normal	[22]
BCR1	Transcription factor	*bcr1-:* severe biofilm defect. *BCR1*-oe: partially restores biofilm in *tec1-*	Normal	[27, 28]
CAT2	Carnitine acetyltransferase	*cat2-:* reduced biofilm formation and biofilm thickness	Normal	[131]
CBK1	Protein Kinase	*cbk1-:* severe biofilm defect and defective hyphae formation	Defective	[78]
CDR1	Drug efflux pump	*cdr1-:* inhibited biofilm growth in the presence of azoles	Normal	[89]
CDR2	Drug efflux pump	*cdr2-:* inhibited biofilm growth in the presence of azoles	Normal	[89]
CHK1	Histidine kinase	*chk1-:* forms farnesol-resistant biofilm	Normal	[129]
CPH1	Transcription factor	*cph1- efg1-:* thin biofilm with reduce number of hyphae	Normal	[119]
CSA1	Cell wall protein	*csa1-:* defect in biofilm formation; additive with *pga10-* and *rbt5-*	Normal	[74]
CSH1	Aryl-alcohol dehydro-genase	*CSH1*-oe: decreased biofilm matrix in *zap1-*	Normal	[29]
CZF1	Transcription factor	*czf1-:* defect in biofilm formation. Aberrant hyphae	Aberrant	[120]
EAP1	Cell wall protein	*eap1-:* severe defect in biofilm formation	Normal	[56]

ECE1	Putative trans-membrane protein	*ECE1*-oe: restores defect in *bcr1*-biofilm	Normal	[28]
EFG1	Transcription factor	*efg1-:* severe biofilm defect and hyphae formation	Defective	[14, 121]
FKS1	Beta-1,3 glucan synthase	*fks1/FKS1*: reduced matrix production, reduce biofilm resistance to fluconazole	Normal	[97]
FLO8	Transcription factor	*czf1-:* defect in biofilm formation. Defective hyphae formation	Defective	[122]
GCA1	Gluco-amylase	*GCA1*-oe: increased biofilm matrix	Normal	[29]
GCA2	Gluco-amylase	*GCA2*-oe: increased biofilm matrix	Normal	[29]
GCN4	Transcription factor	*gcn4-:* decreased biofilm biomass	Normal	[90]
GIN4	Protein Kinase	*gin4*-: severe biofilm defect; defective hyphae	Defective	[78]
HWP1	Cell wall protein	*hwp1*-: defect in biofilm formation and hyphal formation. *HWP1*-oe: restores biofilm in *bcr1*-	Defective	[23, 28]
HWP2	Cell wall protein	*hwp2-:* decreased biomass	Defective	[67]
IFD6	Aryl-alcohol dehydro-genase	*IFD6*-oe: decreased biofilm matrix in *zap1*-	Normal	[29]
IRE1	Protein Kinase	*ire1-:* severe biofilm defect and hyphae formation	Defective	[78]
KEM1	Exo-RNAse	*kem1-:* severe medium-dependent defect in biofilm formation	Defective	[132]

		and hyphal formation		
MDR1	Drug efflux pump	*mdr1-:* inhibited biofilm growth in the presence of azoles	Normal	[89]
MDS3	Unknown	*mds3*-: severe medium-dependent defect in biofilm formation and hyphal formation	Defective	[132]
MKC1	MAP Kinase	*mkc1*-: defective biofilm, with reduced filamentation	Normal	[64]
NDH51	Subunit of nicotinamide adenine dinucleotide dehydrogenase complex I	*ndh51-:* decreased biofilm mass	Normal	[133]
NRG1	Transcription factor	*nrg1-:*decreased release of dispersal cells	Aberrant	[99]
NUP85	Nuclear pore protein	*nup85*-: severe medium-dependent defect in biofilm formation and hyphal formation	Defective	[132]
OCH1	Alpha-1,6-mannosyltransferase	*och1*-: defect in biofilm formation. Cellular aggregation, cell wall defects	Normal	[38]
PBR1	Unknown	*pbr1-:* forms a thin biofilm with reduced matrix production	Normal	[68]
PES1	Pescadillo homolog	*pes1-:* reduced cell dispersion *PES1-oe:* increased cell dispersion	Normal	[98]
PDX1	Pyruvate dehydrogenase	*pdx1-:* biofilm with reduced density	Normal	[133]

PGA1	Cell wall protein	*pga1-:* reduced metabolic activity	Normal	[124]
PGA10	Cell wall protein	*pga10-*: defect in biofilm formation; additive with *rbt5-* and *csa1-*	Aberrant	[74]
PMT1	Mannosyltransferase	*pmt1-*: biofilm with reduced biomass. Defective hyphae	Defective	[125]
PMT2	mannosyltransferase	*pmt2-/+*: biofilm with reduced biomass. Defective hyphae	Defective	[125]
PMT4	Mannosyltransferase	*pmt4-*: moderate defect in biofilm formation	Normal	[125]
PMT6	Mannosyltransferase	*pmt6-*: moderate defect in biofilm formation	Normal	[125]
RBT1	Cell wall protein	*rbt1-:* reduced biomass	Normal	[67]
RBT5	Cell wall protein	*rbt5-:* defect in biofilm formation; additive with *pga10-* and *csa1- RBT5*-oe: restores biofilm in *bcr1-*	Normal	[28, 74]
RIX7	AAA ATPase	*rix7+/-:* defect in biofilm formation	Normal	[134]
SUN41	Cell wall protein	*sun41-:* severe biofilm defect; aberrant hyphae	Aberrant	[75]
SUV3	Mito-chondrial RNA helicase	*suv3-:* severe medium-dependent defect in biofilm formation and hyphae formation	Defective	[132]
TEC1	Transcription factor	*tec1-:* severe biofilm defect and hyphae formation	Defective	[27]
TOR1	Phosphatidylinositol kinases	Rapamycin treatment inhibits *TOR1* resulting in decreased	Defective	[130]

		adhesion of cells and loss of filamentation		
UME6	Transcription factor	*ume6-:* reduced biomass biofilm and defective hyphae formation. Increased cell release from biofilm.	Defective	[98]
VAM3	Vacuolar trafficking	*vam3*-: biofilm defect, fragile biofilm, reduced biomass and abnormal hyphae	Aberrant	[135]
VPS1	Dynamin-family GTPase-related protein	*vps1-:* rudimentary biofilm composed primarily of yeast and pseudohyphal	Aberrant	[136]
YAK1	Protein Kinase	*yak1-:* severe biofilm defect and hyphal formation	Defective	[128]
YWP1	Cell wall protein	*ywp1*-: increased adhesion. Biofilm formation by only yeast-form cells	Normal	[126]
ZAP1	Transcription factor	*zap1-:* increased production of biofilm matrix	Normal	[29]
Footnotes:				
a. Molecular functions have been inferred from protein sequence homology in most cases.				
b. Mutant phenotype was observed with either homozygous loss-of-function alleles (e.g., *als1*- refers to an *als1/als1* homozygous mutant) or over-expression alleles (e.g., *ALS1*-oe refers to a strain in which one *ALS1* allele has been fused to a strong promoter). The strains which have -/+ after the gene indicate a heterozygous genotype. The "*als2*+/- " is a heterozygous strain which has reduced but not abolished *ALS2* expression. Negative results (absence of a phenotype) are omitted.				
c. The ability to filament was record as "Normal" for those mutants able to form hyphae, "Defective" for those unable to form hyphae, or "Aberrant" for those with an intermediate phenotype.				