Table 1-Forward Genetic Screening

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| Screening result from Dr. Madhani’s deletion set: | |
| Non-Hyphal | |
| CNAG\_00032 | 2,4-dihydroxyhept-2-ene-1,7-dioic acid aldolase |
| CNAG\_00035 | hypothetical protein |
| CNAG\_00039 | hypothetical protein |
| CNAG\_00045 | hypothetical protein |
| CNAG\_00156 | zinc finger transcription factor (SP1) |
| CNAG\_00171 | peroxin-2 |
| CNAG\_00187 | ubiquitin carboxyl-terminal hydrolase (UBP16) |
| CNAG\_00289 | hypothetical protein |
| CNAG\_00328 | DNA excision repair protein ERCC-5 |
| CNAG\_00333 | hypothetical protein |
| CNAG\_00399 | transformer-2-beta isoform 3 |
| CNAG\_00413 | putative oxidoreductase (OFD1) |
| CNAG\_00414 | hypothetical protein |
| CNAG\_00422 | hypothetical protein |
| CNAG\_00456 | hypothetical protein |
| CNAG\_00498 | cell division cycle protein 14 |
| CNAG\_00662 | carboxymethylenebutenolidase |
| CNAG\_00698 | hypothetical protein |
| CNAG\_00745 | serine/threonine-protein kinase (HRK1) |
| CNAG\_01043 | hypothetical protein |
| CNAG\_01230 | chitin-deacetylase (MP98) |
| CNAG\_01243 | histone-lysine N-methyltransferase (SET101) |
| CNAG\_01417 | hypothetical protein |
| CNAG\_01452 | mat3 pheromone repeat protein (MAT3) |
| CNAG\_01610 | hypothetical protein |
| CNAG\_01718 | hypothetical protein |
| CNAG\_01745 | glycerol-3-phosphate dehydrogenase (NAD(+)) |
| CNAG\_01930 | endopeptidase |
| CNAG\_01969 | zinc metalloprotease |
| CNAG\_01970 | hypothetical protein |
| CNAG\_02007 | adenylate kinase 1 |
| CNAG\_02046 | poly(A)-binding protein binding protein |
| CNAG\_02083 | siderochrome-iron transporter (SIT2) |
| CNAG\_02141 | hypothetical protein |
| CNAG\_02181 | dihydrokaempferol 4-reductase |
| CNAG\_02221 | zinc ion transporter (ZIP3) |
| CNAG\_02223 | signal sequence binding protein |
| CNAG\_02473 | endoplasmic reticulum protein |
| CNAG\_02551 | dihydroxyacetone kinase 1 |
| CNAG\_02674 | hypothetical protein |
| CNAG\_02703 | hypothetical protein |
| CNAG\_02730 | sorting nexin-41 |
| CNAG\_02736 | T-complex protein 1 subunit theta |
| CNAG\_02776 | hypothetical protein |
| CNAG\_03019 | long-chain acyl-CoA synthetase |
| CNAG\_03079 | ER protein for association of GPI-anchored proteins with lipid rafts (PER1) |
| CNAG\_03080 | fatty acid elongase |
| CNAG\_03090 | hypothetical protein |
| CNAG\_03139 | phosphatidylethanolamine N-methyltransferase (CHO2) |
| CNAG\_03313 | hypothetical protein |
| CNAG\_03316 | rho gdp-dissociation inhibitor (RDI1) |
| CNAG\_03365 | hypothetical protein |
| CNAG\_03406 | putative compass/set1c complex subunit (SPP101) |
| CNAG\_03451 | hypothetical protein |
| CNAG\_03452 | AFG1 family mitochondrial ATPase |
| CNAG\_03590 | casein kinase II beta chain (CKB1) |
| CNAG\_03664 | putative nickel transporter (NIC1) |
| CNAG\_03928 | adaptor protein complex AP-1 |
| CNAG\_04152 | protein phosphatase methylesterase 1 |
| CNAG\_04224 | carboxy-terminal domain RNA polymerase II polypeptide A small phosphatase |
| CNAG\_04373 | alginate lyase |
| CNAG\_04408 | choline kinase |
| CNAG\_04760 | cytoplasmic protein |
| CNAG\_04804 | sterol regulatory element-binding protein (SRE1) |
| CNAG\_04808 | XPG N-terminal domain-containing protein |
| CNAG\_04842 | hypothetical protein |
| CNAG\_04848 | mRNA binding protein |
| CNAG\_05216 | CAMK protein kinase |
| CNAG\_05253 | hypothetical protein |
| CNAG\_05423 | SET domain-containing protein |
| CNAG\_05533 | hypothetical protein |
| CNAG\_05550 | hypothetical protein |
| CNAG\_05667 | myo-inositol transporter (ITR3B) |
| CNAG\_05675 | trimethyllysine dioxygenase |
| CNAG\_05691 | hypothetical protein |
| CNAG\_05715 | charged multivesicular body protein 5 |
| CNAG\_05744 | 2-dehydropantoate 2-reductase |
| CNAG\_05872 | endopeptidase |
| CNAG\_05914 | MFS transporter, SP family, general alpha glucoside:H+ symporter |
| CNAG\_06144 | cytoplasmic protein |
| CNAG\_06193 | protein kinase (CRK1) |
| CNAG\_06371 | guanine deaminase |
| CNAG\_06383 | cytoplasmic protein |
| CNAG\_06552 | CAMK/CAMKL/AMPK protein kinase (SNF1-related kinase complex anchoring protein SIP1?) |
| CNAG\_06568 | RAN protein kinase |
| CNAG\_06716 | hypothetical protein |
| CNAG\_06863 | hypothetical protein |
| CNAG\_06904 | hypothetical protein |
| CNAG\_06925 | arsenical-resistance protein |
| CNAG\_06968 | hypothetical protein |
| CNAG\_07005 | armadillo/beta-catenin repeat protein; encoded on mat locus (BSP2) |
| CNAG\_07311 | Set1/Ash2 histone methyltransferase complex subunit (BRE2) |
| CNAG\_07329 | hypothetical protein |
| CNAG\_07380 | hypothetical protein |
| CNAG\_07410 | cid1-family polyA polymerase (CID1alpha) |
| CNAG\_07567 | hypothetical protein |
| CNAG\_07633 | hypothetical protein |
| CNAG\_07670 | hypothetical protein |
| CNAG\_00467 | hypothetical protein |
| CNAG\_00564 | hypothetical protein |
| CNAG\_01322 | hypothetical protein |
| CNAG\_01643 | hypothetical protein |
| CNAG\_02435 | white-collar transcription factor, blue-light photoresponsive gene (BWC2) |
| CNAG\_03322 | UDP-glucuronic acid decarboxylase (UXS1) |
| CNAG\_04514 | mitogen-activated protein kinase (MPK1) |
| CNAG\_06648 | mRNA polymerase-associated protein (RTF1) |
| CNAG\_07636 | putative chitin synthase regulator (CSR2) |
| CNAG\_06401 | hypothetical protein |
| CNAG\_00736 | exocyst protein |
| Decreased |  |
| CNAG\_00053 | hypothetical protein |
| CNAG\_00054 | hypothetical protein |
| CNAG\_00149 | NADH dehydrogenase (ubiquinone) 1 alpha subcomplex 4 |
| CNAG\_00177 | hypothetical protein |
| CNAG\_00280 | complement component 1 Q subcomponent-binding protein, mitochondrial |
| CNAG\_00287 | cytoplasmic protein |
| CNAG\_00358 | tRNA dimethylallyltransferase |
| CNAG\_00374 | hypothetical protein |
| CNAG\_00394 | diphthamide biosynthesis protein 3 |
| CNAG\_00490 | acetyl-CoA acyltransferase |
| CNAG\_00540 | pantothenate transporter |
| CNAG\_00568 | hypothetical protein |
| CNAG\_00637 | cystathionine beta-synthase |
| CNAG\_00679 | hypothetical protein |
| CNAG\_00744 | alpha 1,6-mannosyltransferase (OCH1) |
| CNAG\_00889 | hypothetical protein |
| CNAG\_00995 | hypothetical protein |
| CNAG\_01084 | ubiquitin conjugating enzyme (UBC4) |
| CNAG\_01154 | hypothetical protein |
| CNAG\_01239 | chitin deacetylase (CDA3) |
| CNAG\_01350 | putative ubiquitin ligase (RMD5) |
| CNAG\_01717 | cell differentiation protein rcd1 |
| CNAG\_01815 | hypothetical protein |
| CNAG\_01856 | hypothetical protein |
| CNAG\_02102 | hypothetical protein |
| CNAG\_02103 | hypothetical protein |
| CNAG\_02147 | cytochrome c peroxidase |
| CNAG\_02167 | vacuolar protein sorting-associated protein 27 |
| CNAG\_02284 | 2-oxoisovalerate dehydrogenase E1 component, alpha subunit |
| CNAG\_02285 | nucleoside diphosphate kinase |
| CNAG\_02371 | coiled-coil domain-containing protein 130 |
| CNAG\_02553 | short-chain dehydrogenase |
| CNAG\_02554 | sugar transporter |
| CNAG\_02673 | NAD dependent epimerase/dehydratase |
| CNAG\_02735 | hypothetical protein |
| CNAG\_02800 | hypothetical protein |
| CNAG\_02819 | vacuolar membrane protein |
| CNAG\_03048 | gluconokinase |
| CNAG\_03125 | hypothetical protein |
| CNAG\_03155 | ENTH domain-containing protein |
| CNAG\_03404 | hypothetical protein |
| CNAG\_03405 | hypothetical protein |
| CNAG\_03517 | NADH dehydrogenase |
| CNAG\_03722 | RAN protein binding protein |
| CNAG\_03743 | glutamine amidotransferase |
| CNAG\_03827 | hypothetical protein |
| CNAG\_03977 | hypothetical protein |
| CNAG\_04064 | hypothetical protein |
| CNAG\_04068 | large subunit ribosomal protein L28e |
| CNAG\_04237 | hypothetical protein |
| CNAG\_04285 | hypothetical protein |
| CNAG\_04570 | hypothetical protein |
| CNAG\_04627 | COP9 signalosome complex subunit 12 |
| CNAG\_04650 | actin-like protein ARP6 |
| CNAG\_04772 | hypothetical protein |
| CNAG\_04825 | hypothetical protein |
| CNAG\_04904 | clathrin heavy chain |
| CNAG\_04945 | hypothetical protein |
| CNAG\_05192 | hypothetical protein |
| CNAG\_05236 | hypothetical protein |
| CNAG\_05308 | beta-catenin-like protein 1 |
| CNAG\_05397 | hypothetical protein |
| CNAG\_05422 | virulence related protein of unknown function (LIV11) |
| CNAG\_05570 | hypothetical protein |
| CNAG\_05662 | myo-inositol transporter (ITR4) |
| CNAG\_05745 | cytoplasmic protein |
| CNAG\_05838 | rho GTPase activating protein (GAP) homolog (RGD1) |
| CNAG\_05892 | phosphoglycerate mutase |
| CNAG\_06099 | hypothetical protein |
| CNAG\_06141 | dUTP pyrophosphatase |
| CNAG\_06294 | hypothetical protein |
| CNAG\_06440 | DNA dependent ATPase |
| CNAG\_06485 | hexose transporter protein |
| CNAG\_06583 | hypothetical protein |
| CNAG\_06649 | haloacid dehalogenase, type II |
| CNAG\_06656 | diphthine synthase |
| CNAG\_06777 | fructosyl amino acid oxidase |
| CNAG\_07335 | cystinosin |
| CNAG\_07479 | hypothetical protein |
| CNAG\_07566 | hypothetical protein |
| CNAG\_07608 | hypothetical protein |
| CNAG\_07609 | ATP-dependent RNA helicase DDX51/DBP6 |
| CNAG\_07677 | hypothetical protein |
| CNAG\_07866 | transcription initiation factor TFIIA small subunit |
| CNAG\_07903 | rho guanine nucleotide exchange factor (ROM20) |
| Increased |
| CNAG\_00125 | regulator of G-protein signaling (CRG1) |
| CNAG\_00404 | RING zinc finger protein |
| CNAG\_00405 | ste/ste20/ysk protein kinase (KIC1) |
| CNAG\_00436 | palmitoyltransferase AKR1 |
| CNAG\_00484 | 2-oxoisovalerate dehydrogenase E2 component (dihydrolipoyl transacylase) |
| CNAG\_00600 | capsule-associated protein (CAP60) |
| CNAG\_00890 | hypothetical protein |
| CNAG\_01126 | guanine nucleotide exchange protein for ADP-robosylation factor |
| CNAG\_01523 | mitogen-activated protein kinase (HOG1) |
| CNAG\_01688 | ATP-dependent metalloprotease |
| CNAG\_02090 | heterotrimeric G-protein coupled receptor alpha subunit (GPA3) |
| CNAG\_02270 | homoserine O-acetyltransferase (MET2) |
| CNAG\_02702 | putative voltage-gated chloride channel (CLC1) |
| CNAG\_02830 | C-24(28) sterol reductase (ERG4) |
| CNAG\_02883 | ras-like gtp-binding protein (RAC1) |
| CNAG\_02885 | capsule-associated protein (CAP64) |
| CNAG\_03324 | hypothetical protein |
| CNAG\_03385 | cyclin (PCL103) |
| CNAG\_03449 | DNA repair protein |
| CNAG\_03858 | hypothetical protein |
| CNAG\_04649 | peptide alpha-N-acetyltransferase |
| CNAG\_05147 | hypothetical protein |
| CNAG\_05583 | ceramide glucosyltransferase (GCS1) |
| CNAG\_05695 | glucosamine 6-phosphate N-acetyltransferase |
| CNAG\_05842 | cytochrome P450 |
| CNAG\_06298 | hypothetical protein |
| CNAG\_06469 | aminophospholipid translocase(flippase) (APT1) |
| CNAG\_07320 | hypothetical protein |
| CNAG\_07401 | hypothetical protein |
| CNAG\_07415 | hypothetical protein |
| CNAG\_07699 | zinc finger family protein |
| CNAG\_00266 | hypothetical protein |
| CNAG\_00293 | G-protein signaling GTPase (RAS1) |
| CNAG\_00391 | hypothetical protein |
| CNAG\_00495 | hypothetical protein |
| CNAG\_00772 | putative UV excision repair protein (RAD23) |
| CNAG\_00773 | hypothetical protein |
| CNAG\_01005 | glutaredoxin |
| CNAG\_01029 | impact family protein |
| CNAG\_01324 | hypothetical protein |
| CNAG\_01401 | hypothetical protein |
| CNAG\_01418 | hypothetical protein |
| CNAG\_01489 | maltose O-acetyltransferase (CAS9) |
| CNAG\_01525 | hypothetical protein |
| CNAG\_01723 | hypothetical protein |
| CNAG\_01735 | hypothetical protein |
| CNAG\_01816 | hypothetical protein |
| CNAG\_02148 | ubiquitin-conjugating enzyme E2 35 |
| CNAG\_02224 | hypothetical protein |
| CNAG\_02349 | hypothetical protein |
| CNAG\_02771 | DNA repair and recombination protein RAD54B |
| CNAG\_02845 | hypothetical protein |
| CNAG\_03039 | DNA damage-inducible protein 1 |
| CNAG\_03203 | DNA polymerase epsilon p12 subunit |
| CNAG\_03206 | endonuclease III |
| CNAG\_03403 | mitochondrial protein |
| CNAG\_03500 | osmosensor |
| CNAG\_03741 | hypothetical protein |
| CNAG\_04238 | peroxisomal 2,4-dienoyl-CoA reductase |
| CNAG\_04272 | CAMK/CAMK1 protein kinase |
| CNAG\_04417 | alpha-ketoglutarate-dependent 2,4-dichlorophenoxyacetate dioxygenase |
| CNAG\_04450 | chromodomain-helicase-DNA-binding protein 1 |
| CNAG\_04576 | hypothetical protein |
| CNAG\_04639 | hypothetical protein |
| CNAG\_04955 | oxidoreductase |
| CNAG\_04956 | high-affinity nicotinic acid transporter |
| CNAG\_05003 | hypothetical protein |
| CNAG\_05134 | ornithine-oxo-acid transaminase |
| CNAG\_05377 | myo-inositol transporter (ITR3) |
| CNAG\_05402 | protein CMS1 |
| CNAG\_05508 | hypothetical protein |
| CNAG\_05724 | hypothetical protein |
| CNAG\_05913 | alpha-glucosidase |
| CNAG\_06145 | hypothetical protein |
| CNAG\_06295 | cytoplasmic protein |
| CNAG\_06313 | phosphoglucomutase |
| CNAG\_06332 | hypothetical protein |
| CNAG\_06402 | 26S proteasome complex subunit DSS1 |
| CNAG\_06403 | hypothetical protein |
| CNAG\_06484 | hypothetical protein |
| CNAG\_06772 | nucleoporin SEH1 |
| CNAG\_07319 | hypothetical protein |
| CNAG\_07523 | hypothetical protein |
| Hyperfilamentation |
| CNAG\_00003 | drug transporter |
| CNAG\_00531 | p-type ATPase sodium pump (ENA1) |
| CNAG\_01850 | two-component-like sensor kinase (TCO1) |
| CNAG\_01855 | hypothetical protein |
| CNAG\_01891 | RAD57 protein |
| CNAG\_02179 | hemolysin |
| CNAG\_02393 | hypothetical protein |
| CNAG\_02676 | hypothetical protein |
| CNAG\_02930 | virulence related protein of unknown function (LIV10) |
| CNAG\_03234 | cell wall surface anchor protein |
| CNAG\_03504 | hypothetical protein |
| CNAG\_04565 | hypothetical protein |
| CNAG\_05176 | hypothetical protein |
| CNAG\_05195 | ubiquitin-conjugation factor E4 B |
| CNAG\_05420 | RNA polymerase II transcription factor |
| CNAG\_05940 | hypothetical protein |
| CNAG\_06555 | aromatic amino acid aminotransferase I |
| CNAG\_06680 | COP9 signalosome complex subunit 6 |
| CNAG\_06698 | phosphatase |
| CNAG\_06401 | hypothetical protein |
| CNAG\_00736 | exocyst protein |
| Growth defect |
| CNAG\_00051 | putative set3c deacetylase complex subunit (SNT1) |
| CNAG\_01360 | pumilio domain-containing protein c |
| CNAG\_02122 | cytoplasmic tRNA 2-thiolation protein 1 |
| CNAG\_02795 | phosphoribosylglycinamide formyltransferase |
| CNAG\_02891 | endoplasmic reticulum protein |
| CNAG\_03431 | nuclear protein |
| CNAG\_03482 | thiol peroxidase (TSA1) |
| CNAG\_03940 | elongator complex protein 2 |
| CNAG\_03965 | ribosome recycling factor |
| CNAG\_04186 | hypothetical protein |
| CNAG\_04570 | hypothetical protein |
| CNAG\_04992 | hypothetical protein |
| CNAG\_06191 | hypothetical protein |
| CNAG\_06383 | cytoplasmic protein |
| CNAG\_06761 | siderophore-iron transporter Str1 |
| CNAG\_07311 | Set1/Ash2 histone methyltransferase complex subunit (BRE2) |
| CNAG\_07317 | hypothetical protein |
| CNAG\_07373 | carbamoyl-phosphate synthase, large subunit |
| Screening result from Dr. Bahn’s TFs deletion set | |
| Non-Hyphal | |
| CNAG\_00156 | SP1 |
| CNAG\_00559 | BZP3 |
| CNAG\_03366 | ZNF2 |
| CNAG\_05019 | HOB6 |
| CNAG\_07059 | FAP1 |
| CNAG\_03561 | FZC33 |
| CNAG\_04263 | BZP2 |
| Decreased |
| CNAG\_04583 | DDT1 |
| Increased |
| CNAG\_00514 | GAT6-ALSO YSB1385 |
| CNAG\_04353 | CLR1 |
| CNAG\_04586 | HOB7 |
| CNAG\_04908 | CLR4 |
| Hyperfilamentation |
| CNAG\_02566 | FKH2 |
| CNAG\_07924 | MCM1 |
| Growth defect |
| CNAG\_04804 | SRE1 |
| CNAG\_01431 | HOB1 |
| CNAG\_01626 | ADA2 |
| CNAG\_06188 | FZC15 |